

FCC Radio Test Report

FCC ID: TE7HS105V4

This report concerns: Original Grant

Project No.	: 2005C132
Equipment	: Kasa Smart Wi-Fi Plug Mini
Brand Name	: tp-link
Test Model	: HS105
Series Model	: HS103
Applicant	: TP-Link Technologies Co., Ltd.
Address	: Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and
	Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Manufacturer	: TP-Link Technologies Co., Ltd.
Address	: Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and
	Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Date of Receipt	: May 21, 2020
Date of Test	: May 22, 2020 ~ May 28, 2020
Issued Date	: Jun. 03, 2020
Report Version	: R00
Test Sample	: Engineering Sample No.: DG20200521251 for conducted,
	DG20200521252 for radiated.
Standard(s)	: FCC Part15, Subpart C (15.247)
	ANSI C63.10-2013
	FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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

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han 1

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Limitation

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



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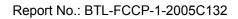




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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jun. 03, 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 Average Output Power	APPENDIX F	PASS					
15.247(d)	Conducted Spurious Emissions	APPENDIX G	PASS					
15.247(e)	Power Spectral Density	APPENDIX H	PASS					
15.203	Antenna Requirement		PASS	Note(2)				

Note:

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



1.1 TEST FACILITY

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

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)) The BTL measurement uncertainty as below table:

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.60

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	I	4.58
		6GHz ~ 18GHz	I	5.18
		18GHz ~ 26.5GHz	-	3.62
		26.5GHz ~ 40GHz	-	4.00

C. Other Measurement:

Parameter	Uncertainty
Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Conducted Spurious Emission	±2.71 dB
Power Spectral Density	±0.86 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

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	55%	AC 120V/60Hz	Sheldon Ou
Radiated Emissions-9K-30MHz	25°C	60%	AC 120V/60Hz	Sheldon Ou
Radiated Emissions-30 MHz to 1GHz	22°C	54%	AC 120V/60Hz	Sheldon Ou
Radiated Emissions-Above 1000 MHz	24°C	60%	AC 120V/60Hz	Sheldon Ou
Bandwidth	25°C	62%	DC 5V	Hayden Chen
Maximum Average Output Power	25°C	62%	DC 5V	Laughing Zhang
Conducted Spurious Emissions	25°C	62%	DC 5V	Hayden Chen
Power Spectral Density	25°C	62%	DC 5V	Hayden Chen

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Kasa Smart Wi-Fi Plug Mini
Brand Name	tp-link
Test Model	HS105
Series Model	HS103
Model Difference(s)	Only differ in model name and the button panel color.
Power Source	AC Mains.
Power Rating	AC 100-240V~ 50/60Hz
Operation Frequency	2412 MHz ~ 2462 MHz
Modulation Type	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 72.2 Mbps
Maximum Average Output Power	IEEE 802.11b: 19.92 dBm (0.0982 W) IEEE 802.11g: 19.71 dBm (0.0935 W) IEEE 802.11n (HT20): 19.72 dBm (0.0938 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)								
ChannelFrequency (MHz)ChannelFrequency (MHz)Frequency (MHz)Frequency (MHz)Frequency (MHz)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)
1	TP-LINK °	N/A	IFA	N/A	2.27

2.2 DESCRIPTION OF TEST MODES

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

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

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

AC power line conducted emissions test	
Final Test Mode	Description
Mode 4	TX B Mode Channel 06

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

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

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



NOTE:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) All the bit rate of transmitter have been tested and found the lowest rate is found to be the worst case and recorded.
- (3) For radiated emission below 1 GHz test, the IEEE 802.11b Channel 06 is found to be the worst case and recorded.
- (4) For radiated emission above 1 GHz test, 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

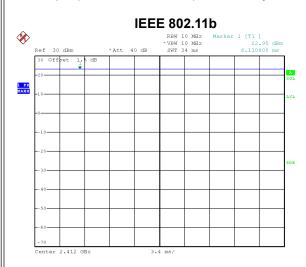
2.3 PARAMETERS OF TEST SOFTWARE

Test Software		QATool_Dbg V.0.3.0.8	
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	21	22	24
IEEE 802.11g	1E	25	25
IEEE 802.11n (HT20)	22	27	27



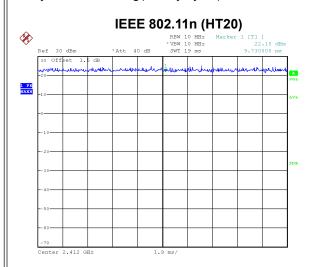
2.4 DUTY CYCLE

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: 23.MAY.2020 19:56:06

Duty cycle = 34.000 ms / 34.000 ms = 100% Duty Factor = 10 log(1/Duty cycle) = 0.00



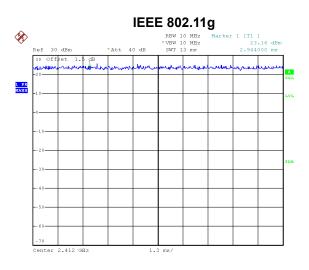
Date: 23.MAY.2020 19:57:53

Duty cycle = 19.000 ms / 19.000 ms = 100% Duty Factor = 10 log(1/Duty cycle) = 0.00

NOTE:

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

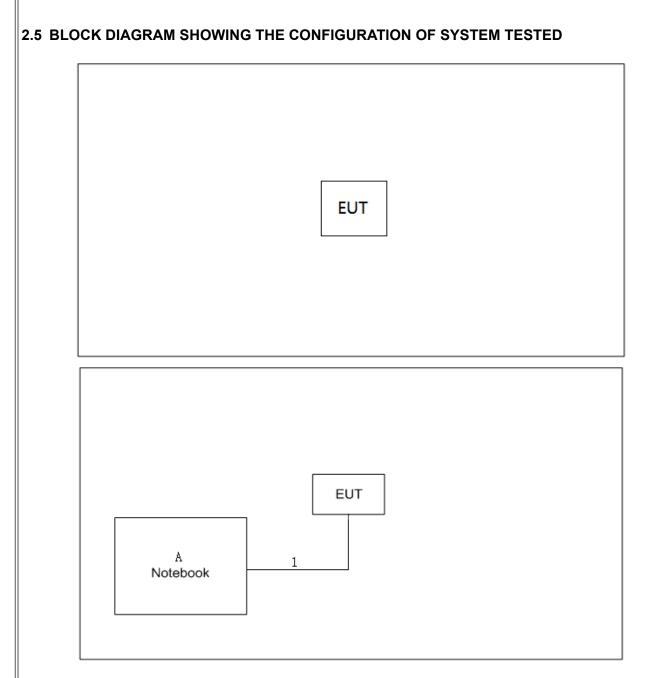
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz (Duty cycle < 98%).



Date: 23.MAY.2020 19:56:58

Duty cycle = 13.000 ms / 13.000 ms = 100% Duty Factor = 10 log(1/Duty cycle) = 0.00





2.6 SUPPORT UNITS

A Notebook Dell Inspiron 15-7559 N/A		Series No.	Model No.	em Equipment Brand		Item
		N/A	Inspiron 15-7559	A Notebook Dell Ins		А
Item Cable Type Shielded Type Ferrite Core Length		Length	Ferrite Core	Shielded Type	Cable Type	Item
1 USB 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

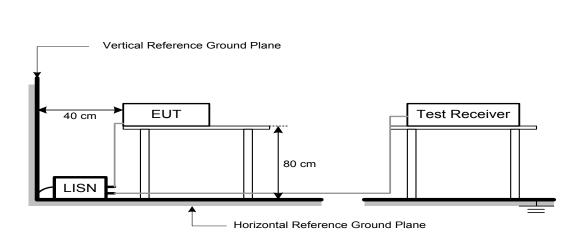
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.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

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

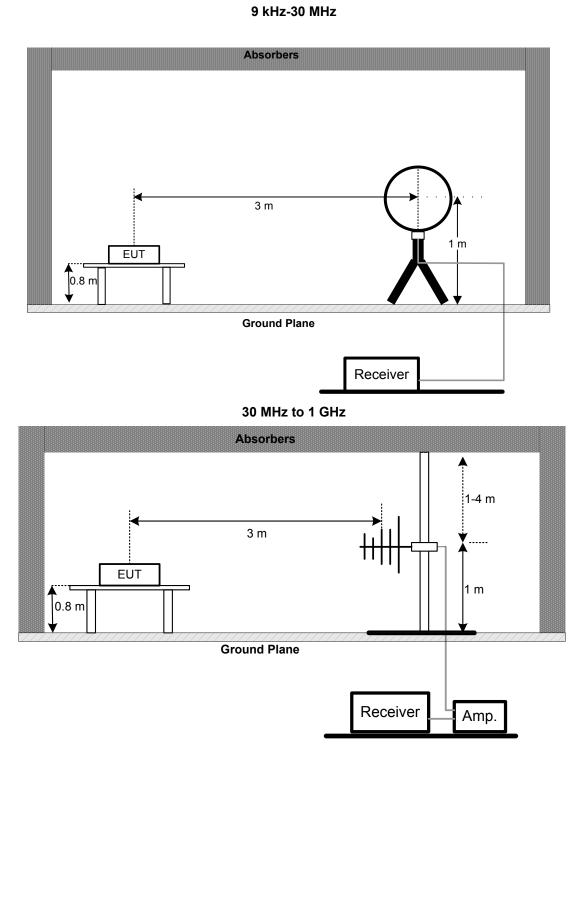
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The measuring distance 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



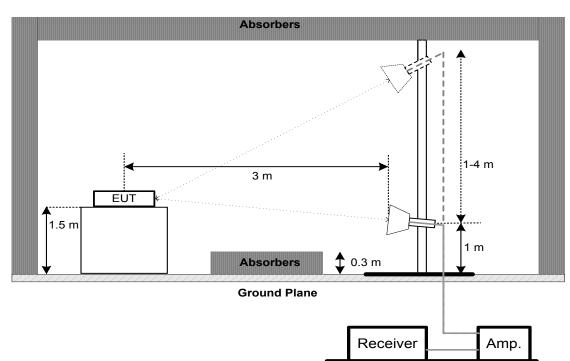
4.4 TEST SETUP





3...





4.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULTS - 9 KHZ TO 30 MHZ

Please refer to the APPENDIX B

Remark:

- (1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
- (2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7 TEST RESULTS - 30 MHZ TO 1000 MHZ

Please refer to the APPENDIX C.

4.8 TEST RESULTS - ABOVE 1000 MHZ

Please refer to the APPENDIX D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



5. BANDWIDTH TEST

5.1 LIMIT

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

5.2 TEST PROCEDURE

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

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

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

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP

EUT	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 AVERAGE OUTPUT POWER TEST

6.1 LIMIT

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

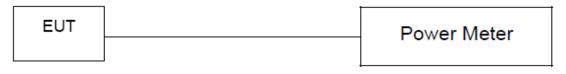
6.2 TEST PROCEDURE

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

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX F.



7. CONDUCTED SPURIOUS EMISSIONS

7.1 LIMIT

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

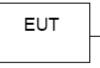
7.2 TEST PROCEDURE

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

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



SPECTRUM ANALYZER

7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX G.



8. POWER SPECTRAL DENSITY TEST

8.1 LIMIT

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

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW=3 kHz, VBW=10 kHz, Sweep time = Auto.
- c. The Power Spectral Density was performed in accordance with method 11.10.2 of ANSI C63.10-2013.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

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	Feb. 28, 2021		
2	LISN	EMCO	3816/2	52765	Mar. 01, 2021		
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 28, 2021		
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 01, 2021		
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A		
6	Cable	N/A	RG223	12m	Mar. 10, 2021		

	Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Antenna	EM	EM-6876-1	230	Apr. 16, 2021	
2	Cable	N/A	RG 213/U	N/A	May 31, 2020	
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 28, 2021	
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

	Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2021	
2*	Amplifier	HP	8447D	2944A08742	Mar. 01, 2021	
3	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020	
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 22, 2021	
5	Controller	СТ	SC100	N/A	N/A	
6	Controller	MF	MF-7802	MF780208416	N/A	
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

	Radiated Emissions - Above 1 GHz						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 19, 2021		
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 23, 2020		
3	Amplifier	Agilent	8449B	3008A02584	Aug. 03, 2020		
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 07, 2021		
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	N/A	A81-SMAMSMAM- 12.5M	N/A	May 09, 2021		
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	
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 03, 2020	
		Maximum	Average Output Po	wer		
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.

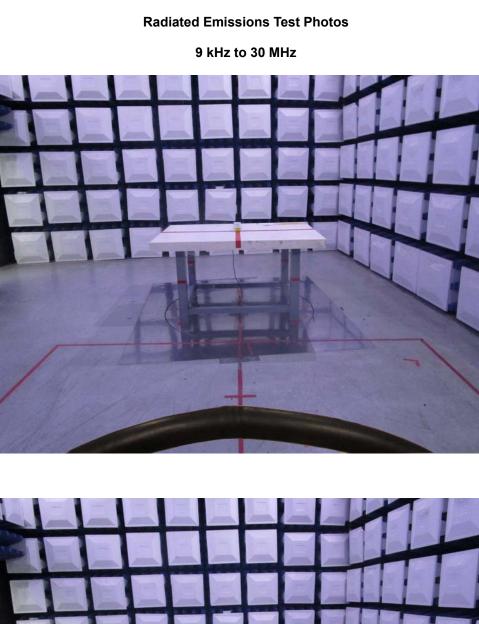


10. EUT TEST PHOTO







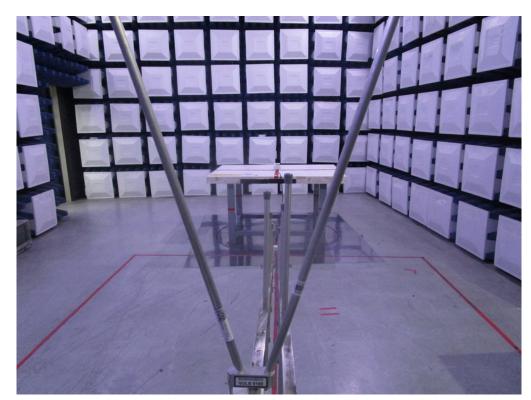


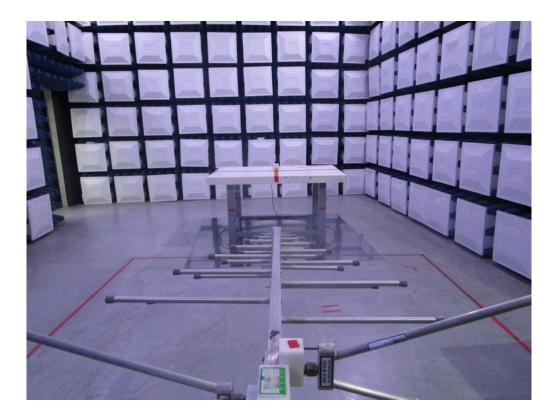




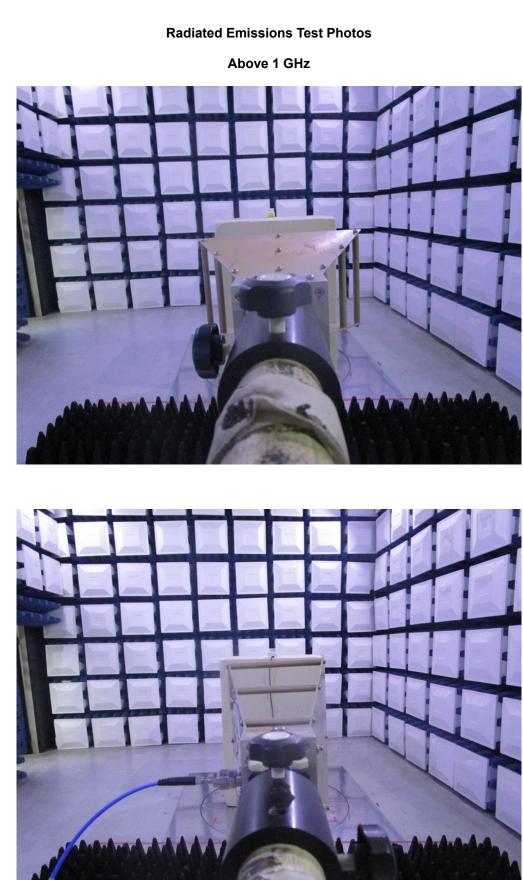
Radiated Emissions Test Photos

30 MHz to 1 GHz





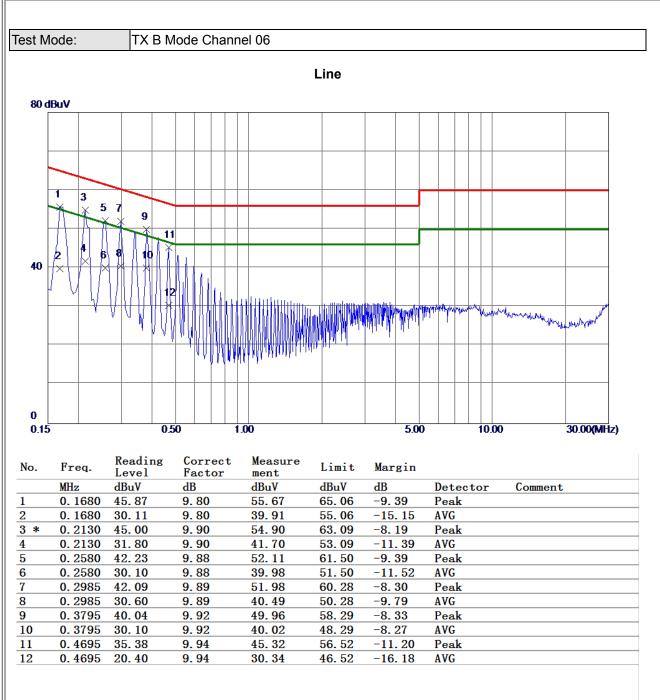






APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

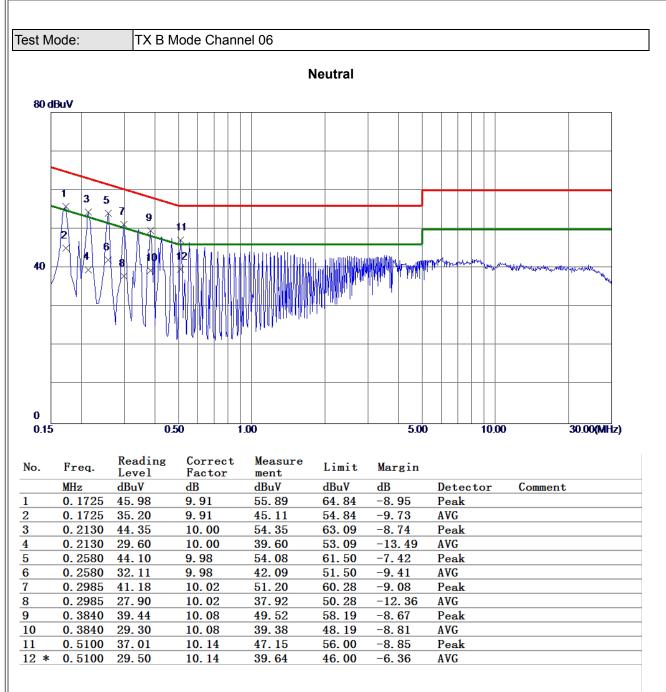




REMARKS:

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





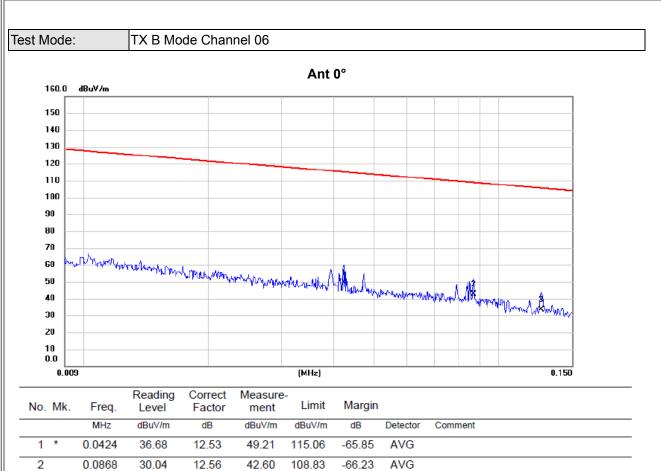
REMARKS:

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



APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ





REMARKS:

3

0.1267

20.89

12.65

33.54

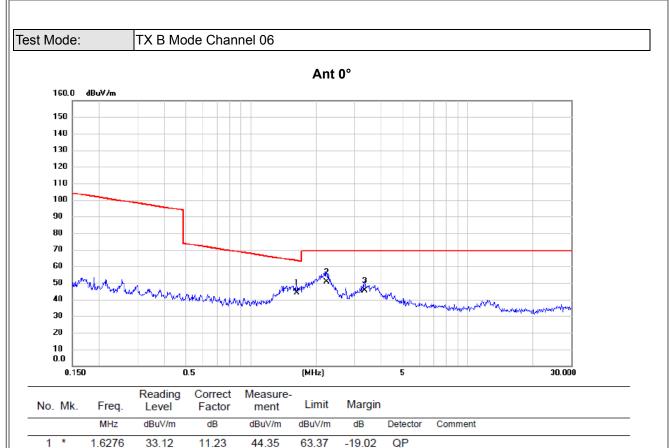
105.55

-72.01

AVG

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





REMARKS:

2

3

2.2367

3.3458

39.57

34.85

10.88

10.45

50.45

45.30

69.54

69.54

-19.09

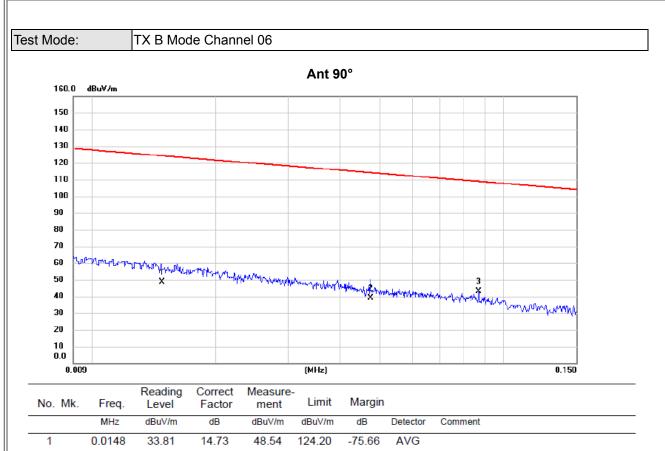
-24.24

QP

QP

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





-74.98

-65.85

AVG

AVG

REMARKS:

2

3 *

0.0475

0.0868

26.69

30.42

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

12.40

12.56

39.09

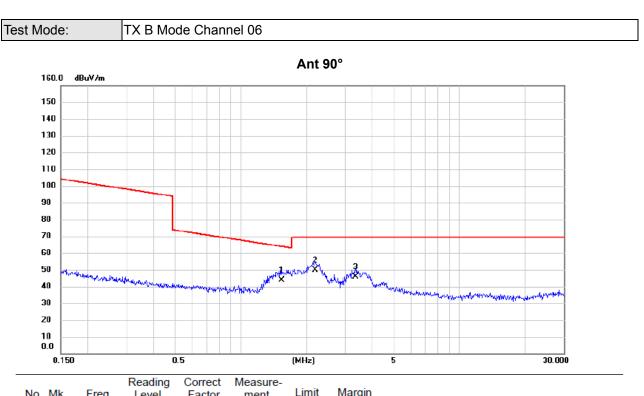
42.98

114.07

108.83

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





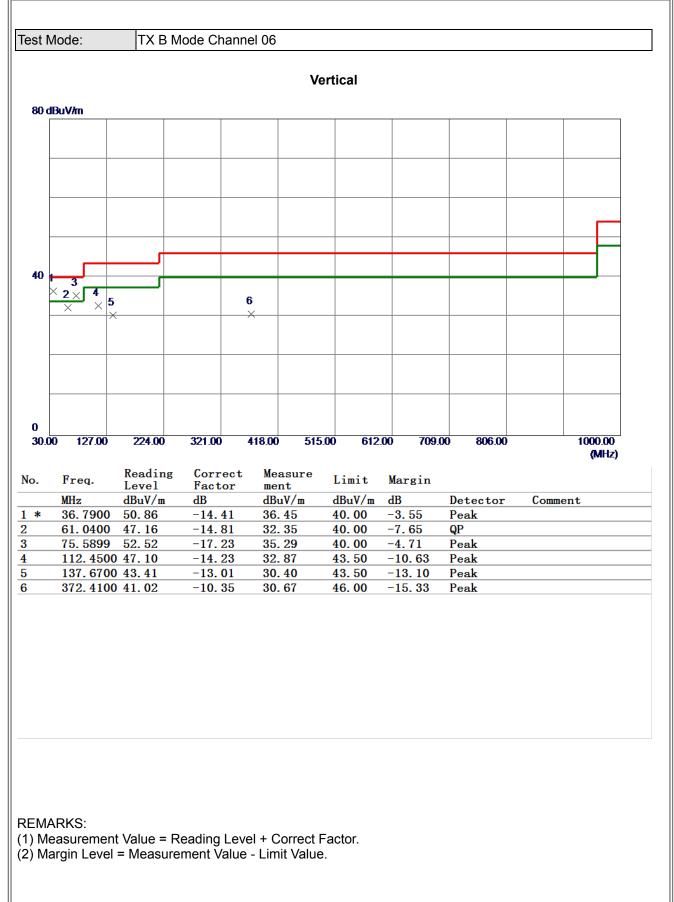
Freq.	Level	Factor	ment	Limit	Margin		
MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1.5355	32.63	11.29	43.92	63.88	-19.96	QP	
2.1898	38.80	10.91	49.71	69.54	-19.83	QP	
3.3458	35.27	10.45	45.72	69.54	-23.82	QP	
	MHz 1.5355 2.1898	MHz dBuV/m 1.5355 32.63 2.1898 38.80	MHz dBuV/m dB 1.5355 32.63 11.29 2.1898 38.80 10.91	MHz dBuV/m dB dBuV/m 1.5355 32.63 11.29 43.92 2.1898 38.80 10.91 49.71	MHz dBuV/m dB dBuV/m dBuV/m 1.5355 32.63 11.29 43.92 63.88 2.1898 38.80 10.91 49.71 69.54	MHz dBuV/m dB dBuV/m dBuV/m dB 1.5355 32.63 11.29 43.92 63.88 -19.96 2.1898 38.80 10.91 49.71 69.54 -19.83	MHz dBuV/m dB dBuV/m dBuV/m dB Detector 1.5355 32.63 11.29 43.92 63.88 -19.96 QP 2.1898 38.80 10.91 49.71 69.54 -19.83 QP

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

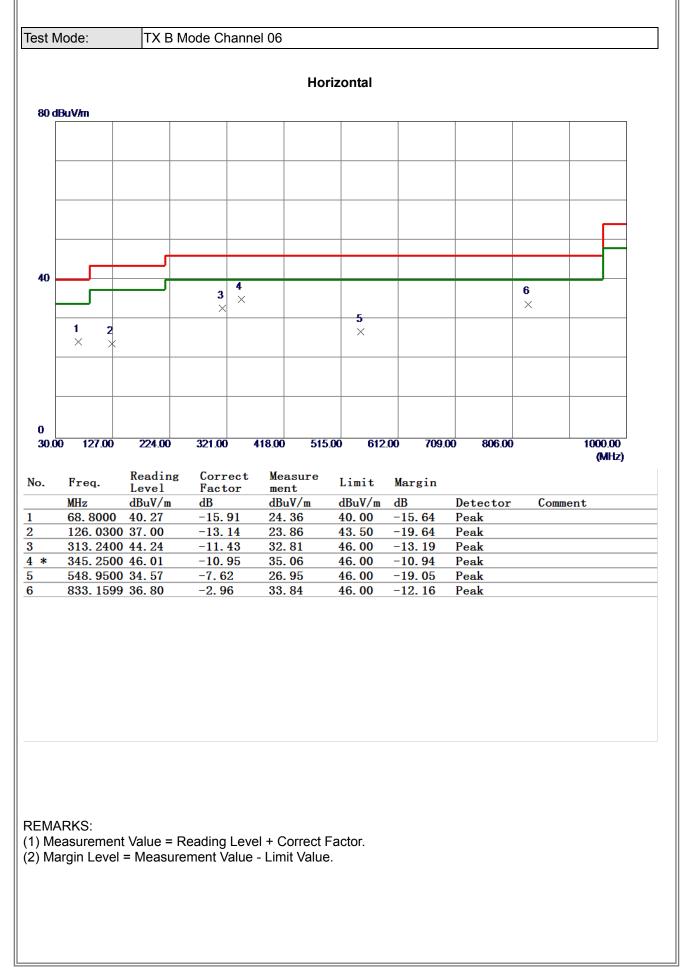


APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ





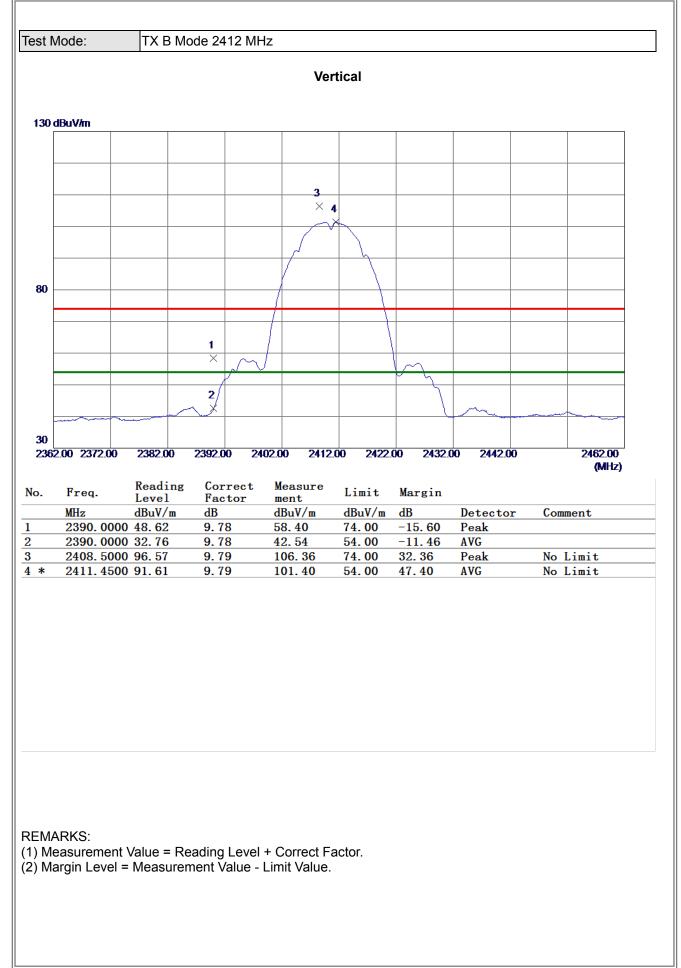




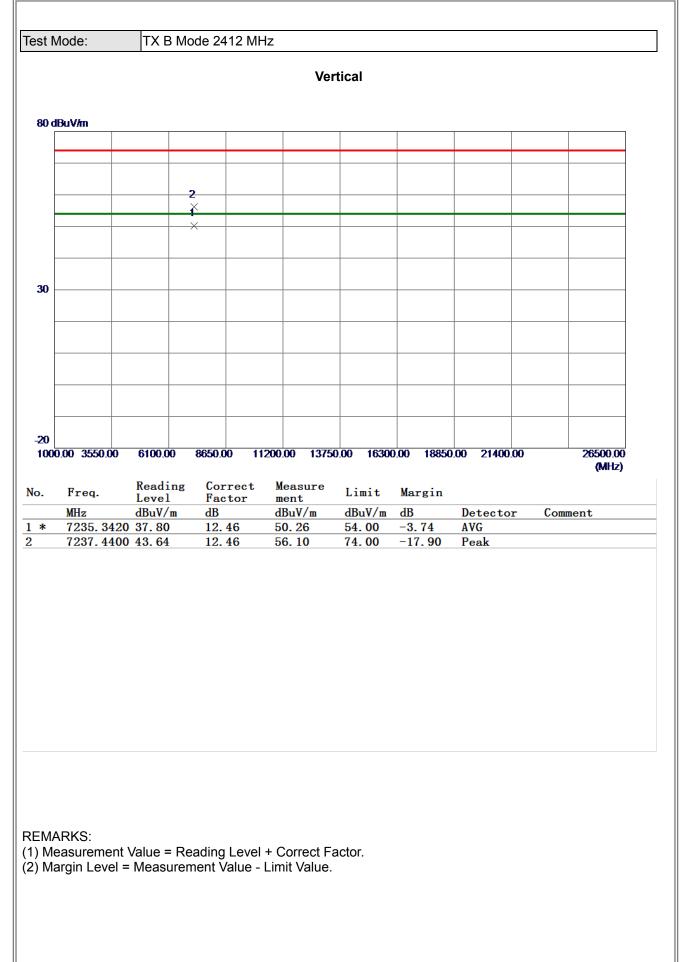


APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ

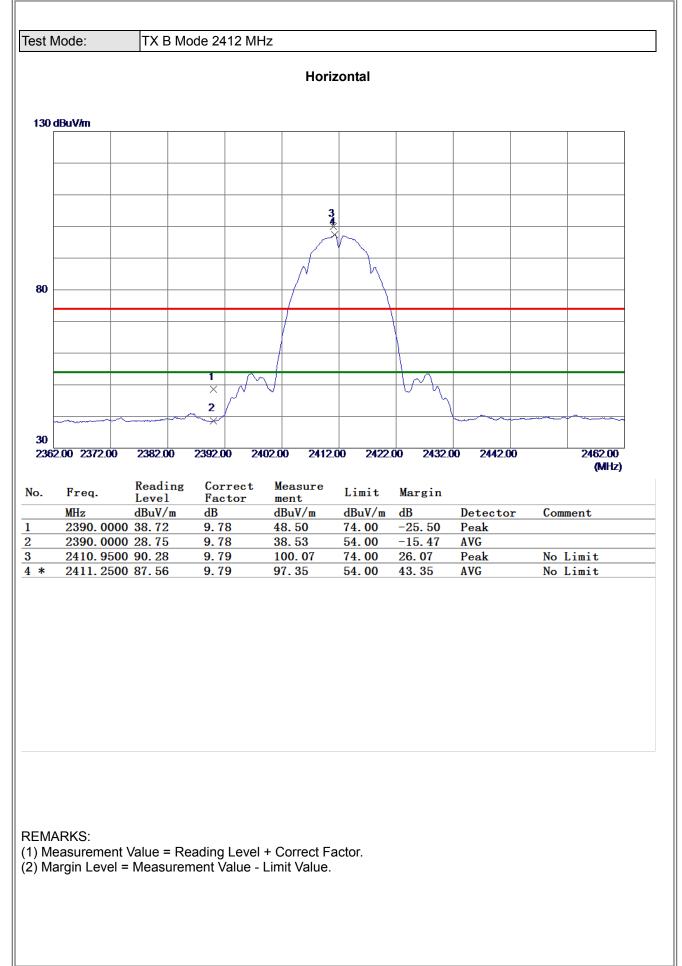








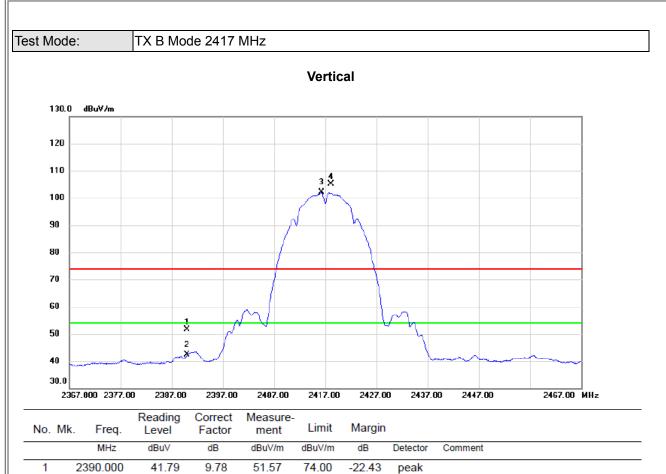












2390.000

2416.300

2418.150

2

3 *

4 X

32.50

92.24

95.28

9.78

9.78

9.79

42.28

102.02

105.07

54.00

54.00

74.00

-11.72

48.02

31.07

AVG

AVG

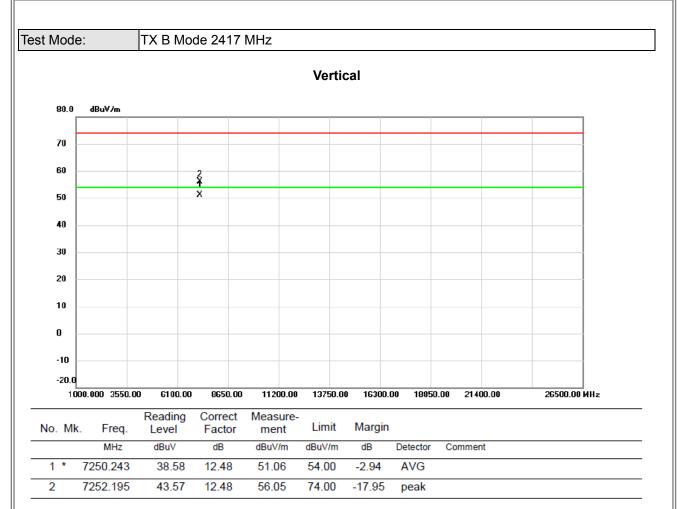
peak

No Limit

No Limit

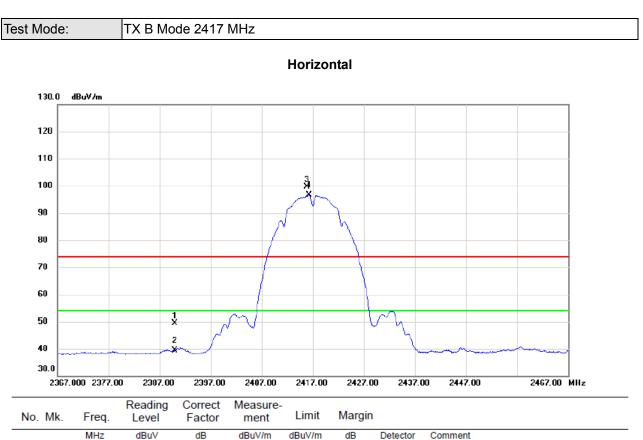
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

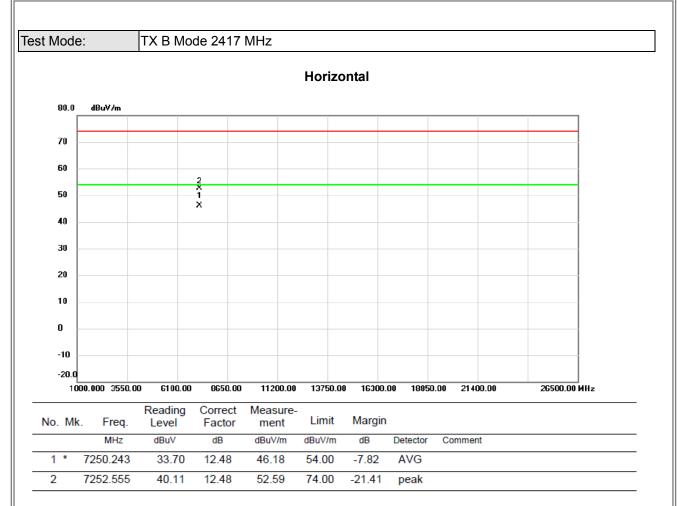




	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.000	39.52	9.78	49.30	74.00	-24.70	peak	
2	2390.000	29.65	9.78	39.43	54.00	-14.57	AVG	
3 X	2415.900	89.78	9.78	99.56	74.00	25.56	peak	No Limit
4 *	2416.300	86.94	9.78	96.72	54.00	42.72	AVG	No Limit

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

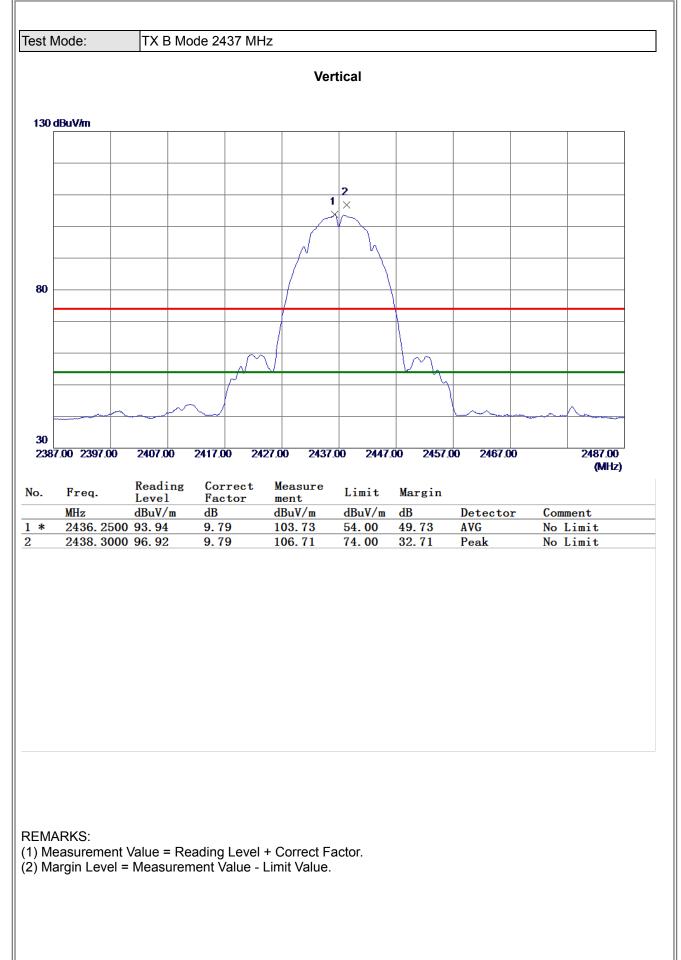




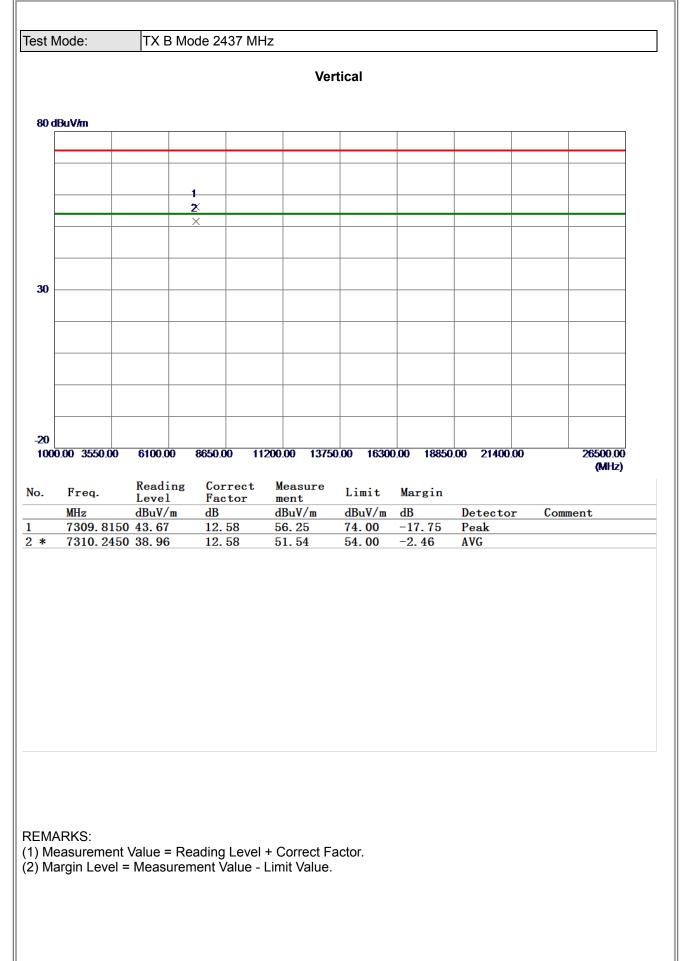
(1) Measurement Value = Reading Level + Correct Factor.

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

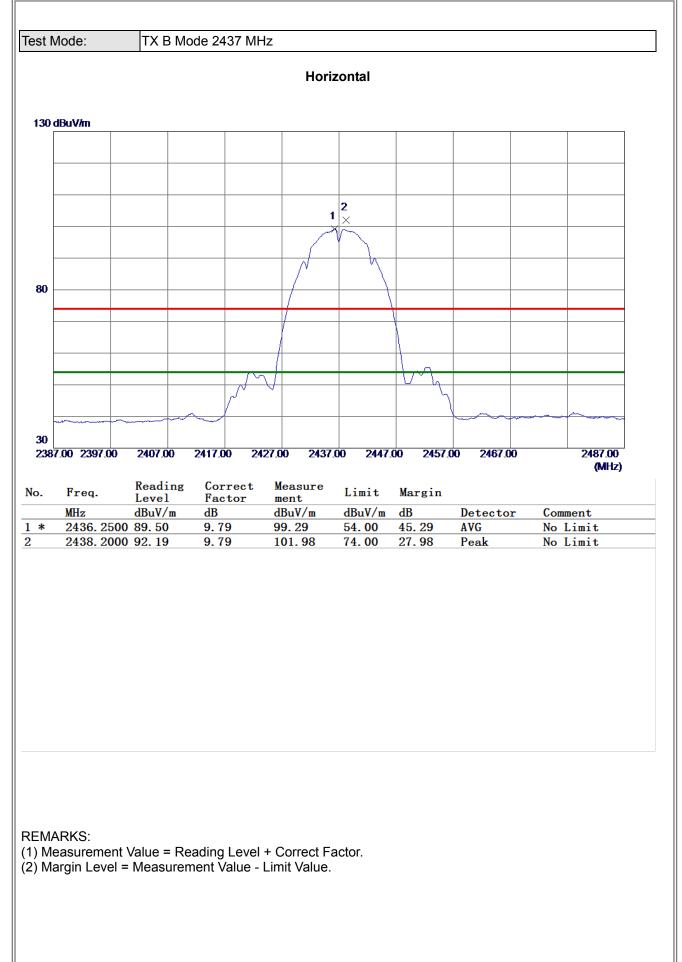




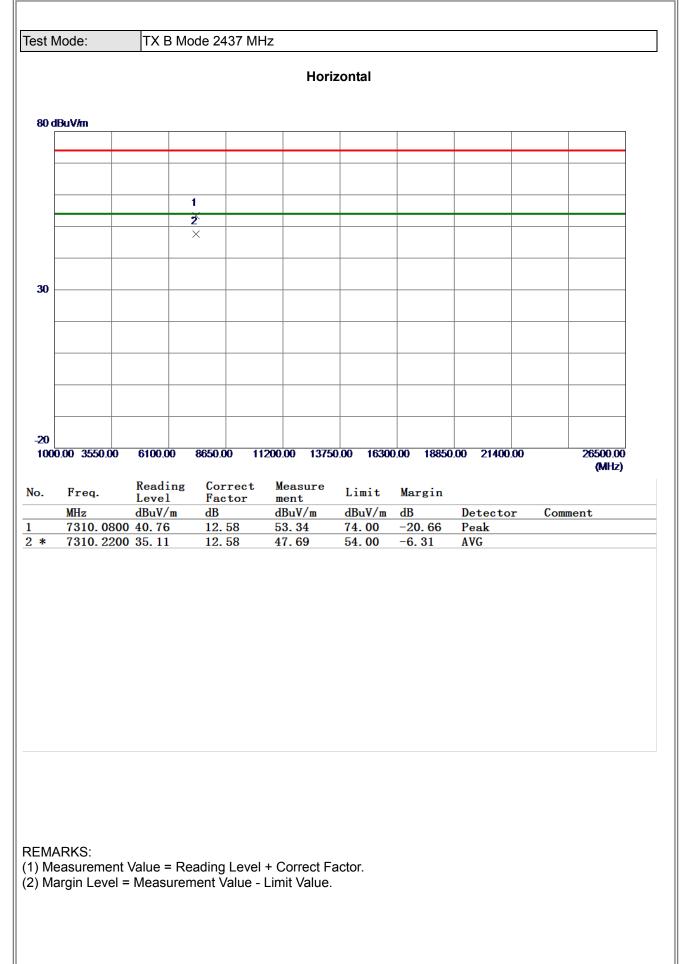




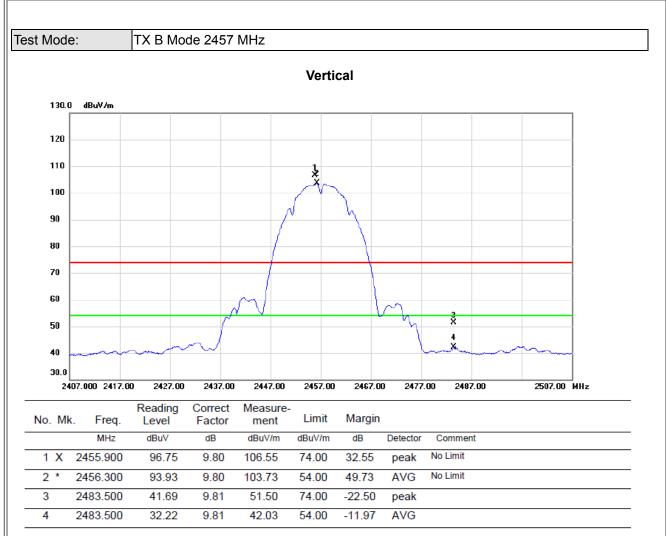






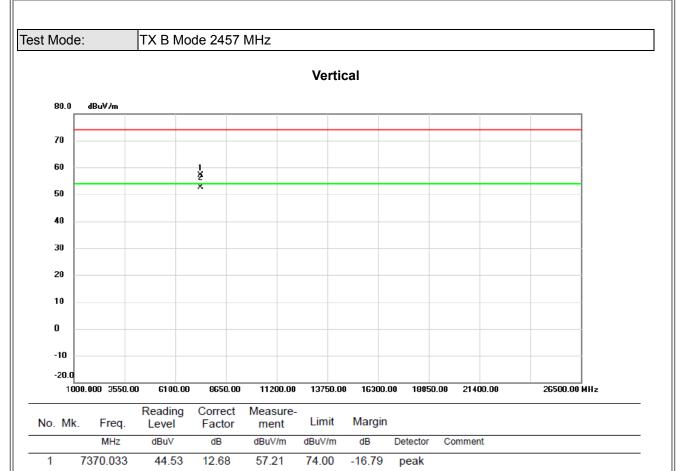






- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





7370.238

2 *

39.95

12.68

52.63

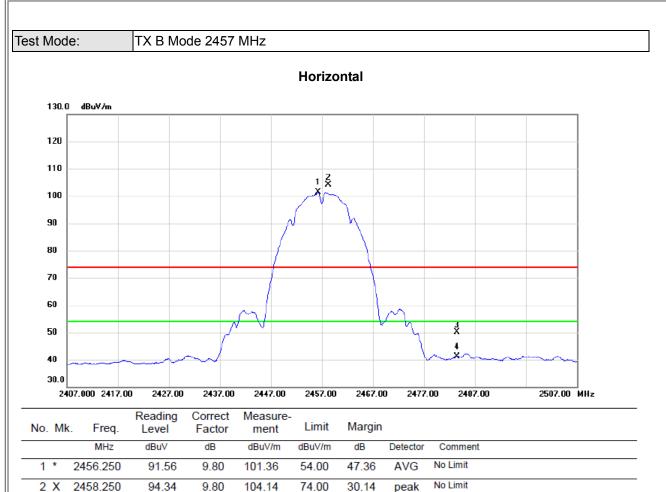
54.00

-1.37

AVG

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





2483.500

2483.500

3

4

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

40.23

31.44

9.81

9.81

50.04

41.25

74.00

54.00

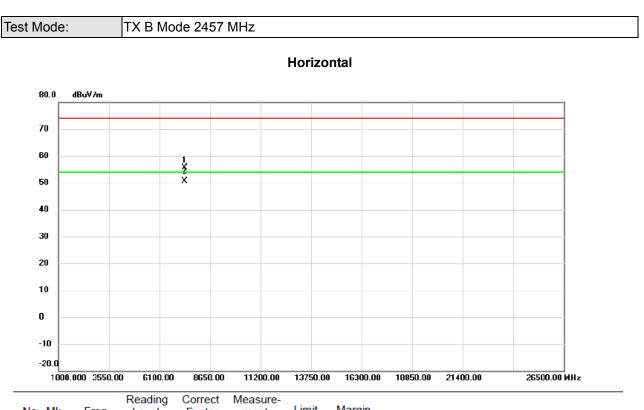
-23.96

-12.75

peak

AVG

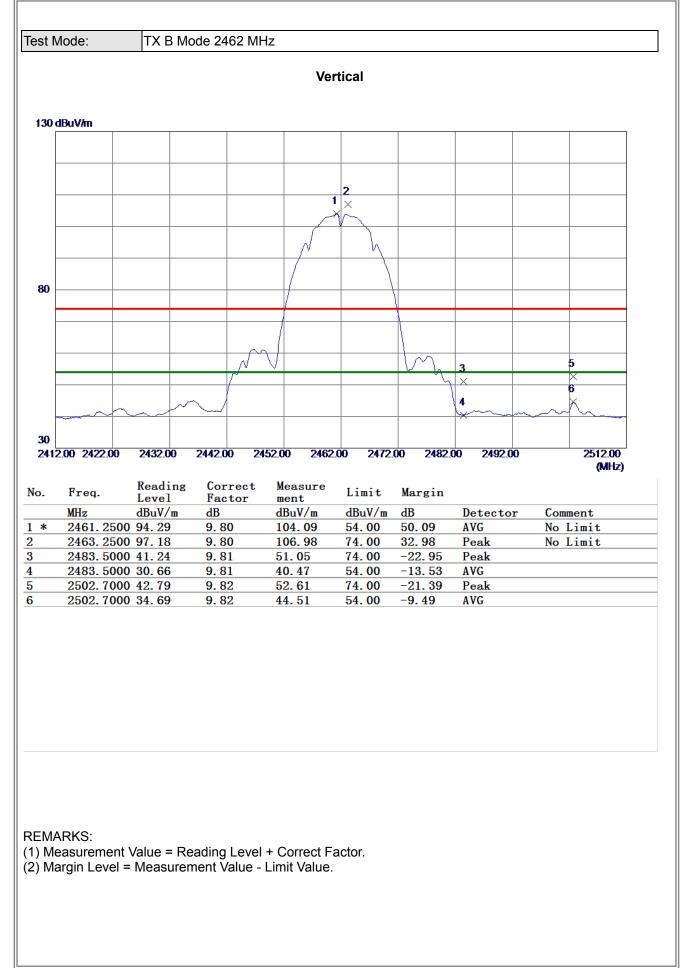




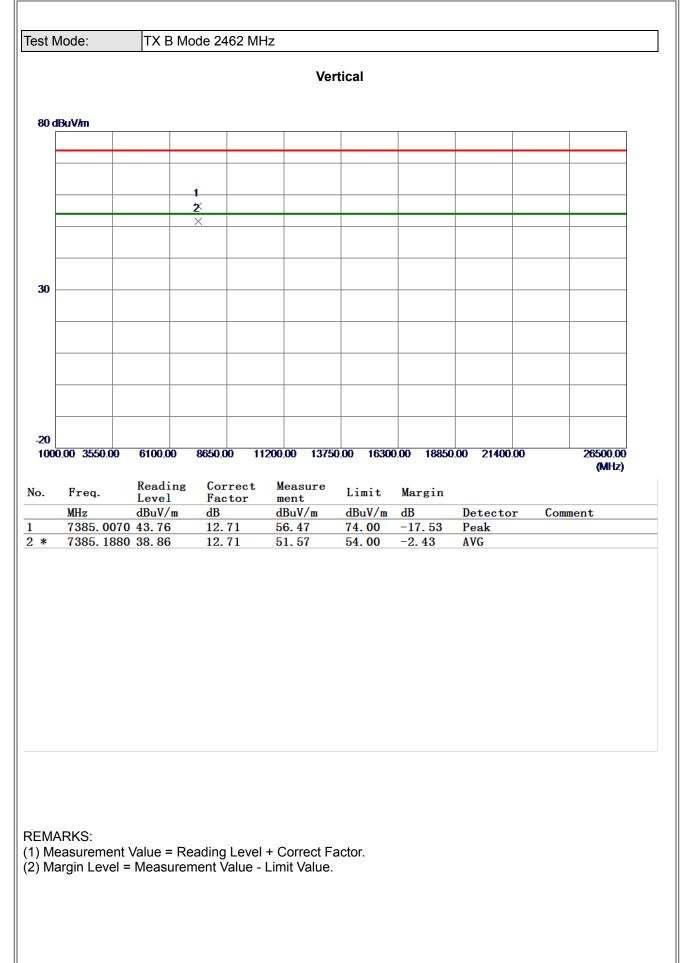
No. M	lk.		Level		ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	736	9.953	43.02	12.68	55.70	74.00	-18.30	peak	
2 *	737	0.205	37.94	12.68	50.62	54.00	-3.38	AVG	

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

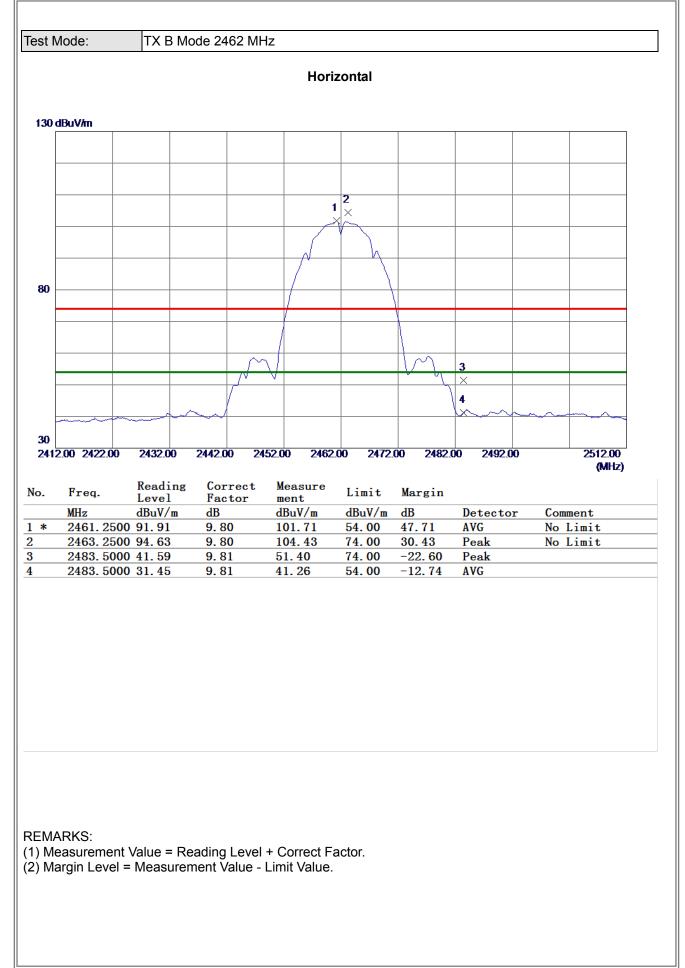




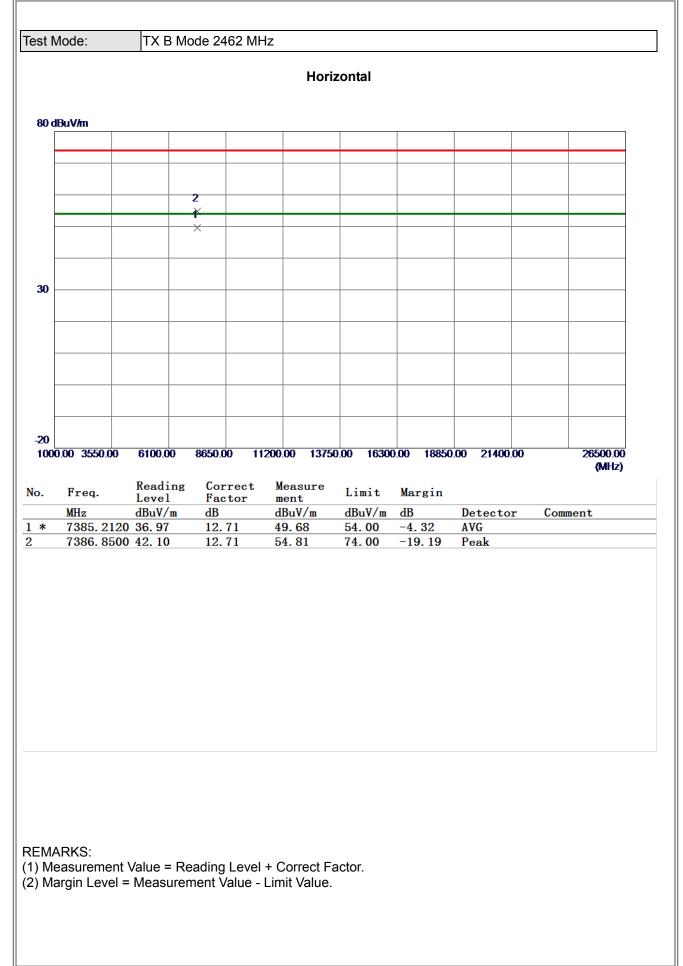




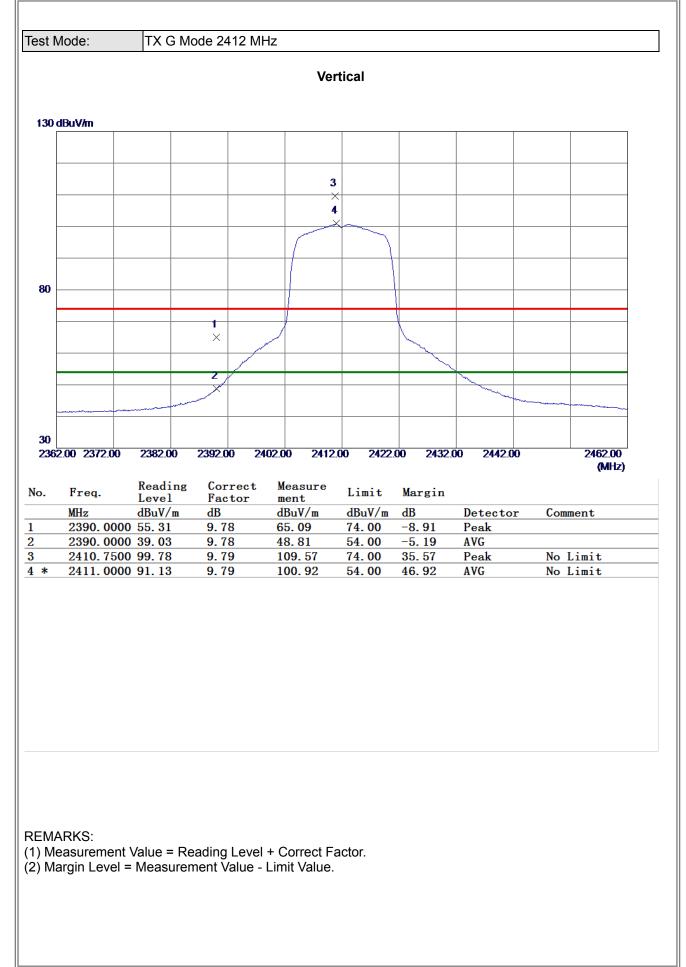




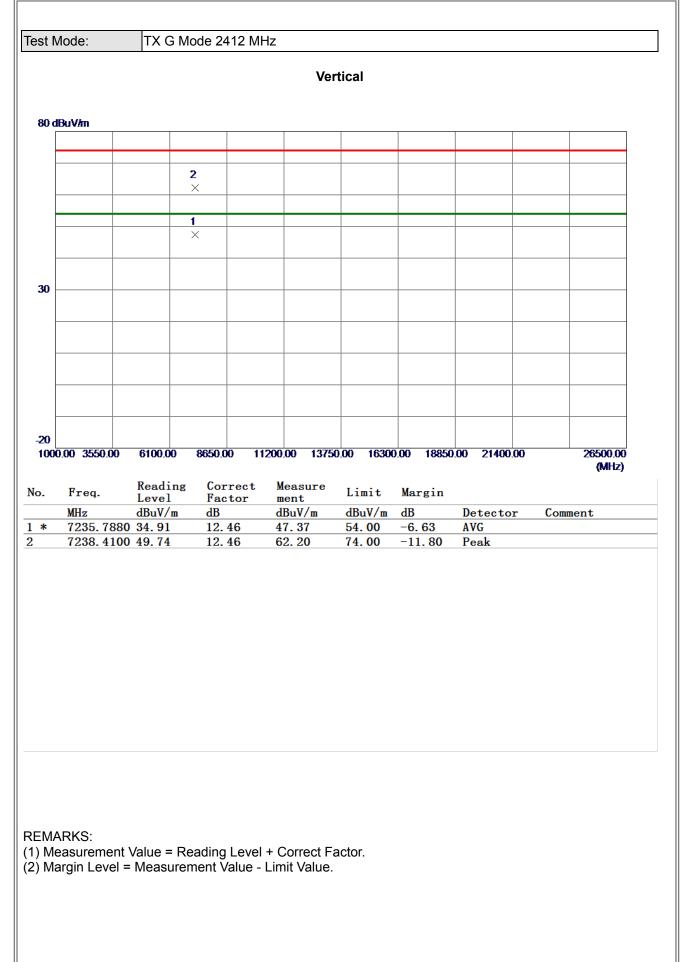




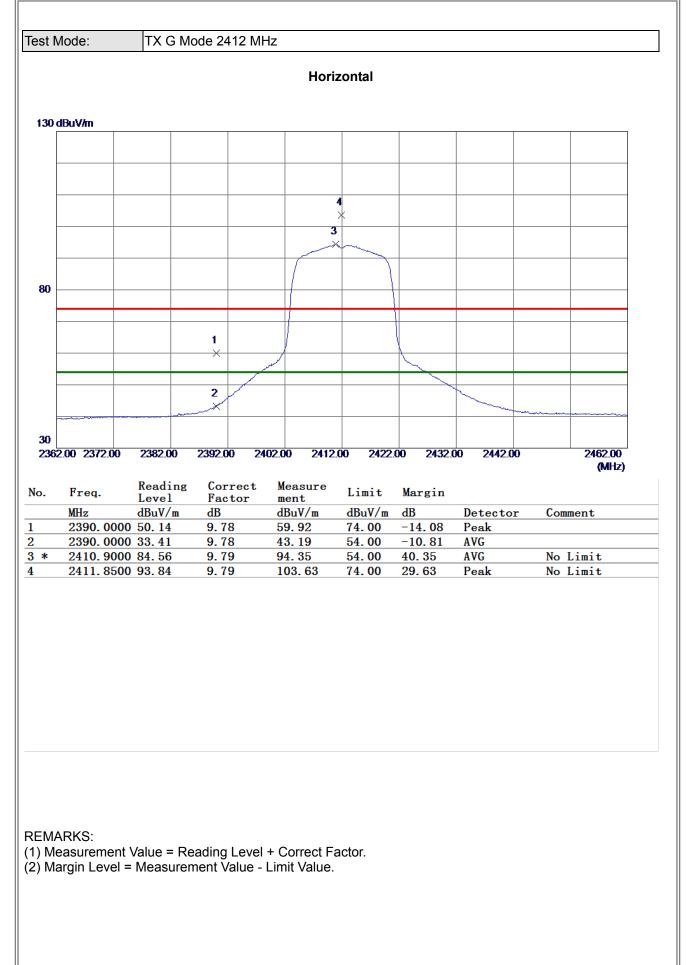




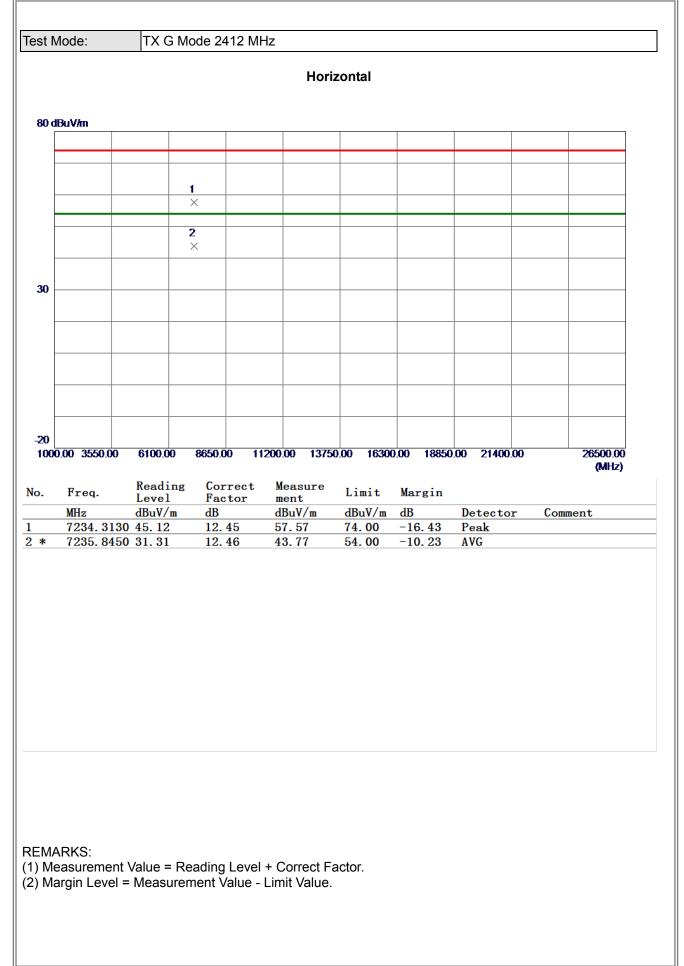




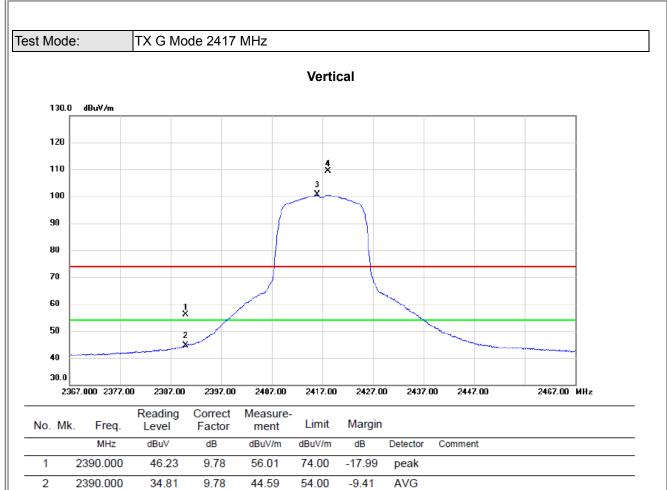












No Limit

No Limit

AVG

peak

REMARKS:

2415.950

4 X 2418.100

3 *

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

90.74

99.71

9.78

9.78

100.52

109.49

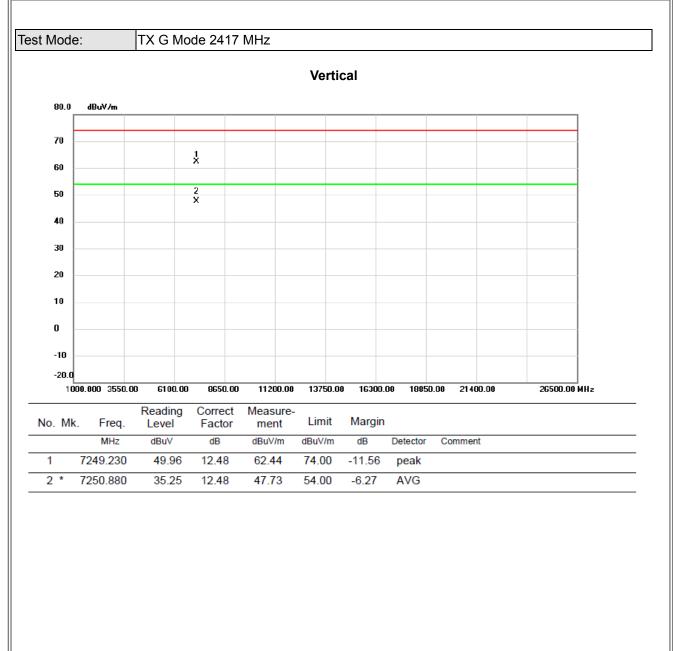
54.00

74.00

46.52

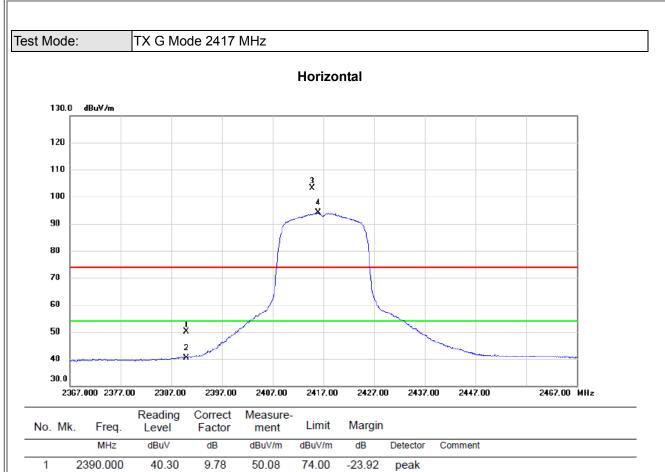
35.49





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





2

3 X

4 *

2390.000

2414.750

2415.950

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

30.72

93.32

84.26

9.78

9.78

9.78

40.50

103.10

94.04

54.00

74.00

54.00

-13.50

29.10

40.04

AVG

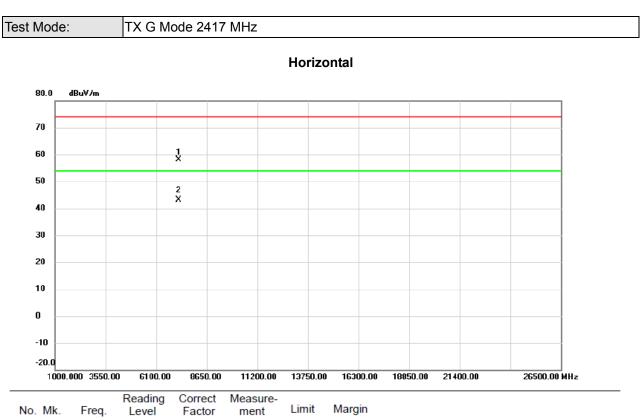
peak

AVG

No Limit

No Limit

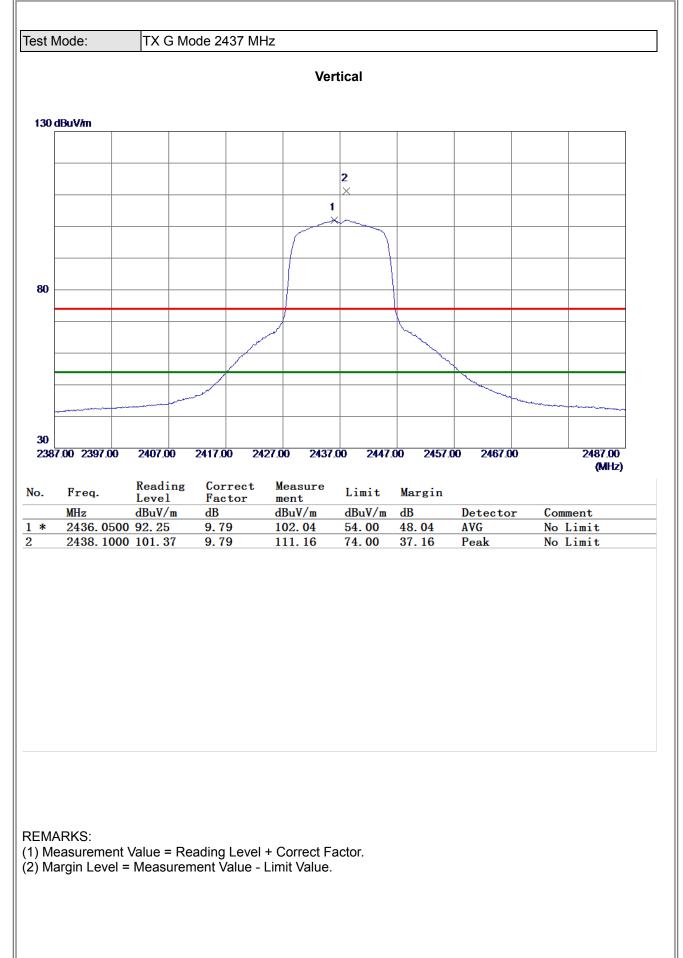




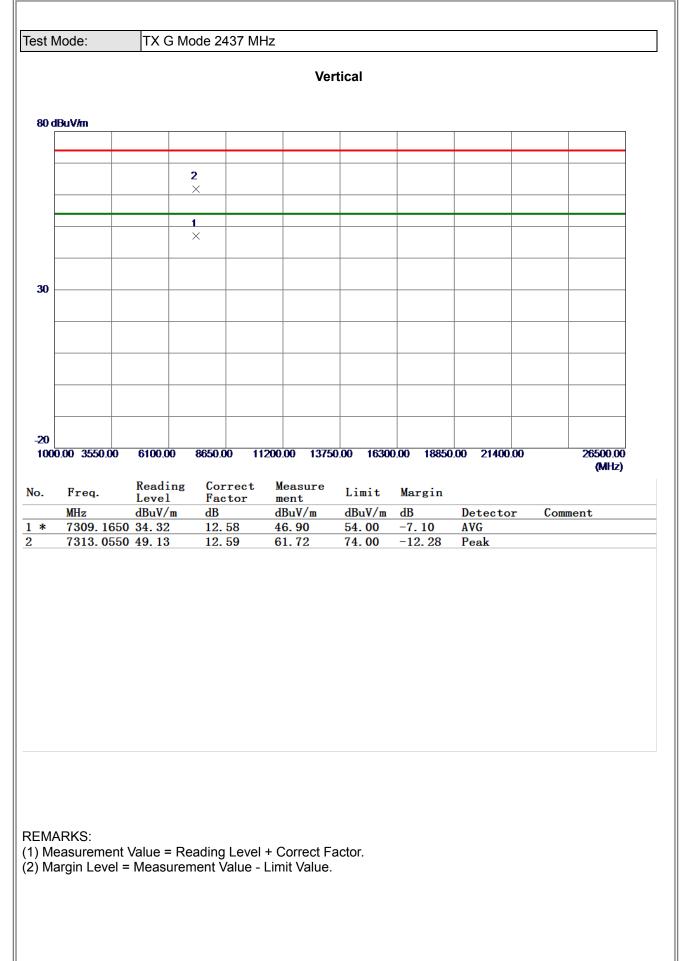
N	0.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin			
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
	1	7	249.185	45.61	12.48	58.09	74.00	-15.91	peak		
	2	* 7	251.382	30.62	12.48	43.10	54.00	-10.90	AVG		

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

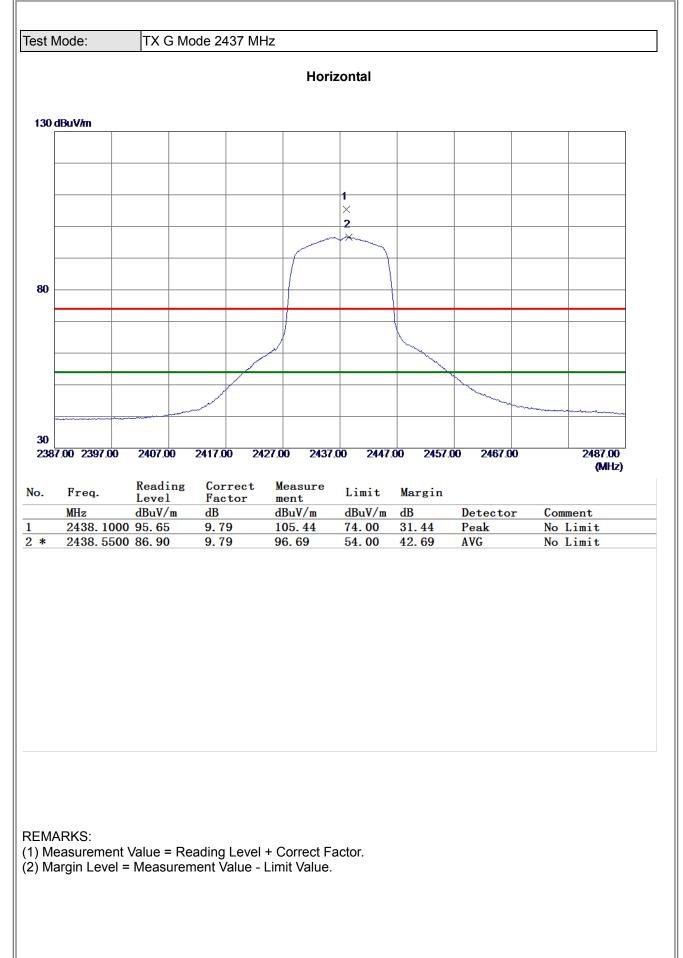




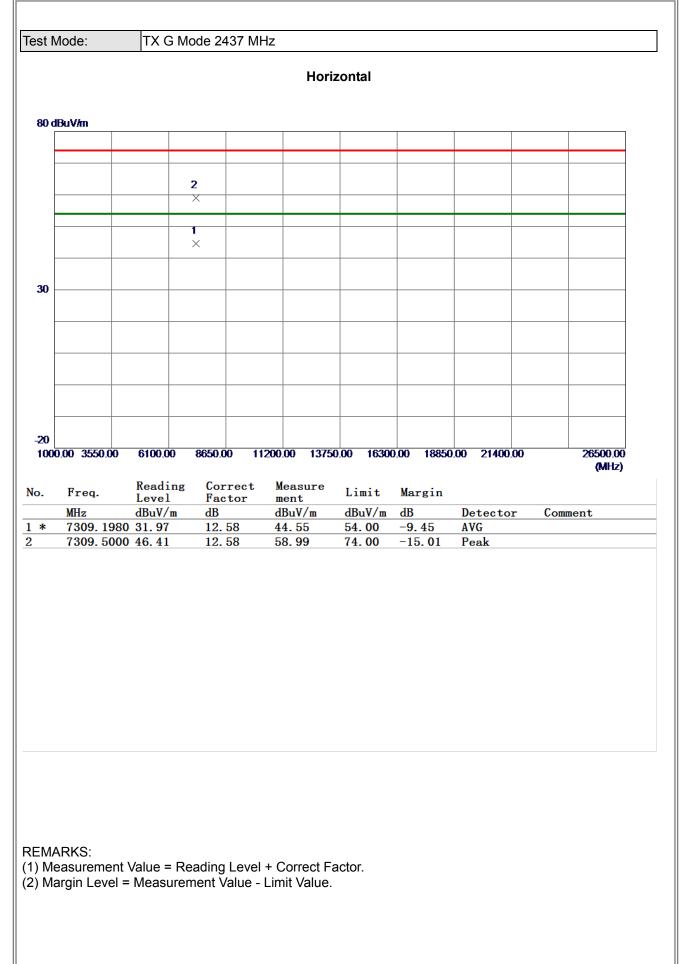




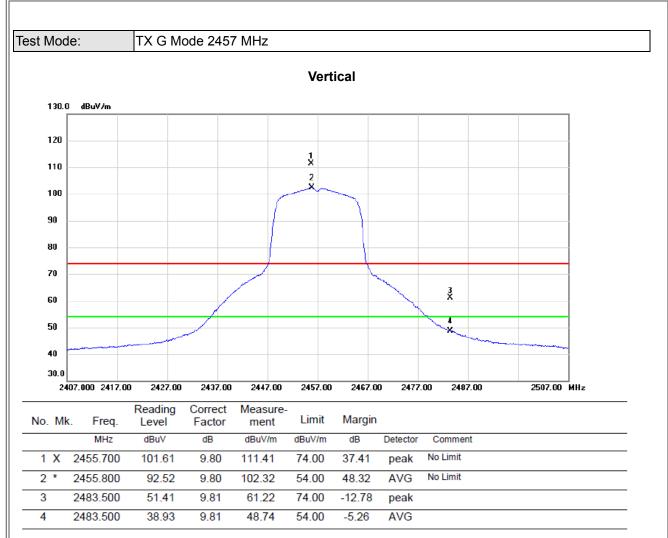






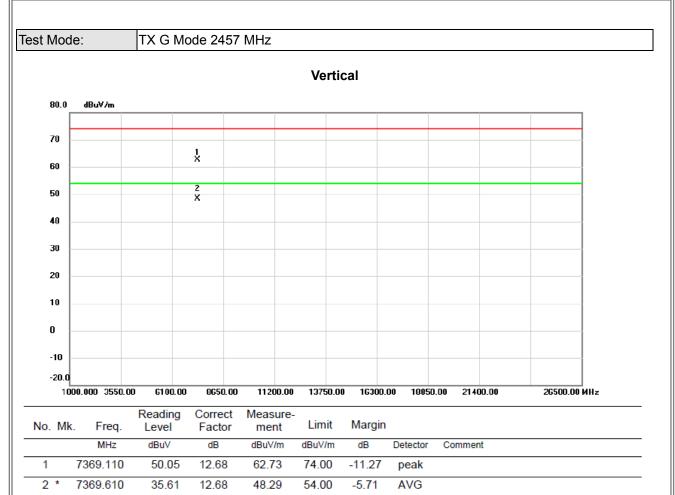






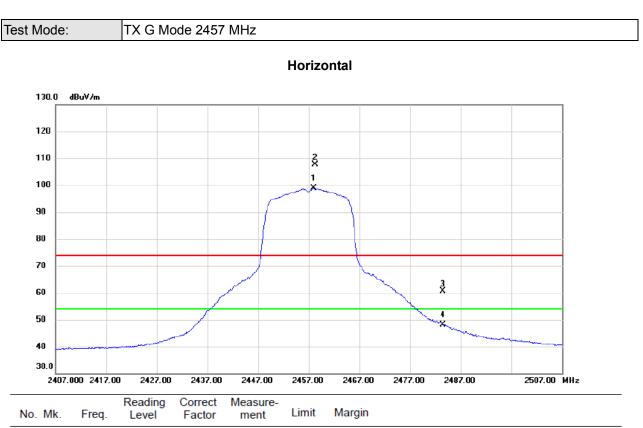
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

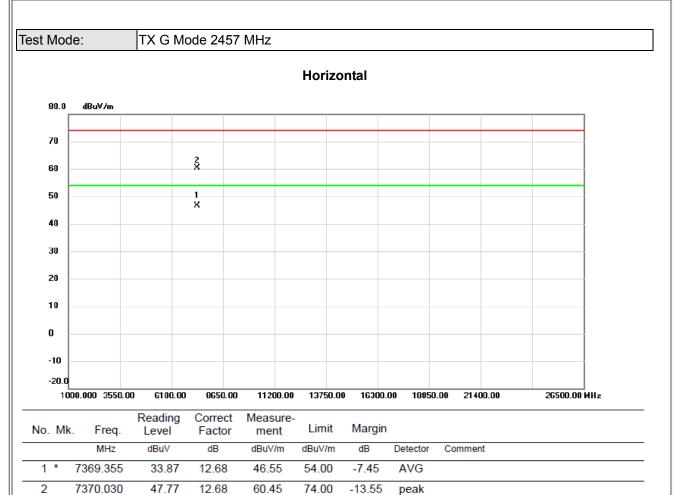




No.	MK.	Freq.	Level	Factor	ment	Limit	wargin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2458.000	88.98	9.80	98.78	54.00	44.78	AVG	No Limit
2	Х	2458.300	97.72	9.80	107.52	74.00	33.52	peak	No Limit
3		2483.500	50.90	9.81	60.71	74.00	-13.29	peak	
4		2483.500	38.41	9.81	48.22	54.00	-5.78	AVG	

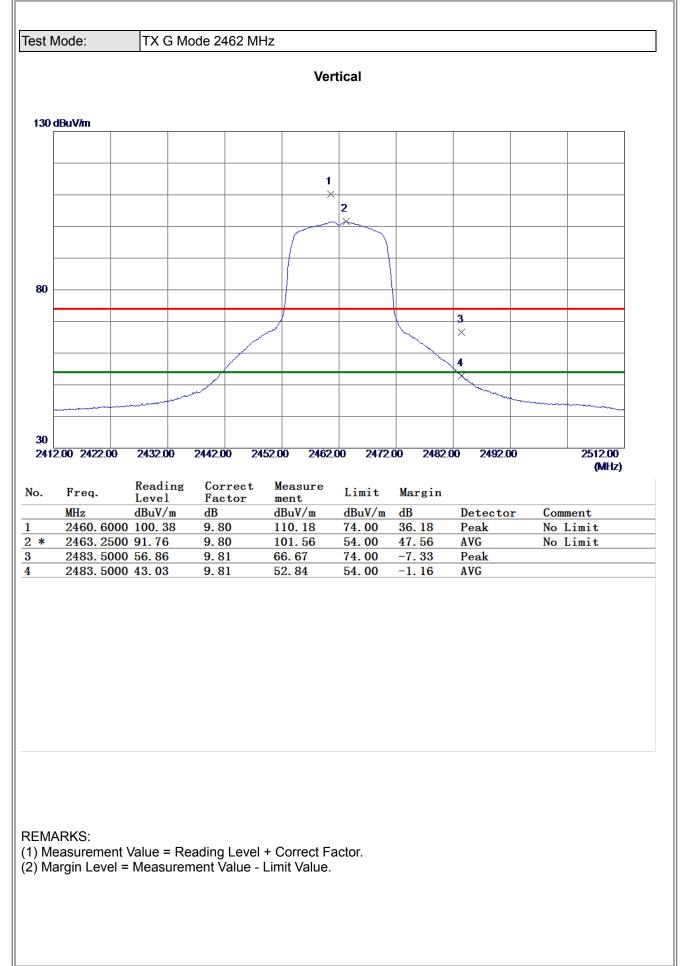
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



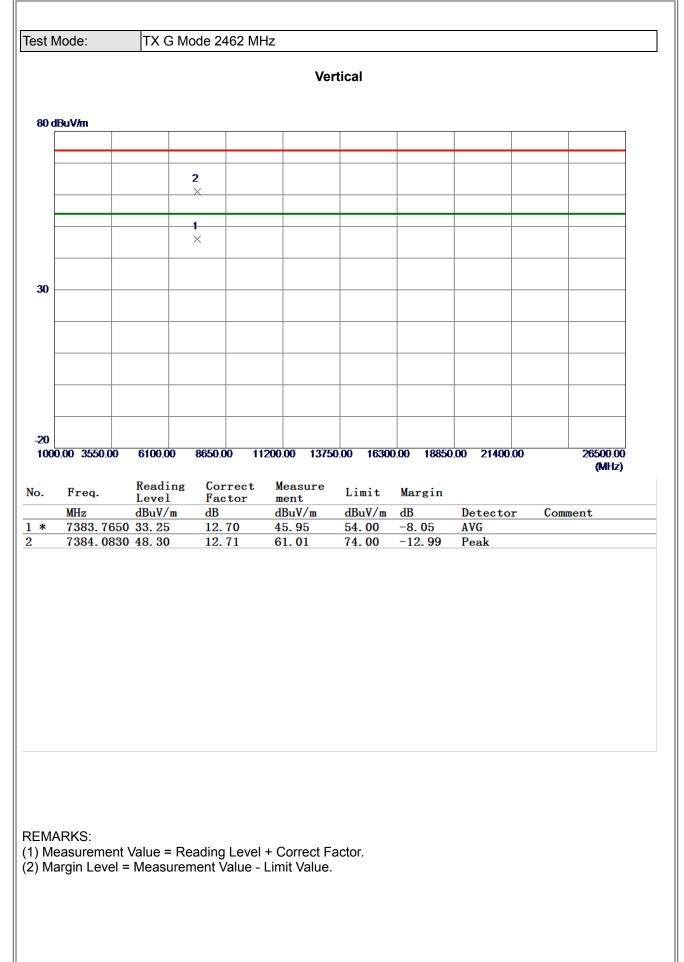


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

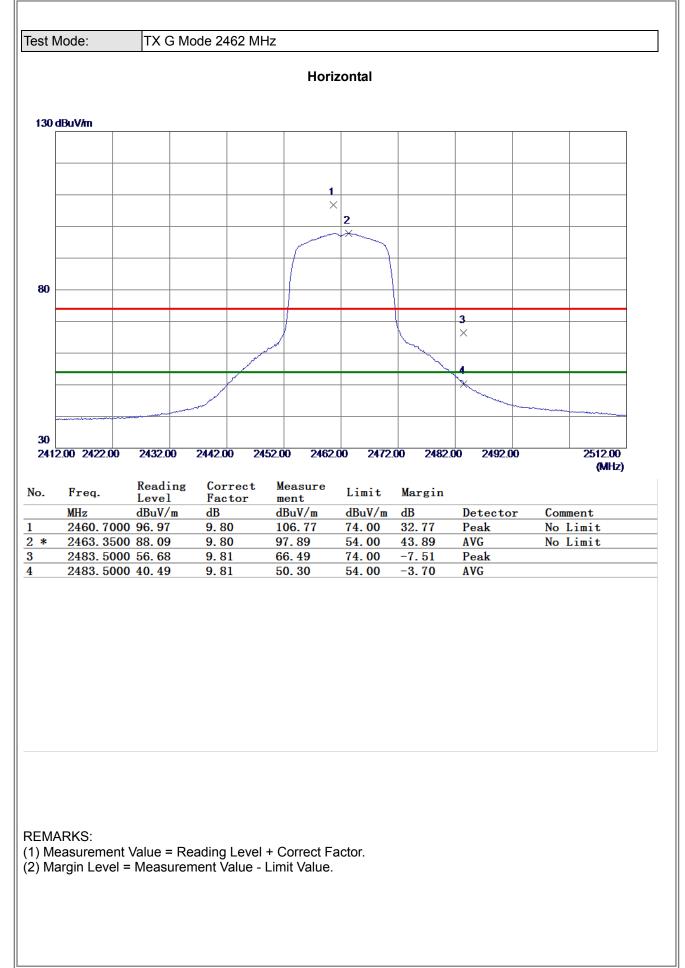




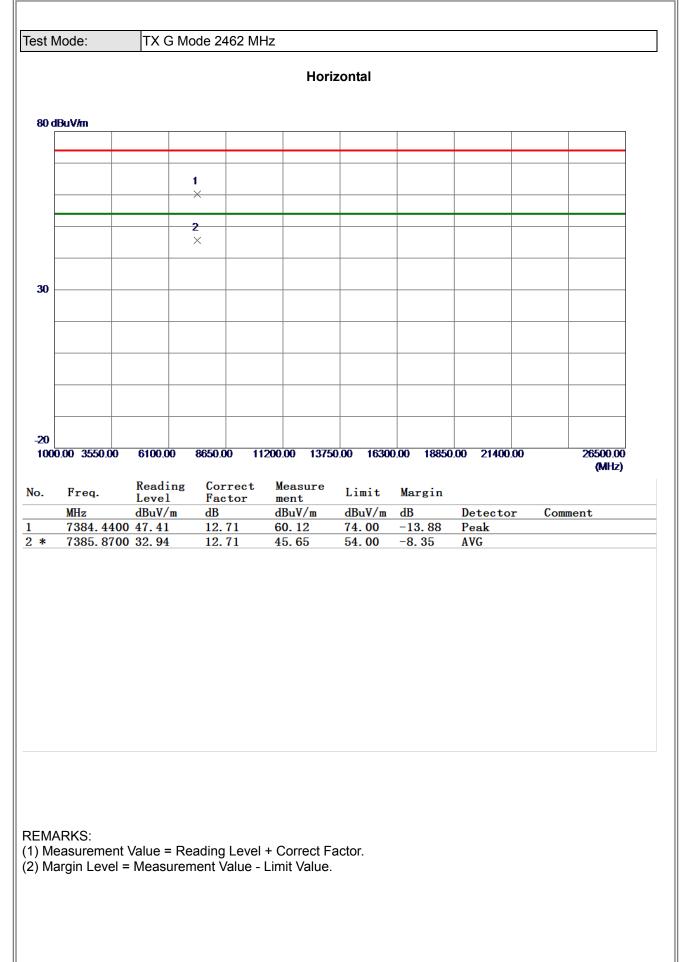




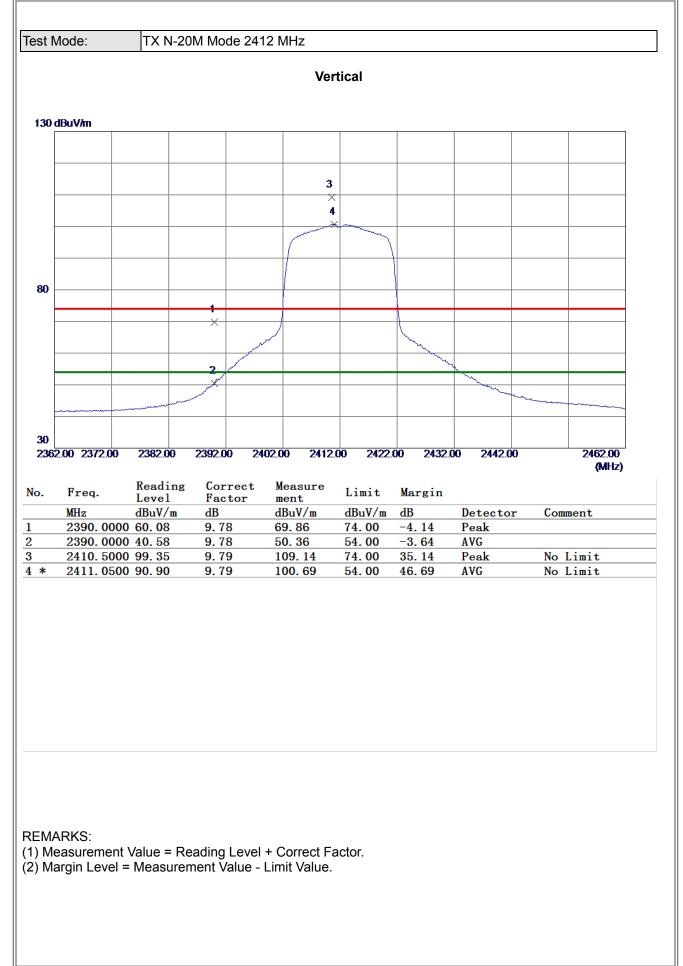




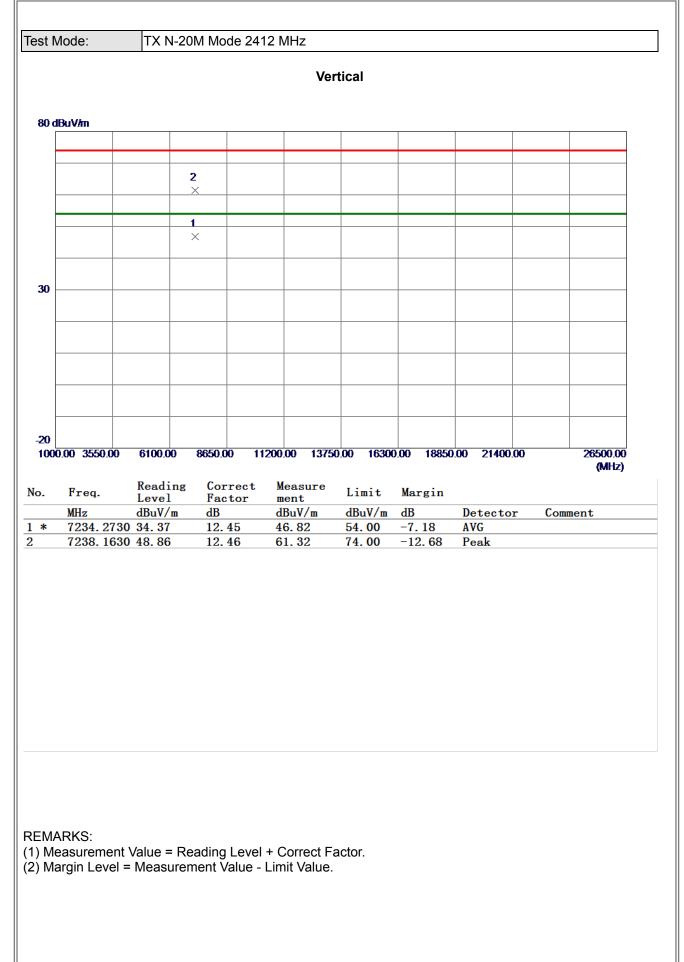




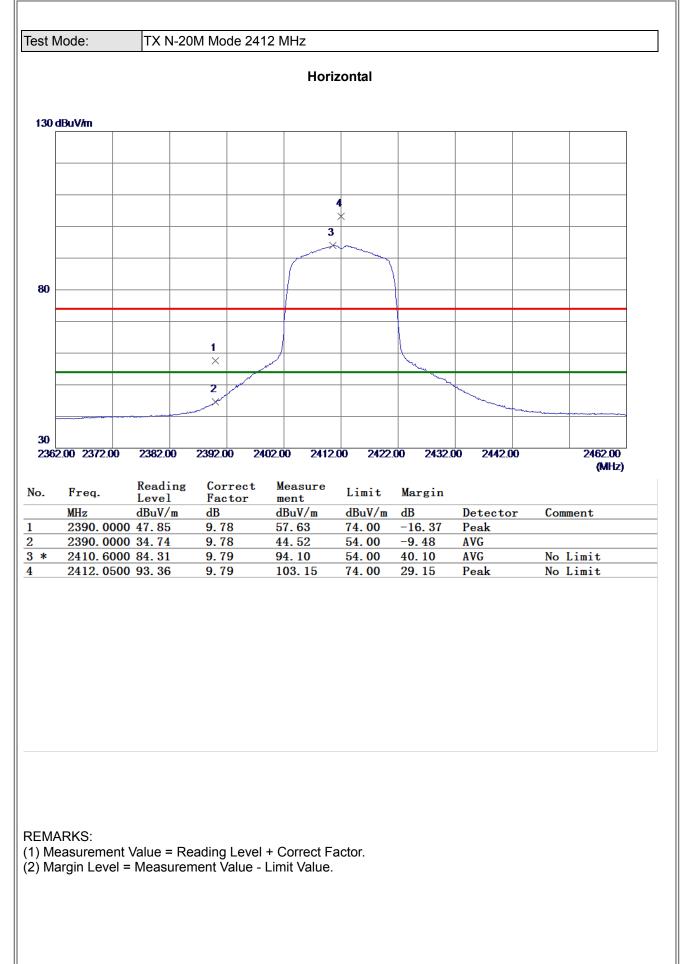




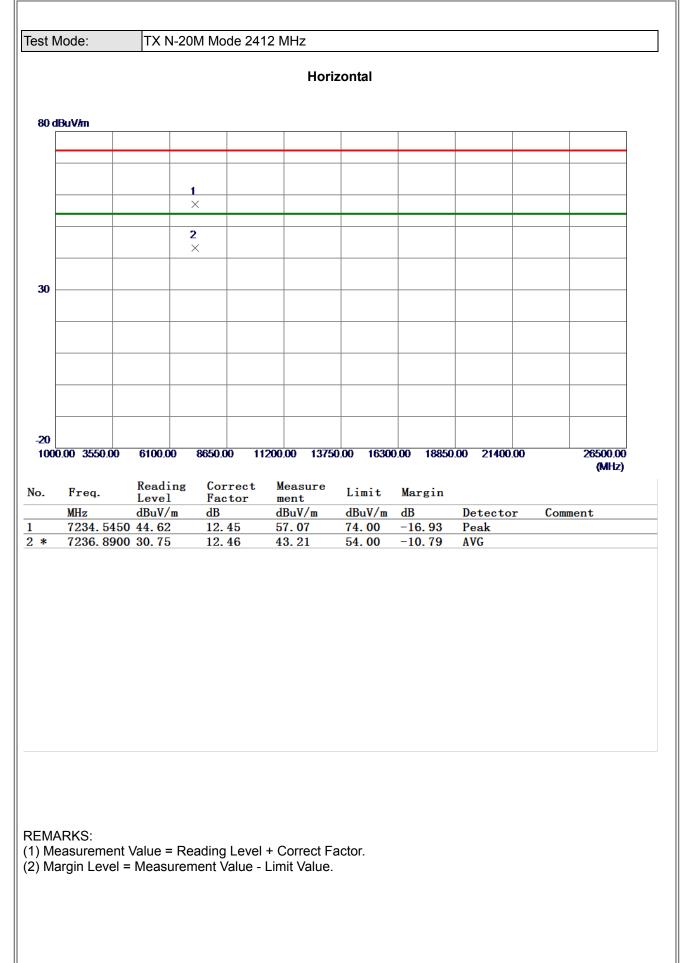




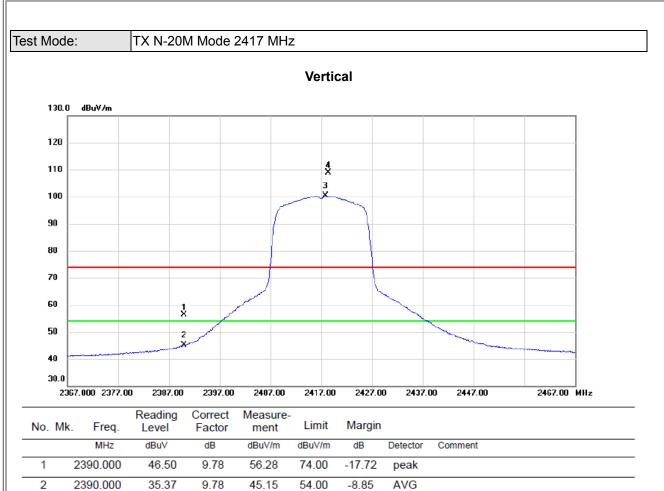












3 *

4 X

2417.900

2418.400

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

90.59

99.13

9.78

9.79

100.37

108.92

54.00

74.00

46.37

34.92

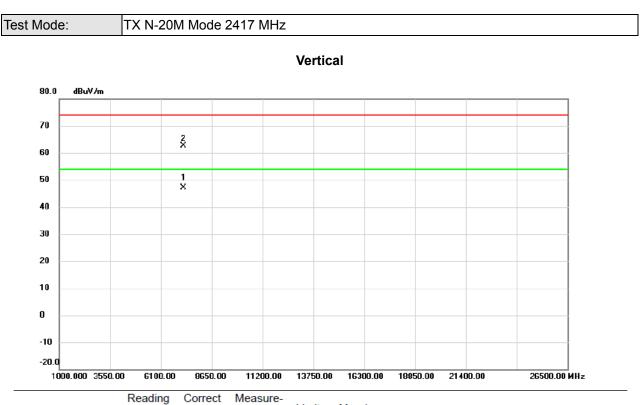
AVG

peak

No Limit

No Limit

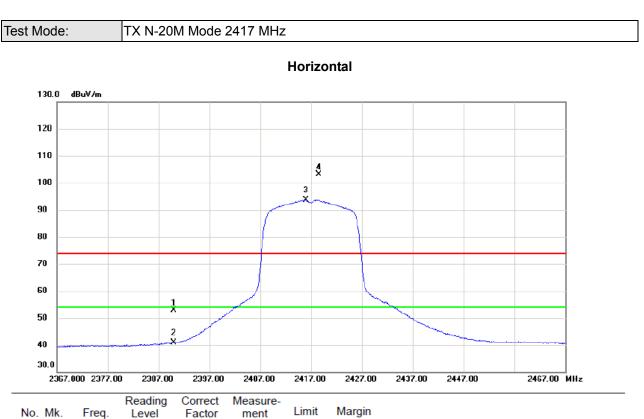




	No.	Mk.	Freq.			ment	Limit	Margin		
-			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1 *	* 7	249.255	34.61	12.48	47.09	54.00	-6.91	AVG	
-	2	7	251.403	50.17	12.48	62.65	74.00	-11.35	peak	

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

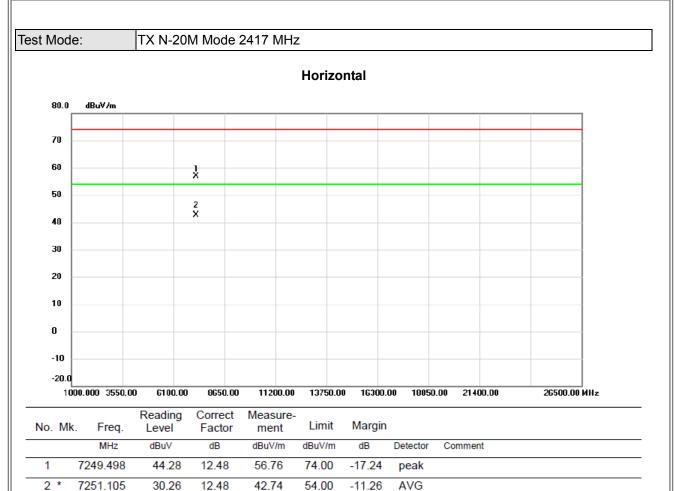




	No. N	۷k.	Freq.	Level	Factor	ment	Limit	Margin		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1	23	390.000	43.19	9.78	52.97	74.00	-21.03	peak	
_	2	23	390.000	31.09	9.78	40.87	54.00	-13.13	AVG	
	3 *	24	415.950	83.97	9.78	93.75	54.00	39.75	AVG	No Limit
_	4 X	(24	418.500	93.34	9.79	103.13	74.00	29.13	peak	No Limit

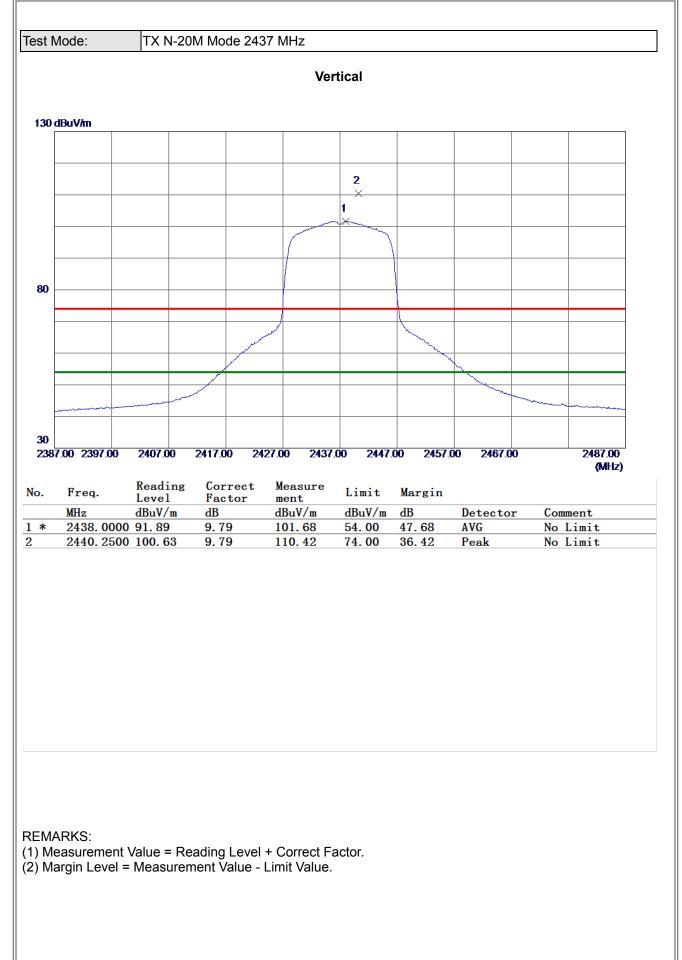
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



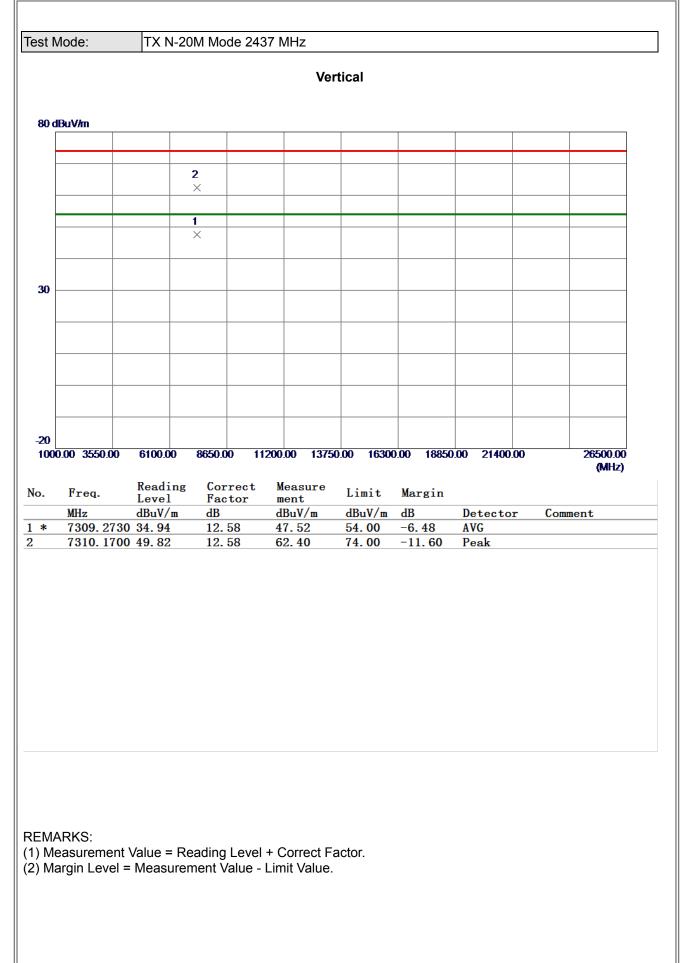


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

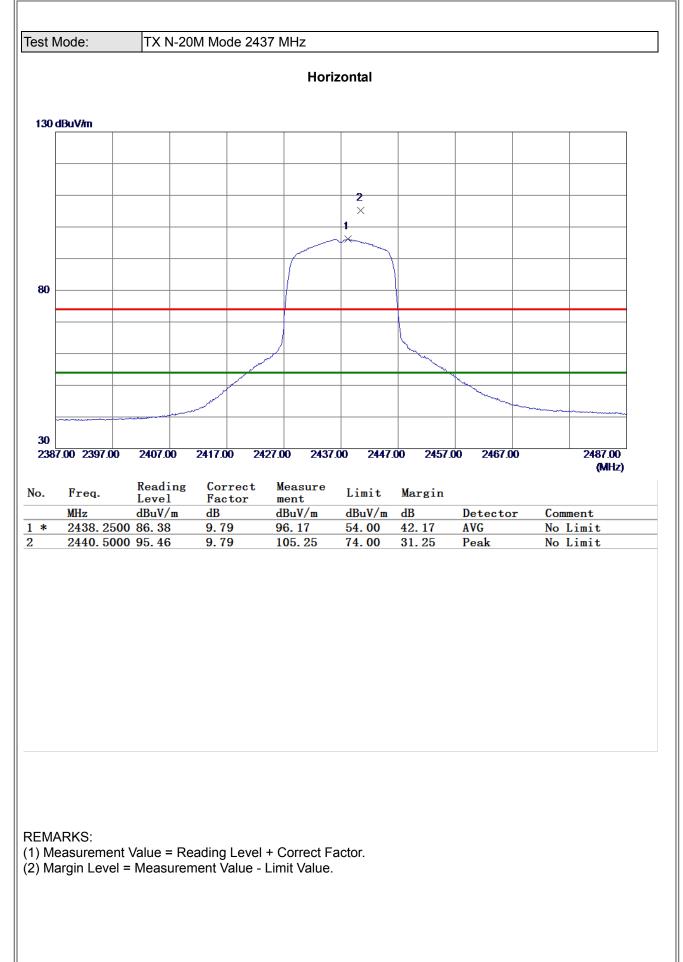




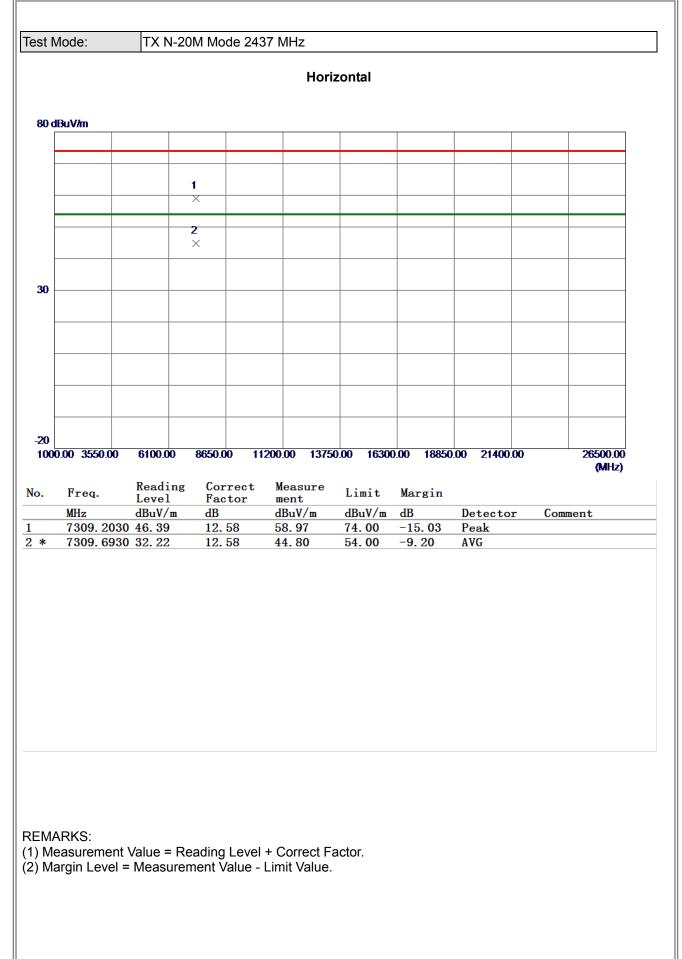




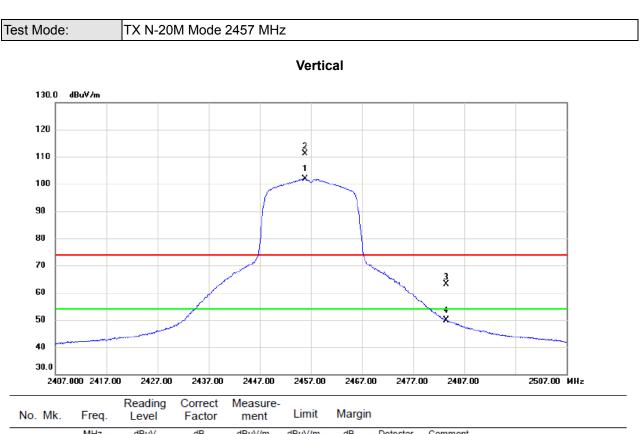








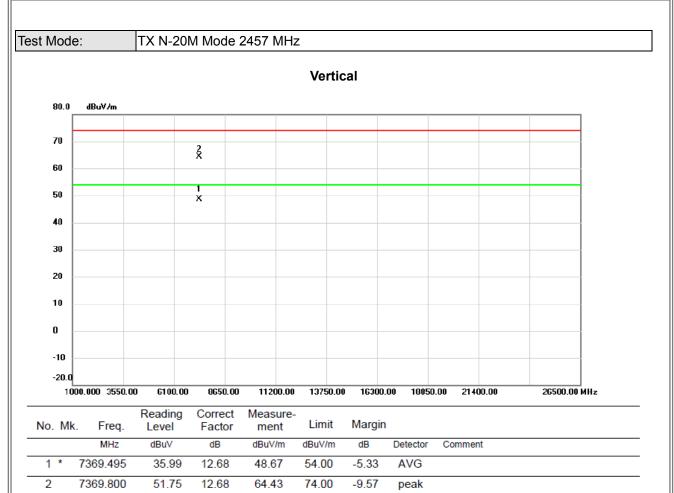




INO.	IVIK	. Fieq.	Level	Factor	ment	Linin	margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2455.800	91.99	9.80	101.79	54.00	47.79	AVG	No Limit
2	Х	2455.900	101.35	9.80	111.15	74.00	37.15	peak	No Limit
3		2483.500	53.28	9.81	63.09	74.00	-10.91	peak	
4		2483.500	40.16	9.81	49.97	54.00	-4.03	AVG	

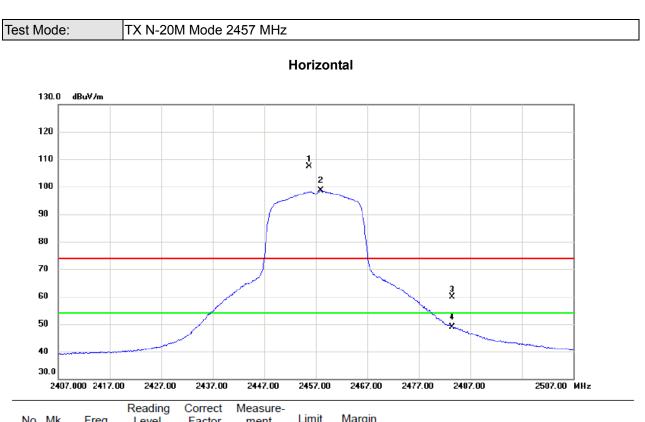
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





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

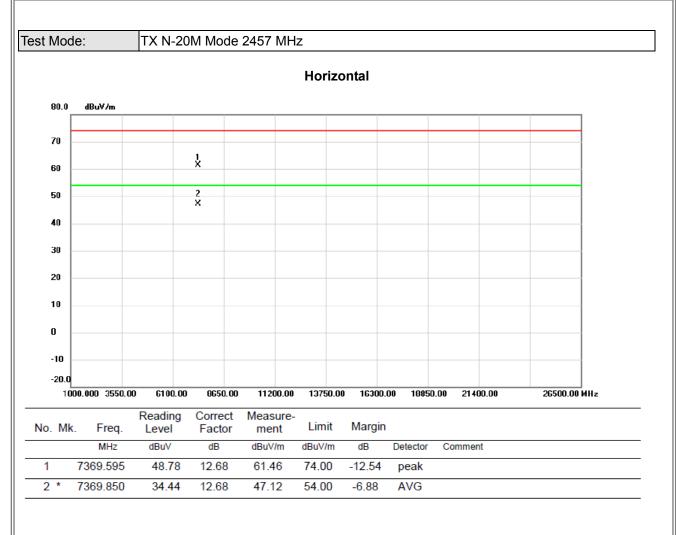




MHz dBuV dB dBuV/m dBuV/m dB Detector Comment 1 X 2455.750 97.52 9.80 107.32 74.00 33.32 peak No Limit 2 * 2458.050 88.82 9.80 98.62 54.00 44.62 AVG No Limit 3 2483.500 50.04 9.81 59.85 74.00 -14.15 peak 4 2483.500 39.03 9.81 48.84 54.00 -5.16 AVG	No. Mk	. Freq.	Level	Factor	ment	Limit	Margin			
2 * 2458.050 88.82 9.80 98.62 54.00 44.62 AVG No Limit 3 2483.500 50.04 9.81 59.85 74.00 -14.15 peak		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
3 2483.500 50.04 9.81 59.85 74.00 -14.15 peak	1 X	2455.750	97.52	9.80	107.32	74.00	33.32	peak	No Limit	
	2 *	2458.050	88.82	9.80	98.62	54.00	44.62	AVG	No Limit	
4 2483.500 39.03 9.81 48.84 54.00 -5.16 AVG	3	2483.500	50.04	9.81	59.85	74.00	-14.15	peak		
	4	2483.500	39.03	9.81	48.84	54.00	-5.16	AVG		

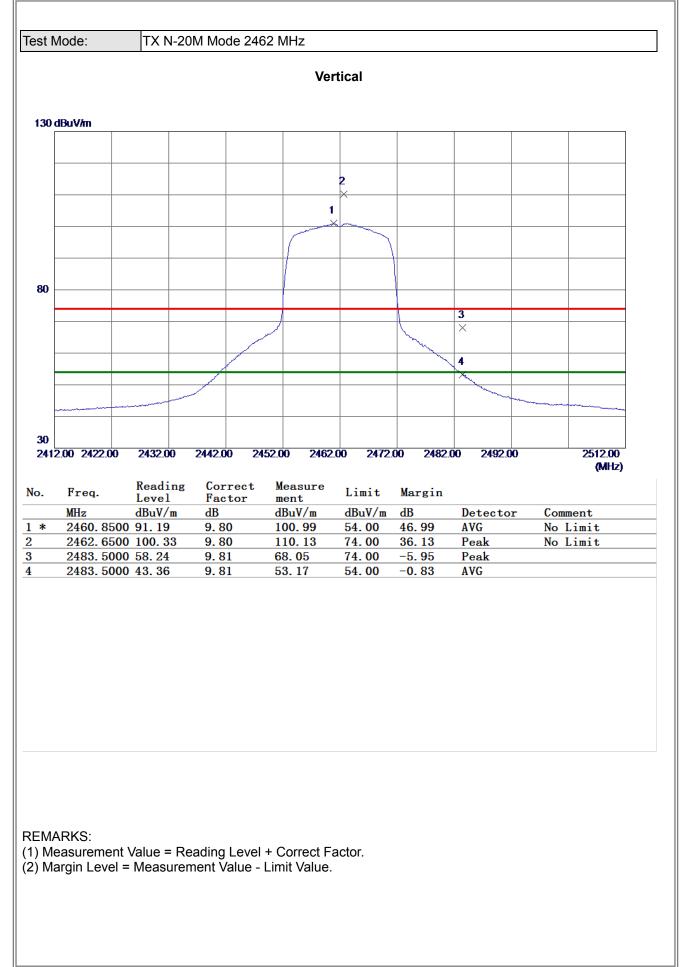
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



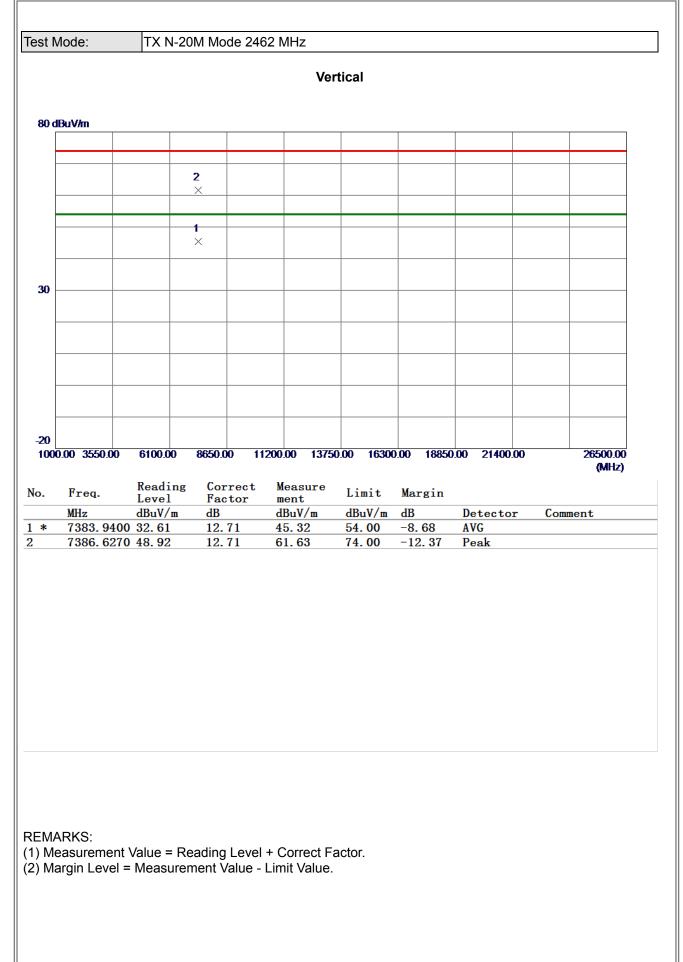


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

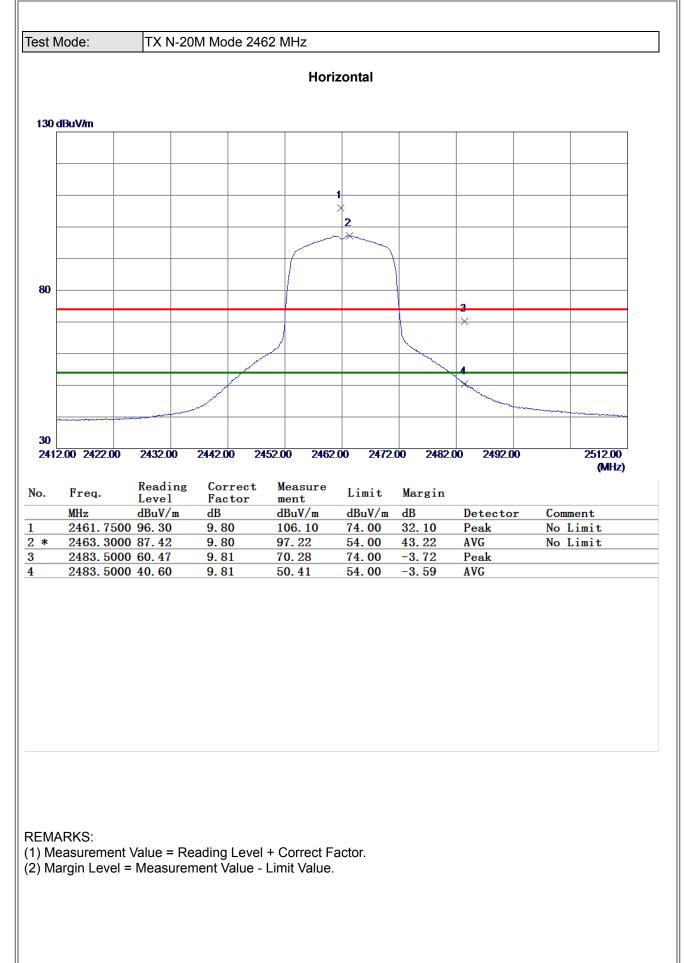




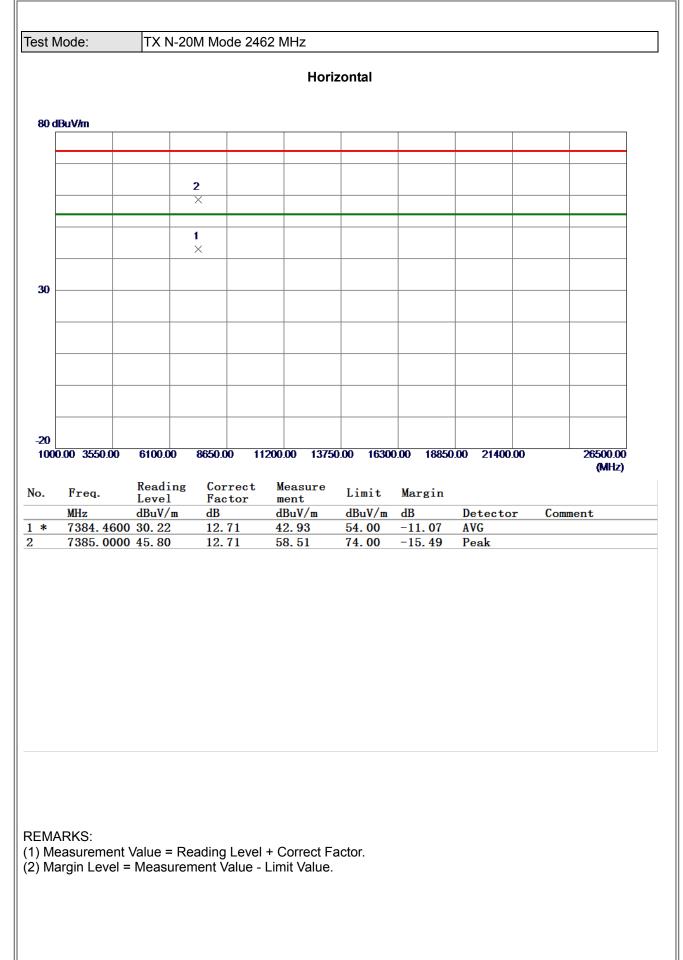












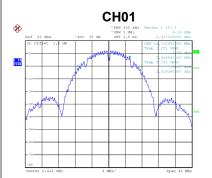


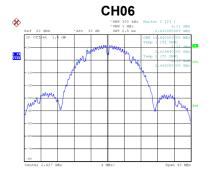
APPENDIX E - BANDWIDTH



Test Mode	TX B Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	10.06	500	Complies
06	2437	10.02	500	Complies
11	2462	9.08	500	Complies
*P *V Ref 20 dBm *Att 30 dB S 20 Offpet 1.6 dB	VIII 2:5 million 10:00071000 NIIII VIII VIIII 1:1000 1:000 VIIII VIIIII 1:000 1:000 VIIIII VIIIIIIII 1:000 1:000 VIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	• VBW 300 kHz	1 (T1) -0.22 dB 0.01960000 MBz ref 20 dBm *Att 30 dB 1 (T1) -0.7 dBm -0.7 dBm -	HILE MARKEN BALL STATE MARKEN STATE MARKE
Channel	Frequency		n Randwidth (MHz)	Popult

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	14.72	Complies
06	2437	14.64	Complies
11	2462	14.56	Complies







Date: 26.MAY.2020 14:03:31

Date: 26.MAY.2020 14:04:05

Date: 26.MAY.2020 14:04:43



est Mode	TX G Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	16.08 500		Complies
06	2437	16.38	500	Complies
11	2462	16.12	500	Complies
		CHOSE *********************************		CH11:
71	7 Bpan 20 MBz	Center 2.437 08z 2 M8z/	29 MH 20 MHz Centre 2.442 OHz 2 Date: 26.MAY.2020 11:36:15	Maz/ žpran 20 Maz
	Frequency (MHz)	Date: 26.MMY.2020 11:33:56		naz/ zpran 20 Max
te: 27.MAY.2020 10:51:23	Frequency	Date: 26.MWY.2020 11:33:56	Date: 26,MMY.2020 11:36:15	
te: 27,MV.2020 10:51:23	Frequency (MHz)	Date: 26.MW.2020 11:33:56	on Bandwidth (MHz)	Result
te: 27.MW.2020 10:51:23	Frequency (MHz) 2412	Date: 26.MWY.2020 11:33:56	on Bandwidth (MHz) 16.80	Result Complies



Test Mode	TX N-20M Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	17.36	500	Complies
06	2437	17.62	500	Complies
11	2462	17.62	500	Complies
*20 Ref 20 dBm *Att 30 dB */ 10 0ffbet 1.8 dB	HOI 1 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	Image: Contract of the second seco		************************************
Channel	Frequency (MHz)	99 % Emissio	n Bandwidth (MHz)	Result
01	2412		17.92	Complies
06	2437		18.08	Complies
11	2462		18.08	Complies
* 12	Hond and a set of the	Creating and the second		EXPENSION 1992 1993 2013 2013 2013 2013 2013 2013 2013 2014 2014 2014 2014 2014 20



APPENDIX F - MAXIMUM AVERAGE OUTPUT POWER



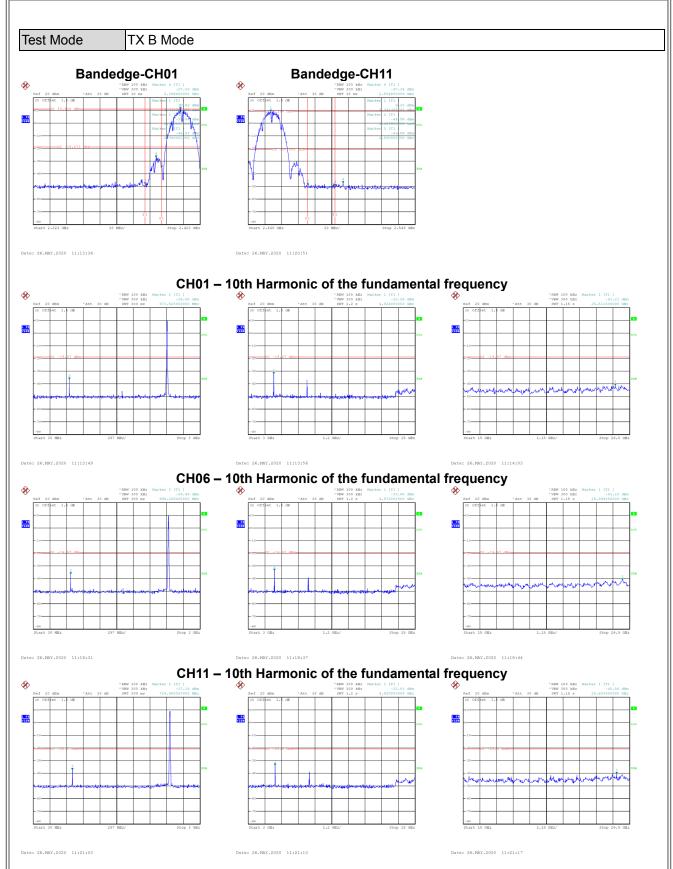
Test Mode TX B Mode										
Channel	Frequency (MHz)	Average Output Power (dBm)	Duty Factor	Average Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result			
01	2412	19.72	0.00	19.72	30.00	1.0000	Complies			
06	2437	19.92	0.00	19.92	30.00	1.0000	Complies			
11	2462	19.82	0.00	19.82	30.00	1.0000	Complies			
Test Mode	TX G Mo	de								
Channel	Frequency	de Average Output Power	Duty	Average Output Power	Max. Limit	Max. Limit	Result			
onanner	(MHz)	(dBm)	Factor	+ Duty Factor (dBm)	(dBm)	(W)	rtesuit			
01	2412	17.73	0.00	17.73	30.00	1.0000	Complies			
06	2437	19.71	0.00	19.71	30.00	1.0000	Complies			
11	2462	18.83	0.00	18.83	30.00	1.0000	Complies			
		· · · · ·		· · · ·		· · ·				
Test Mode TX N-20M Mode										

Channel	Frequency (MHz)	Average Output Power (dBm)	Duly	Average Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	16.46	0.00	16.46	30.00	1.0000	Complies
06	2437	19.72	0.00	19.72	30.00	1.0000	Complies
11	2462	18.53	0.00	18.53	30.00	1.0000	Complies



APPENDIX G - CONDUCTED SPURIOUS EMISSIONS





Note:

The RF power generated by the transmitter in any 100 kHz out of the frequency band is less than 30 decibels (dB) lower than the RF power in the 100 kHz with the highest required power in the frequency band.