

FCC Radio Test Report

FCC ID: KA2IRLX1870A1

This report concerns: Original Grant

Project No.	:	2005H044
Equipment	:	1) AX1800 Whole Home Mesh Wi-Fi 6 Router
		2) AX1800 Whole Home Mesh Wi-Fi 6 System
Brand Name	:	D-Link
Test Model	:	COVR-X1870
Series Model	:	COVR-X1872, COVR-X1873, DIR-LX1870, DIR-LX1872, DIR-LX1873
Applicant	:	D-Link Corporation
Address	:	17595 Mt. Herrmann, Fountain Valley, California United State 92708
Manufacturer	:	D-Link Corporation
Address	:	17595 Mt. Herrmann, Fountain Valley, California United State 92708
Date of Receipt	:	May 25, 2020
Date of Test	:	May 25, 2020~Jul. 02, 2020
Issued Date	:	Jul. 20, 2020
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SH2020052550 for EUT; SH2020052550-1/
		SH20200609295-2 for adapter.
Standard(s)	:	FCC Part15, Subpart C (15.247)
		ANSI C63.10-2013
		KDB 558074 D01 15.247 Meas Guidance v05r02

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

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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	8
1.2 MEASUREMENT UNCERTAINTY	8
1.3 TEST ENVIRONMENT CONDITIONS	8
2 . GENERAL INFORMATION	9
2.1 GENERAL DESCRIPTION OF EUT	9
2.2 DESCRIPTION OF TEST MODES	12
2.3 PARAMETERS OF TEST SOFTWARE	13
2.4 DUTY CYCLE	17
2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	18
2.6 SUPPORT UNITS	18
3 . AC POWER LINE CONDUCTED EMISSIONS TEST	19
3.1 LIMIT	19
3.2 TEST PROCEDURE	19
3.3 DEVIATION FROM TEST STANDARD	19
3.4 TEST SETUP	20
3.5 EUT OPERATION CONDITIONS	20
3.6 TEST RESULTS	20
4 . RADIATED EMISSIONS TEST	21
4.1 LIMIT	21
4.2 TEST PROCEDURE	22
4.3 DEVIATION FROM TEST STANDARD	22
4.4 TEST SETUP	23
4.5 EUT OPERATION CONDITIONS	24
4.6 TEST RESULTS - 9 KHZ TO 30 MHZ	25
4.7 TEST RESULTS - 30 MHZ TO 1000 MHZ	25
4.8 TEST RESULTS - ABOVE 1000 MHZ	25
5 . BANDWIDTH TEST	26
5.1 LIMIT	26
5.2 TEST PROCEDURE	26
5.3 DEVIATION FROM STANDARD	26
5.4 TEST SETUP	26



Table of Contents	Page
5.5 EUT OPERATION CONDITIONS	26
5.6 TEST RESULTS	26
6 . MAXIMUM OUTPUT POWER TEST	27
6.1 LIMIT	27
6.2 TEST PROCEDURE	27
6.3 DEVIATION FROM STANDARD	27
6.4 TEST SETUP	27
6.5 EUT OPERATION CONDITIONS	27
6.6 TEST RESULTS	27
7 . CONDUCTED SPURIOUS EMISSIONS	28
7.1 LIMIT	28
7.2 TEST PROCEDURE	28
7.3 DEVIATION FROM STANDARD	28
7.4 TEST SETUP	28
7.5 EUT OPERATION CONDITIONS	28
7.6 TEST RESULTS	28
8 . POWER SPECTRAL DENSITY TEST	29
8.1 LIMIT	29
8.2 TEST PROCEDURE	29
8.3 DEVIATION FROM STANDARD 8.4 TEST SETUP	29 29
8.5 EUT OPERATION CONDITIONS	29 29
8.6 TEST RESULTS	29
9 . MEASUREMENT INSTRUMENTS LIST	30
10 . EUT TEST PHOTO	32
APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS	35
APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ	38
APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ	39
APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ	42
APPENDIX E - BANDWIDTH	127
APPENDIX F - MAXIMUM OUTPUT POWER	135
APPENDIX G - CONDUCTED SPURIOUS EMISSIONS	148



Table of Contents

Page

APPENDIX H - POWER SPECTRAL DENSITY

163



REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jul. 20, 2020

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

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

Note:

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



1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210, China BTL's Test Firm Registration Number for FCC: 476765 BTL's Designation Number for FCC: CN1241

1.2 MEASUREMENT UNCERTAINTY

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

A. Radiated emissions test:

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

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

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	23°C	56%	AC 120V/60Hz	Forest Li
Radiated Emissions-30 MHz to 1GHz	24°C	58%	AC 120V/60Hz	Forest Li
Radiated Emissions-Above 1000 MHz	24°C	58%	AC 120V/60Hz	Forest Li
Bandwidth	24°C	56%	AC 120V/60Hz	Forest Li
Maximum output power	24°C	56%	AC 120V/60Hz	Forest Li
Conducted Spurious Emissions	24°C	56%	AC 120V/60Hz	Forest Li
Power Spectral Density	24°C	56%	AC 120V/60Hz	Forest Li



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	1) AX1800 Whole Home Mesh Wi-Fi 6 Router				
Equipment	2) AX1800 Whole Home Mesh Wi-Fi 6 System				
Brand Name	D-Link				
Test Model	COVR-X1870				
Series Model	COVR-X1872, COVR-X1873, DIR-LX1870, DIR-LX1872, DIR-LX1873				
	COVR-X1870 /DIR-LX1870: Single Pack;				
Madal Differences (a)	COVR-X1872/DIR-LX1872: double Pack;				
Model Difference(s)	DIR-LX1873 /COVR-X1873: treble Pack				
	All versions of the Models are electrically equal except for the model name				
Software Version	and number of packages.				
•••••••					
Hardware Version	A1				
Power Source	DC voltage supplied from AC/DC adapter. 1# Brand/Model: Gongjin/S12A12-120A100-CJ 2# Brand/Model: Gongjin/WB-12G12R				
Devuer Deting	1# I/P: 100-240V~50/60Hz max 0.5A O/P:12V 1A				
Power Rating	2# I/P: 100-240V~50-60Hz 0.3A Max. O/P:12.0V 1.0A 12.0W				
Operation Frequency	2412 MHz ~ 2462 MHz				
Modulation Type	OFDM,OFDMA				
Bit Rate of Transmitter	Up to 574Mbps				
Maximum Avg Output Power Non-Beamforming	IEEE 802.11ax (HE20): 25.88 dBm (0.3873 W) IEEE 802.11ax (HE40): 23.17 dBm (0.2075 W)				
Maximum Avg Output Power Beamforming	IEEE 802.11ax (HE20): 25.65 dBm (0.3673 W) IEEE 802.11ax (HE40): 22.79 dBm (0.1901 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 802.11ax (HE20) CH03 - CH09 for IEEE 802.11ax (HE40)							
Channel Frequency (MHz) Channel Frequency (MHz) Channel Frequency (MHz) Channel Frequency (MHz)							
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		



3. RU configuration

Operating Mode	Resource Unit	52 Tone(4M)	
		37	
	Specific Resource Unit	38	
		40	
IEEE 802.11ax	Resource Unit	106 Tone(8M)	
(HE20)	Specific Resource Unit	53	
	Specific Resource Unit	54	
	Resource Unit	242 Tone(20M)	
	Specific Resource Unit	61	
Operating Mode	Resource Unit	52 Tone(4M)	
		37	
	Specific Resource Unit	40	
		44	
	Resource Unit	106 Tone(8M)	
		53	
IEEE 802.11ax	Specific Resource Unit	54	
(HE40)		56	
(11240)	Resource Unit	242 Tone(20M)	
	Spacific Resource Unit	61	
	Specific Resource Unit	62	
	Resource Unit	484 Tone(40M)	
	Specific Resource Unit	65	



4. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Dipole	IPEX	3
2	N/A	N/A	Dipole	IPEX	3

Note:

 Antenna Gain=3 dBi. This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so Directional gain =GAnt.+10log(N)dBi,

that is Directional gain= $3+10\log(2)dBi=6.01$. So output power limit is 30-6.01+6=29.99, the power spectral density limit is 8-6.01+6=7.99.

- (2) Beamforming gain: 3dB.
- 5. Table for Antenna Configuration:

Operating Mode TX Mode	Ant. 1	Ant. 2	Ant. 1 + Ant. 2
IEEE 802.11ax (HE20)	\checkmark	\checkmark	~
IEEE 802.11ax (HE40)	\checkmark	\checkmark	~

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 AX-20 Mode Channel 01/06/11	
Mode 2	TX AX-40 Mode Channel 01/06/11	
Mode 3	TX Mode	

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 Mode	

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

Radiated emissions test- Above 1GHz			
Final Test Mode: Description			
Mode 1	TX AX-20 Mode Channel 01/06/11		
Mode 2	TX AX-40 Mode Channel 01/06/11		

Conducted test			
Final Test Mode: Description			
Mode 1	TX AX-20 Mode Channel 01/06/11		
Mode 2	TX AX-40 Mode Channel 01/06/11		

NOTE:

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

- (2) 802.11n HT20 mode : BPSK (13 Mbps)
 802.11n HT40 mode : BPSK (27 Mbps)
 For radiated emission tests, the highest output powers were set for final test.
- (3) For conducted emissions and radiated emission below 1 GHz test, two power adapter has been pre-tested, but only the worst case recorded in this report.

2.3 PARAMETERS OF TEST SOFTWARE

2TX					
Test Software	accessMTool				
Operating Mode	Test Frequency (MHz) Resource Unit Specific Resource Unit		Parameters of Test Software		
			37	71	
		52 Tone	38	71	
	2412		40	71	
	2412	106 Tone	53	72	
		TUO TUNE	54	72	
		242 Tone	61	68	
	2437	52 Tone	37	86	
			38	84	
IEEE 802.11ax			40	86	
(HE20)		106 Tone	53	77	
			54	80	
		242 Tone	61	74	
			37	70	
		52 Tone	38	70	
	2462		40	70	
	2462 -	106 Tone	53	68	
			54	68	
		242 Tone	61	68	

Non-Beamforming



2TX				
Test Software	accessMTool			
Operating Mode	Test Frequency (MHz)			Parameters of Test Software
			37	58
		52 Tone	40	58
			44	58
			53	59
	2422	106 Tone	54	59
			56	59
		242 Tone	61	60
		242 TONE	62	60
		484 Tone	65	56
			37	68
	2437	52 Tone	40	68
			44	68
IEEE 802.11ax		106 Tone	53	69
			54	69
(HE40)			56	69
		242 Tone	61	72
			62	72
		484 Tone	65	67
			37	54
		52 Tone	40	54
			44	54
			53	64
	2452	106 Tone	54	64
			56	64
		242 Tone	61	66
			62	66
		484 Tone	65	61



Beamforming

2TX				
Test Software	accessMTool			
Operating Mode	Test Frequency (MHz)	Resource Unit	Specific Resource Unit	Parameters of Test Software
			37	71
		52 Tone	38	71
	2412		40	71
	2412	106 Tone	53	72
		TUO TUNE	54	72
		242 Tone	61	68
	2437	52 Tone	37	86
			38	84
IEEE 802.11ax			40	86
(HE20)		106 Tone	53	77
			54	80
		242 Tone	61	74
			37	70
		52 Tone	38	70
	2462		40	70
	2462	106 Tone	53	68
		TUB TONE	54	68
		242 Tone	61	68

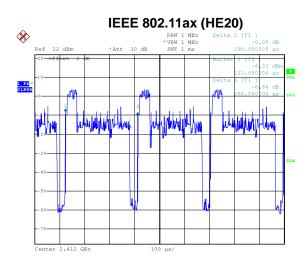


2TX				
Test Software	accessMTool			
Operating Mode	Test Frequency (MHz)			Parameters of Test Software
			37	58
		52 Tone	40	58
			44	58
			53	59
	2422	106 Tone	54	59
			56	59
		242 Tone	61	60
		242 10110	62	60
		484 Tone	65	56
			37	68
	2437	52 Tone	40	68
			44	68
IEEE 802.11ax		106 Tone	53	69
			54	69
(HE40)			56	69
		242 Tone	61	72
			62	72
		484 Tone	65	67
			37	54
		52 Tone	40	54
			44	54
			53	64
	2452	106 Tone	54	64
			56	64
		242 Tone	61	66
			62	66
		484 Tone	65	61



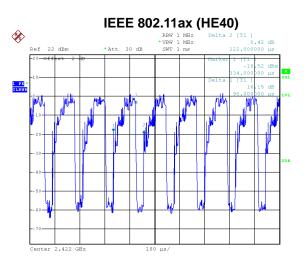
2.4 DUTY CYCLE

If duty cycle is \geq 98 %, duty factor is not required. If duty cycle is < 98 %, duty factor shall be considered. The output power = measured power + duty factor.

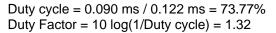


Date: 2.JUN.2020 15:07:54

Duty cycle = 0.258 ms / 0.290 ms = 88.97%Duty Factor = $10 \log(1/\text{Duty cycle}) = 0.51$,



Date: 2.JUN.2020 15:04:40



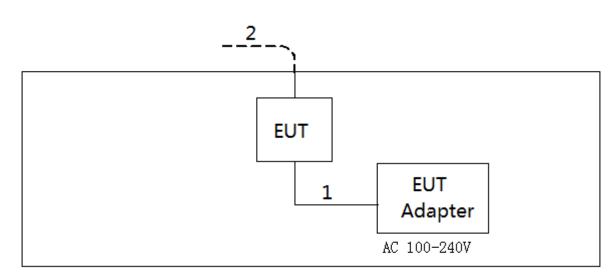
NOTE:

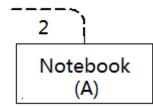
For IEEE 802.11ax (HE20) and IEEE 802.11ax (HE40):

For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 kHz (Duty cycle < 98%).



2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





2.6 SUPPORT UNITS

ltem	Equipment	Brand	Model/Type No.	Series No.
A	S	Lenovo	#P152014	N/A

ltem	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m
2	RJ45 Cable	NO	NO	10m



3. AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

	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

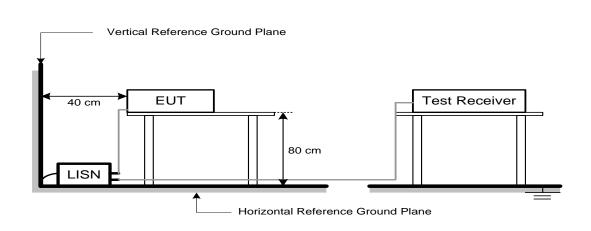
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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)	Band edge/ Harmonic at 3m (dBµV/m)		
	Peak	Average	
Above 1000	74	54	

NOTE:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following: Measurement Value = Reading Level + Correct Factor Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use) Margin Level = Measurement Value - Limit Value



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

Receiver Parameter	Setting	
Attenuation	Auto	
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector	
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector	
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector	
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector	
Start ~ Stop Frequency 30 MHz~1000 MHz for QP detector		

4.2 TEST PROCEDURE

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

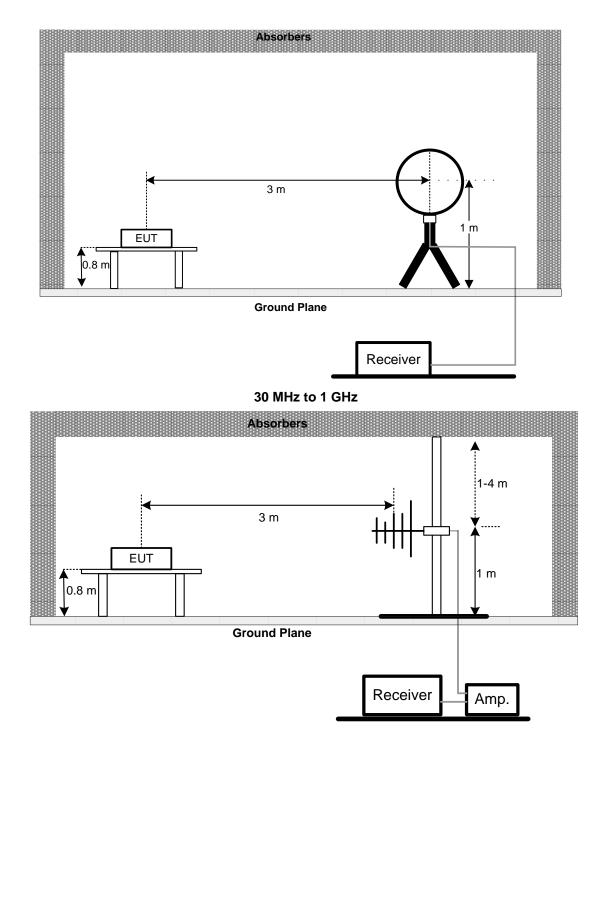
4.3 DEVIATION FROM TEST STANDARD

No deviation

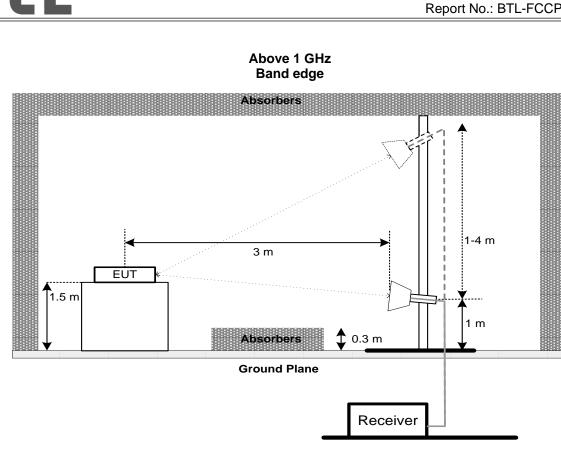


4.4 TEST SETUP

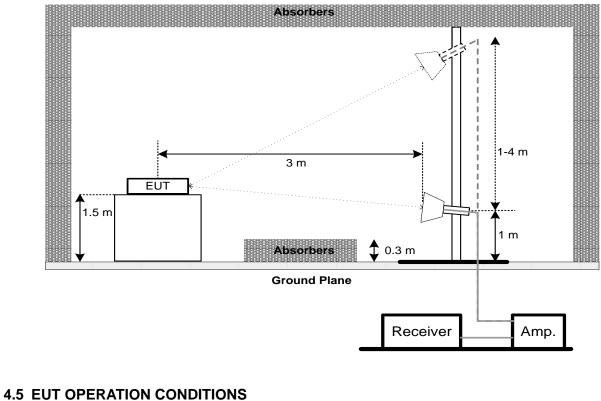
9 kHz-30 MHz







Harmonic



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			
	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.

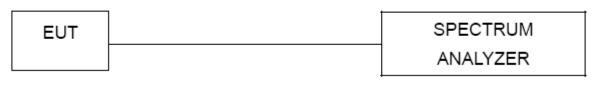
For 99% Emission Bandwidth B/G/N-20 Mode: RBW= 300 KHz, VBW=1 MHz, Sweep time = 2.5 ms. For 99% Emission Bandwidth N-40 Mode: RBW= 1 MHz, VBW=3 MHz, Sweep time = 2.5 ms.

c. The bandwidth was performed in accordance with method 11.8.1 of ANSI C63.10-2013.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to the APPENDIX E.



6. MAXIMUM OUTPUT POWER TEST

6.1 LIMIT

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

6.2 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- b. The maximum conducted output power was performed in accordance with method 11.9.1.3 (for peak power) or 11.9.2.3.1 (for AVG power) of ANSI C63.10-2013.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX F.



7. CONDUCTED SPURIOUS EMISSIONS

7.1 LIMIT

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

7.2 TEST PROCEDURE

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

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX G.



8. POWER SPECTRAL DENSITY TEST

8.1 LIMIT

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

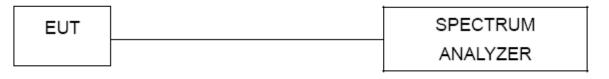
8.2 TEST PROCEDURE

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

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX H.



9. MEASUREMENT INSTRUMENTS LIST

	AC Power Line Conducted Emissions				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Line Impedance Stabilisation Network	Schwarzbeck	NNLK 8121	8121-822	Mar. 21, 2021
2	TWO-LINE V-NETWORK	R&S	ENV216	101340	Sep. 01, 2020
3	Test Cable	emci	EMCRG400-BM-N M-10000	170628	Jul. 16, 2020
4	EMI Test Receiver	R&S	ESCI	100082	Mar. 21, 2021
5	50Ω Terminator	SHX	TF2-1G-A	17051602	Mar. 21, 2021
6	50Ω coaxial switch	Anritsu	MP59B	6201750902	Mar. 21, 2021
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

	Radiated Emissions - 9 kHz to 30 MHz				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EMCI	EMCI LPA600	275	Apr. 02, 2021
2	EMI Test Receiver	R&S	ESCI	100082	Mar. 21, 2021
3	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	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Apr. 02, 2021
2	Pre-Amplifier	emci	EMC9135	980400	Mar. 21, 2021
3	MXE EMI Receiver	Keysight	N9038A	MY57150106	May. 06, 2021
4	Test Cable	emci	EMC104-SM-SM-7 000	170330	Apr. 13, 2021
5	Test Cable	emci	EMC104-SM-SM-1 000	170331	Apr. 13, 2021
6	Test Cable	emci	EMC104-SM-NM-3 500	170621	Apr. 13, 2021
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A



	Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	9120D	00206960	Apr. 02, 2021	
2	Pre-Amplifier	emci	EMC012645SE	980421	May. 11, 2021	
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480545	Mar. 21, 2021	
4	Test Cable	emci	EMC104-SM-SM-7 000	170330	Apr. 13, 2021	
5	Test Cable	emci	EMC104-SM-SM-1 000	170331	Apr. 13, 2021	
6	Test Cable	emci	EMC104-SM-NM-3 500	170621	Apr. 13, 2021	
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
8	MXE EMI Receiver	Keysight	N9038A	MY57150106	May. 06, 2021	
9	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3116C	00203919	Mar. 21, 2021	
10	Pre-Amplifier	emci	EMC184045SE	980409	Mar. 21, 2021	
11	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 21, 2021	
12	Test Cable	emci	EMC102-KM-KM-8 00	170654	Apr. 13, 2021	
13	Test Cable	emci	Super Reliable-40G-SS11- 7000	W0030860001	Apr. 13, 2021	
14	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

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

Maximum Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Peak Power Analyze	Keysight	8990B	MY51000507	Mar. 21, 2021
2	Wideband Power Sensor	Keysight	N9123A	MY58310003	Mar. 21, 2021

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

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

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

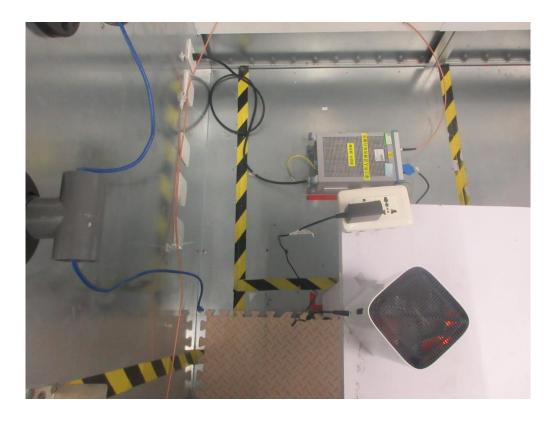
All calibration period of equipment list is one year.



10. EUT TEST PHOTO

Conducted Emissions Test Photos

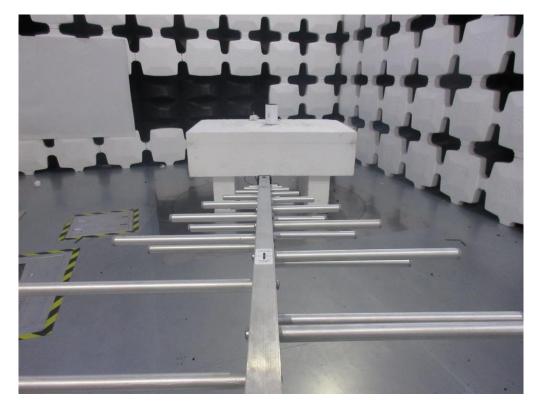


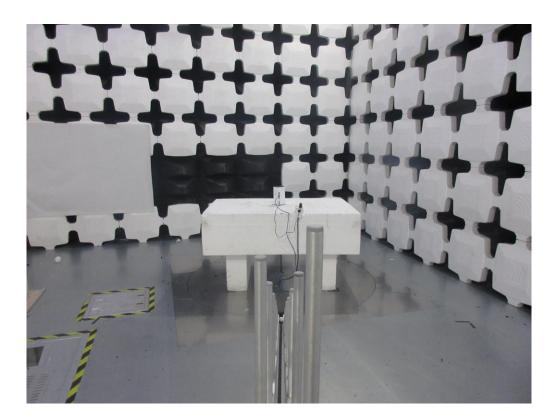


BIL

Radiated Emissions Test Photos

30 MHz to 1 GHz



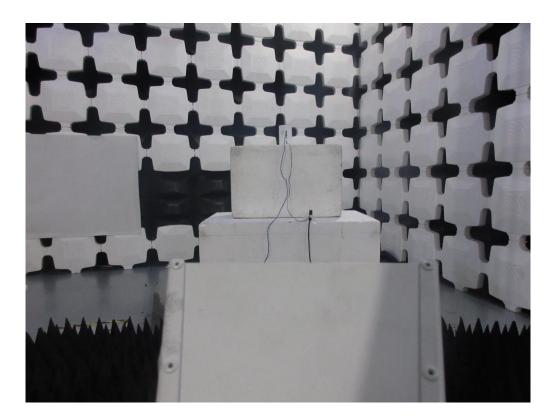




Radiated Emissions Test Photos

Above 1 GHz

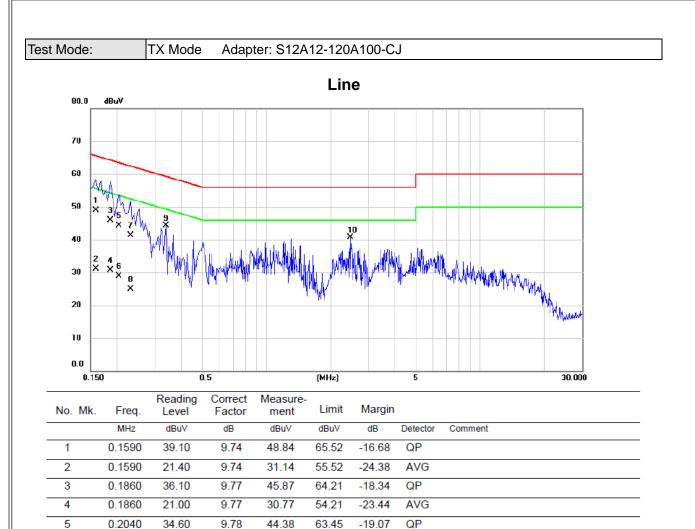






APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS





REMARKS:

6

7

8

9

10

0.2040

0.2310

0.2310

0.3390

2.4765

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

19.10

31.50

15.10

34.56

30.88

9.78

9.79

9.79

9.83

9.82

28.88

41.29

24.89

44.39

40.70

53.45

62.41

52.41

59.23

56.00

-24.57

-21.12

-27.52

-14.84

-15.30

AVG

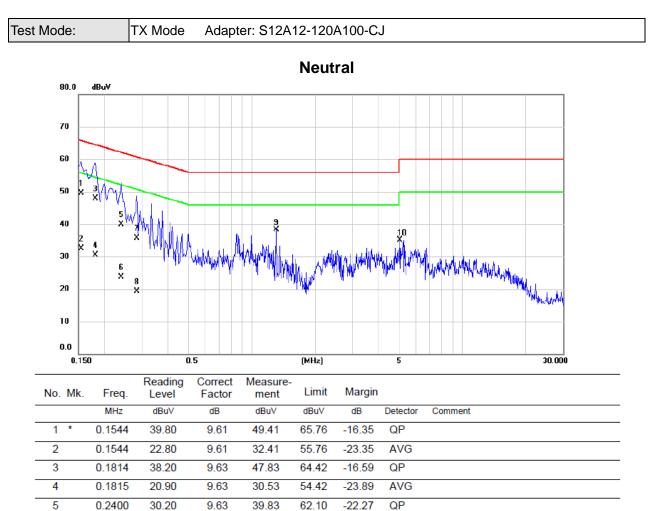
QP

AVG

peak

peak





5	0.2400	30.20	9.63	39.83	62.10	-22.27	QP
6	0.2400	14.10	9.63	23.73	52.10	-28.37	AVG
7	0.2850	26.10	9.65	35.75	60.67	-24.92	QP
8	0.2850	9.70	9.65	19.35	50.67	-31.32	AVG
9	1.3110	28.49	9.74	38.23	56.00	-17.77	peak
10	5.0280	25.24	9.94	35.18	60.00	-24.82	peak

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



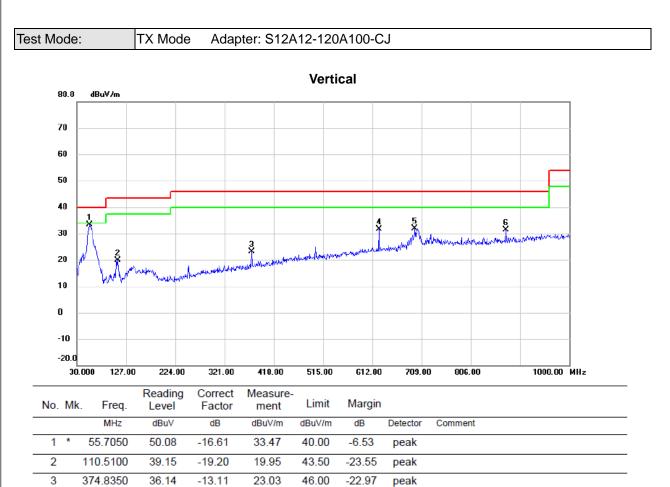
APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

Note: Below 30MHz, The measured value have enough margin over 20dB than the limit, therefore they are not reported



APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ





4

5

6

625.0950

695.9050

874.8700

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

-7.75

-6.83

-4.66

31.58

31.95

31.40

46.00

46.00

46.00

-14.42

-14.05

-14.60

peak

peak

peak

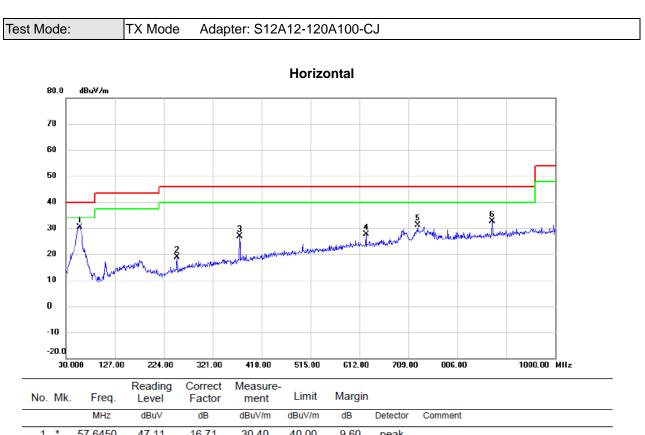
(2) Margin Level = Measurement Value - Limit Value.

39.33

38.78

36.06





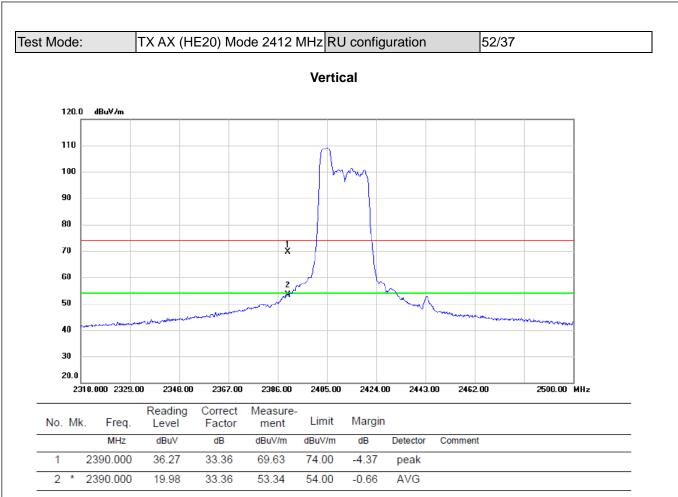
1	*	57.6450	47.11	-16.71	30.40	40.00	-9.60	peak	
2		250.1900	35.61	-16.67	18.94	46.00	-27.06	peak	
3		374.8350	39.89	-13.11	26.78	46.00	-19.22	peak	
4		625.0950	35.34	-7.75	27.59	46.00	-18.41	peak	
5		727.9150	37.33	-6.25	31.08	46.00	-14.92	peak	
6		874.8700	37.32	-4.66	32.66	46.00	-13.34	peak	

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



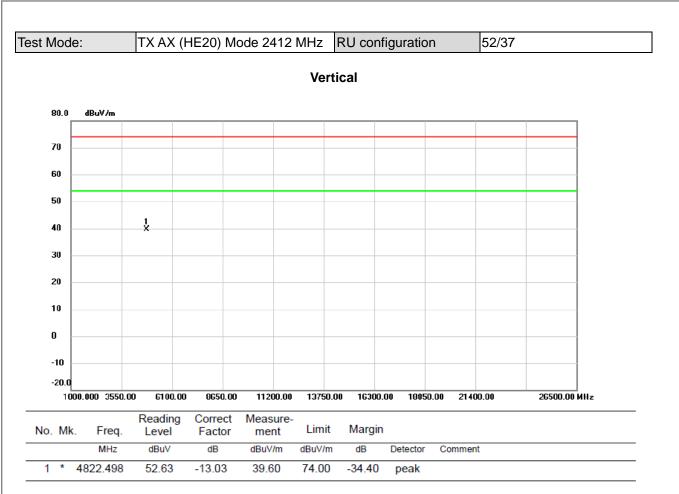
APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ





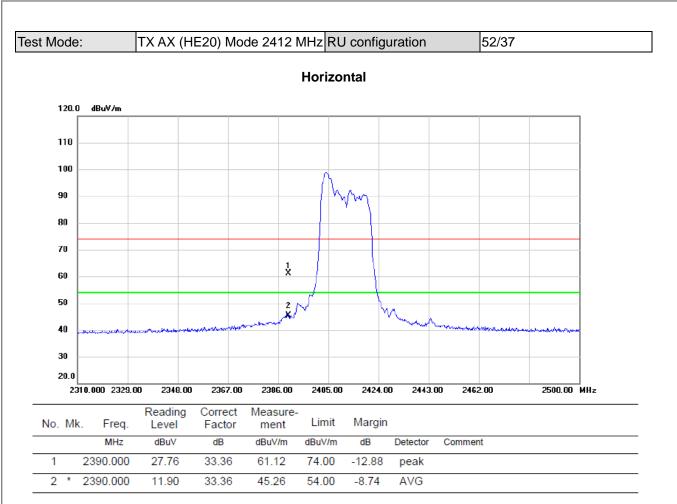
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





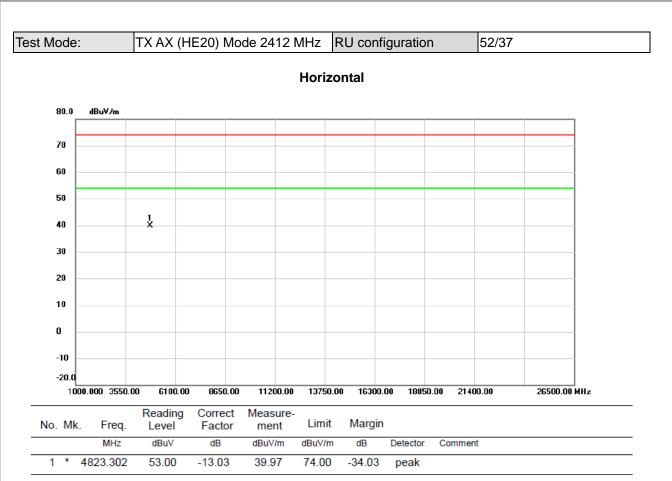
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





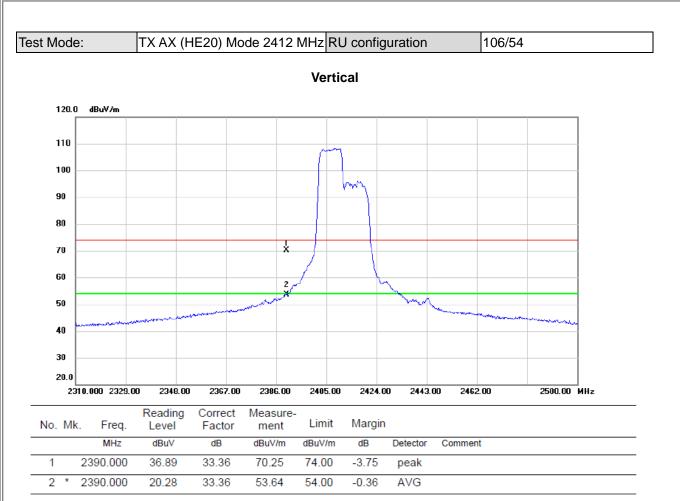
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





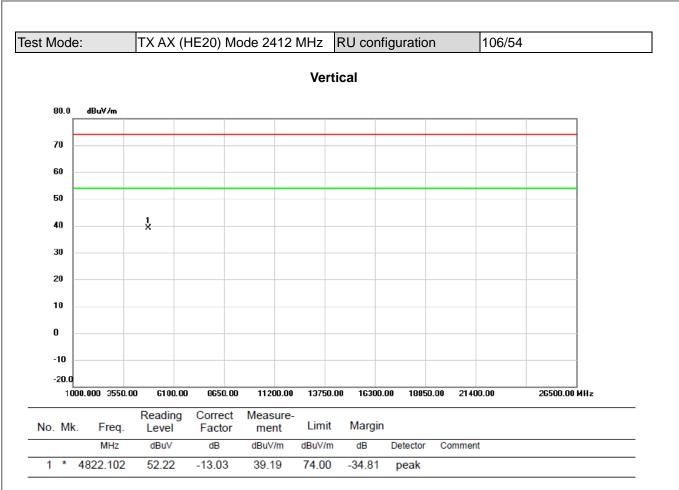
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





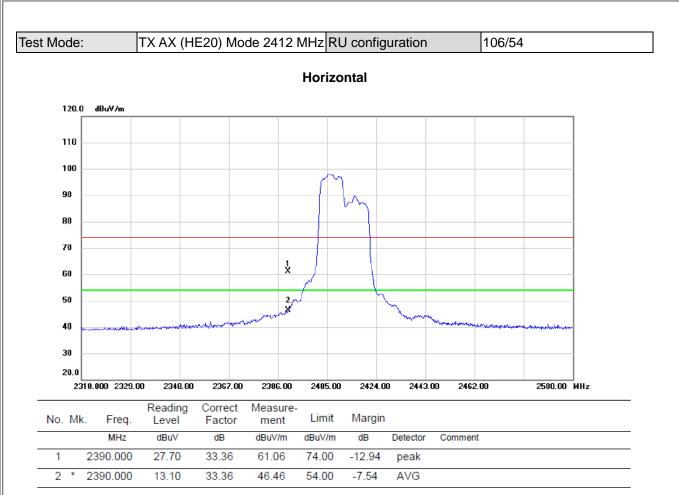
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





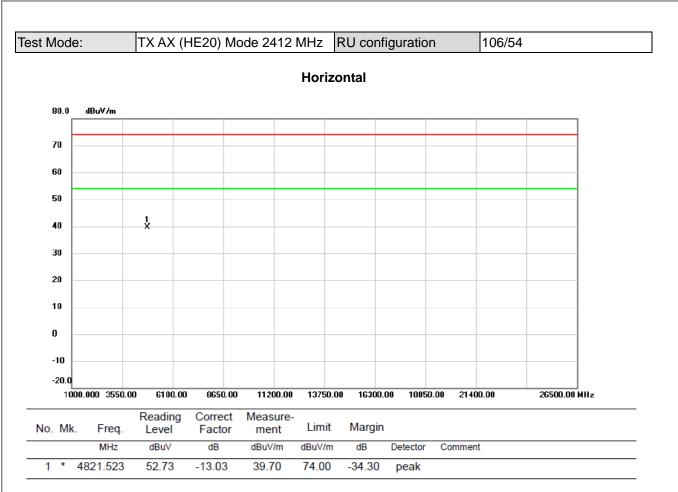
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





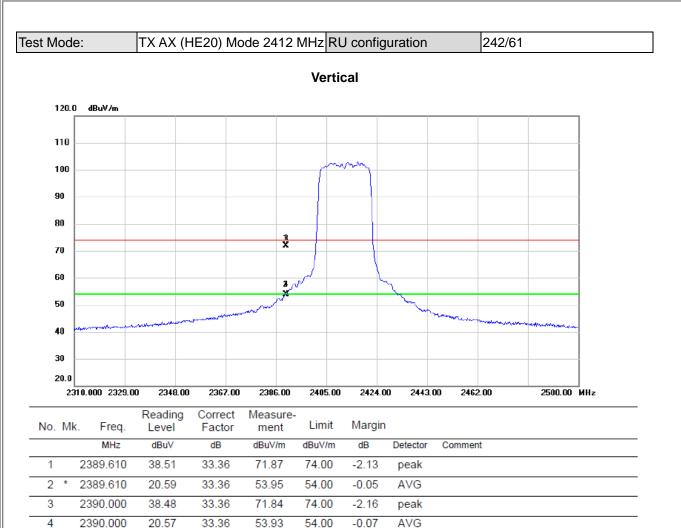
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





4

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

33.36

53.93

54.00

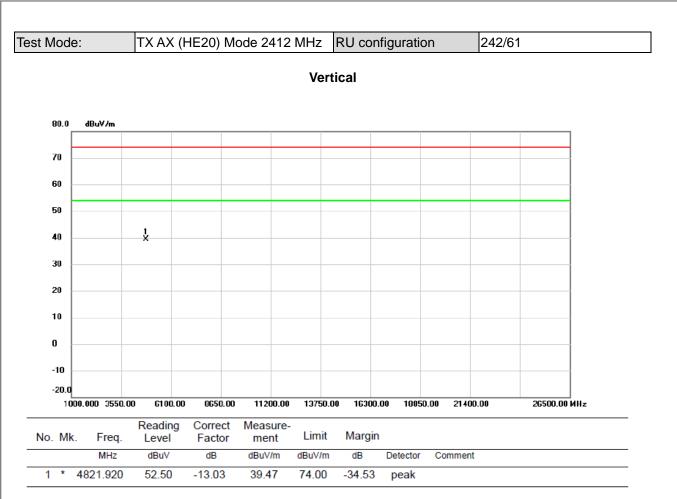
-0.07

AVG

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

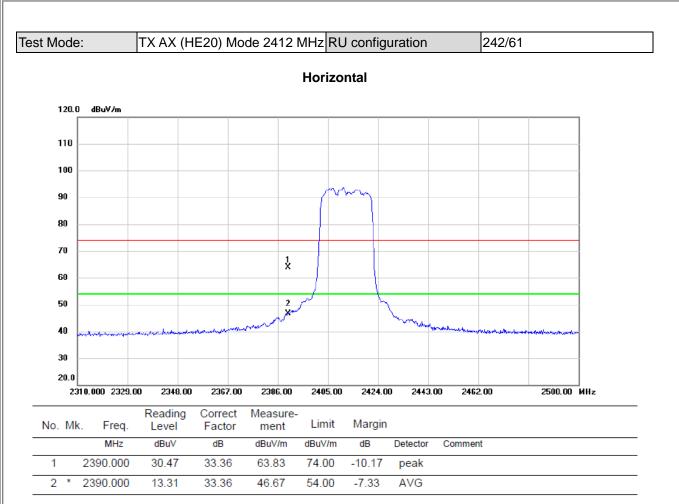
20.57





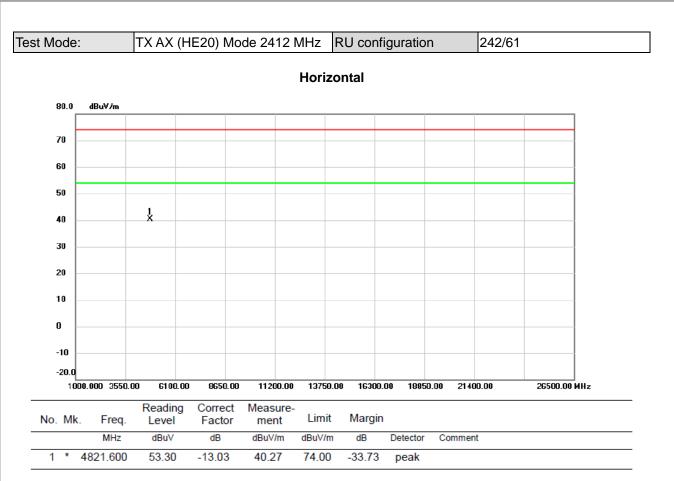
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





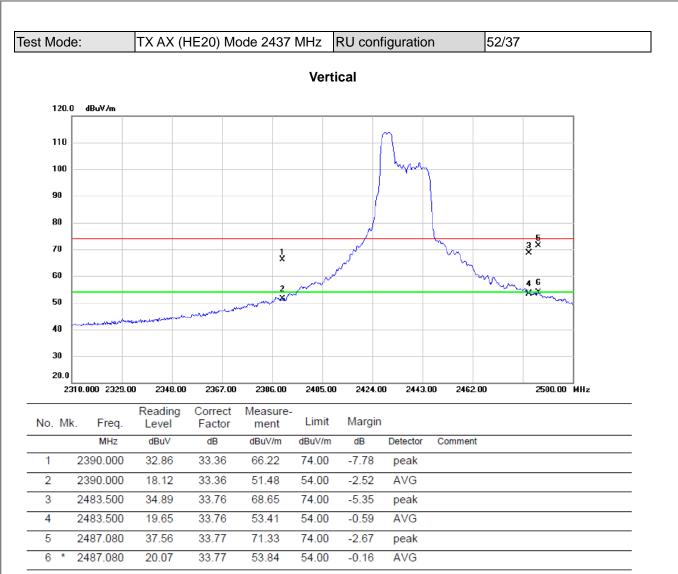
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





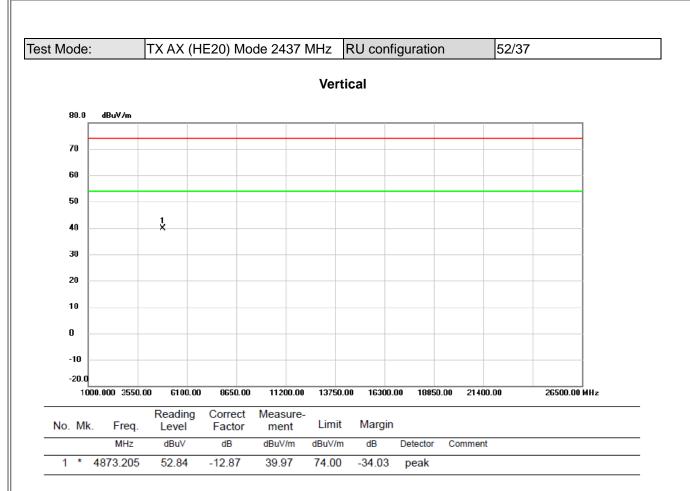
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





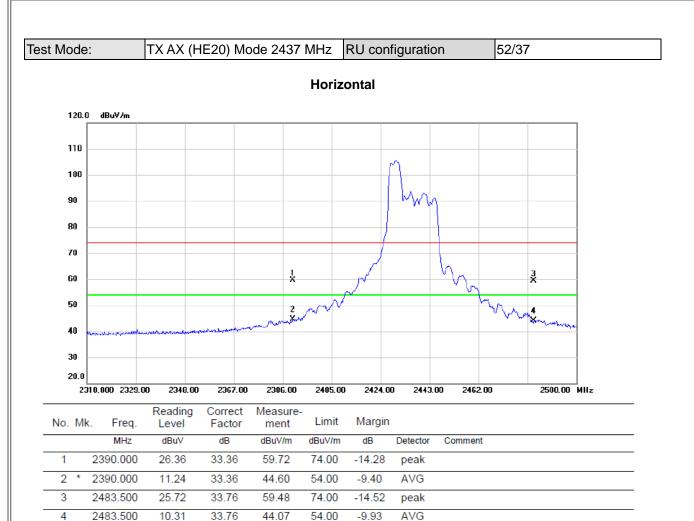
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





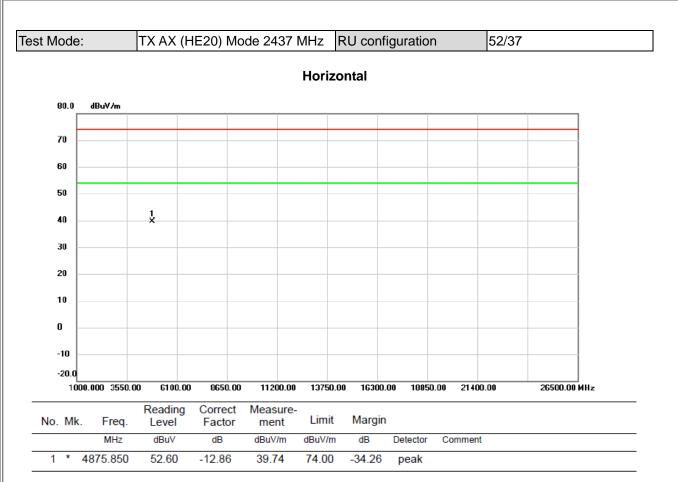
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- (2) Margin Level = Measurement Value Limit Value.





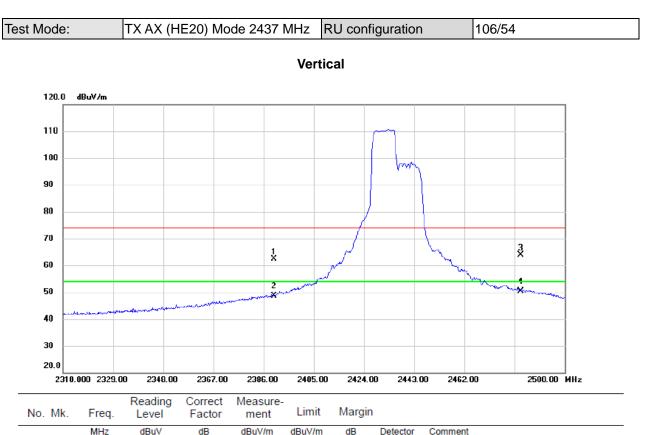
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

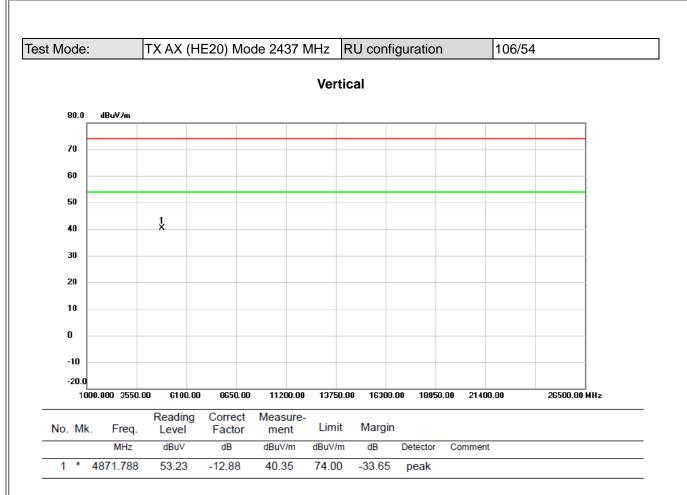




NO.	IVIN.	rieq.	Level	Factor	ment	Linne	margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	23	390.000	29.05	33.36	62.41	74.00	-11.59	peak	
2	23	390.000	15.38	33.36	48.74	54.00	-5.26	AVG	
3	24	183.500	30.06	33.76	63.82	74.00	-10.18	peak	
4	* 24	183.500	16.74	33.76	50.50	54.00	-3.50	AVG	

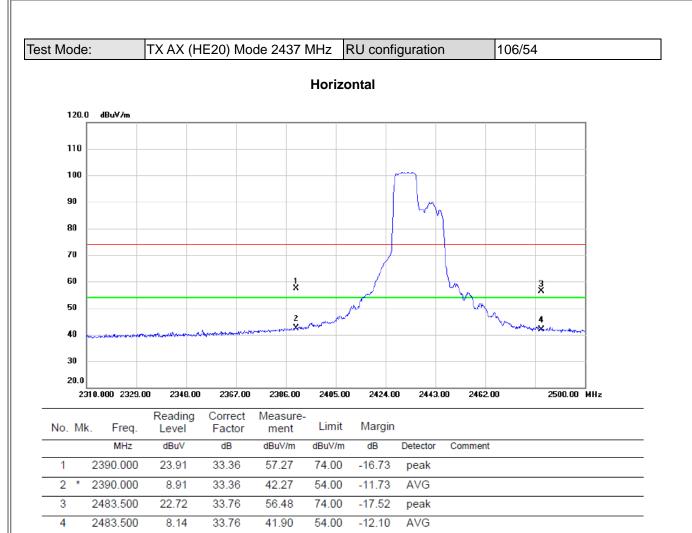
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





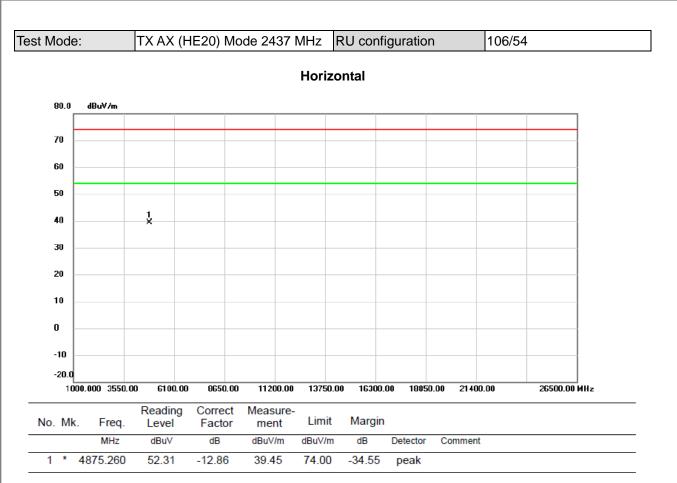
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





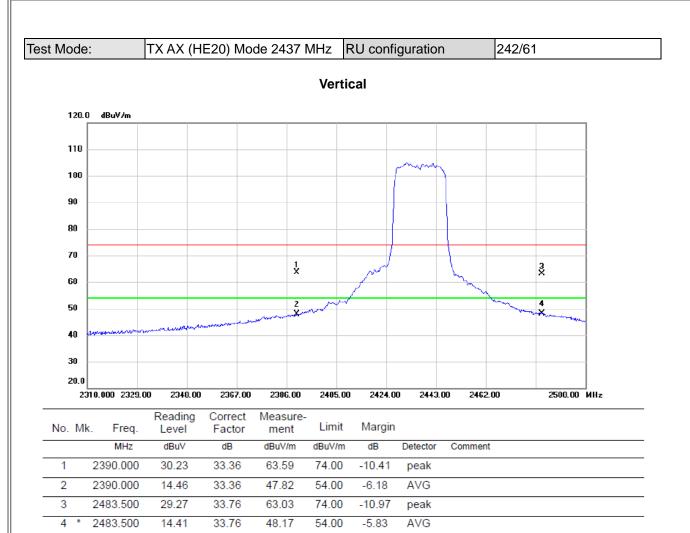
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





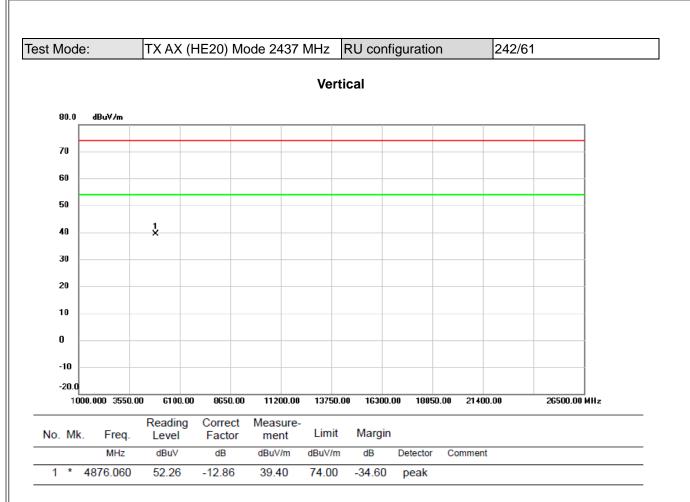
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





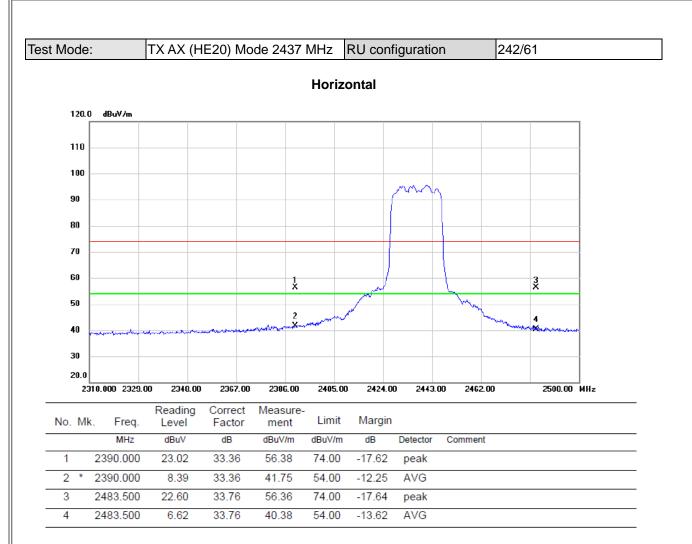
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





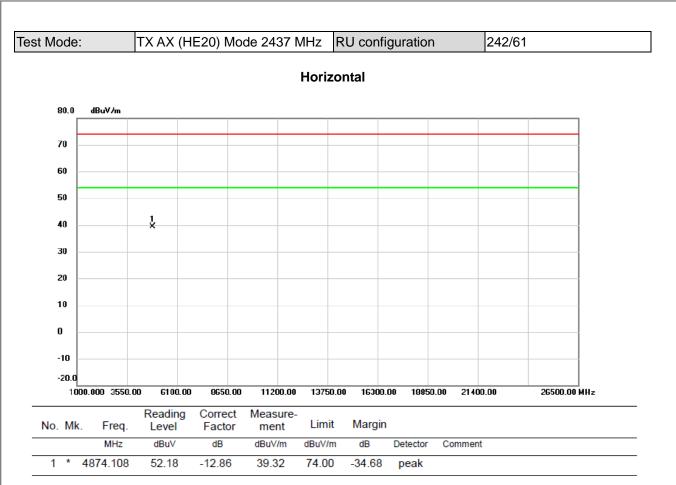
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





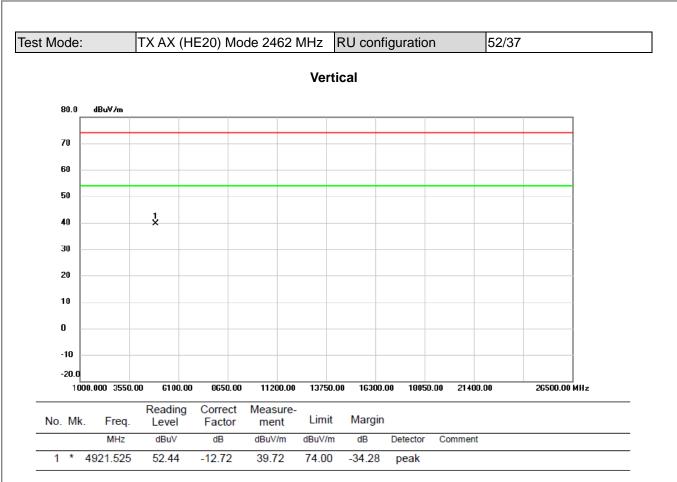
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





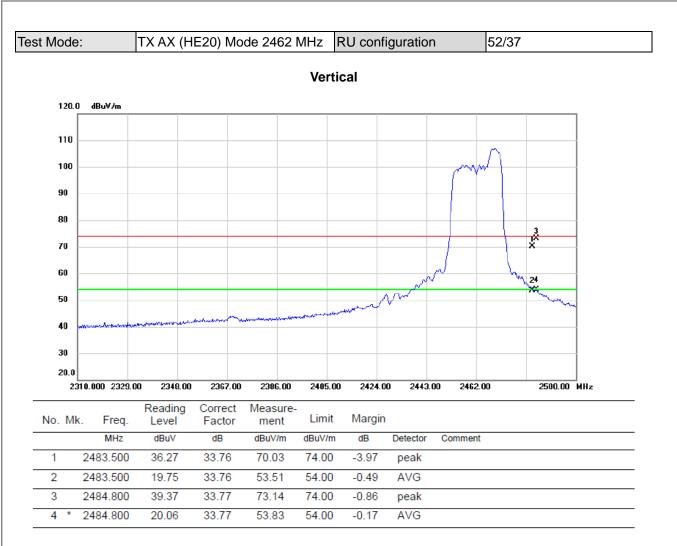
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





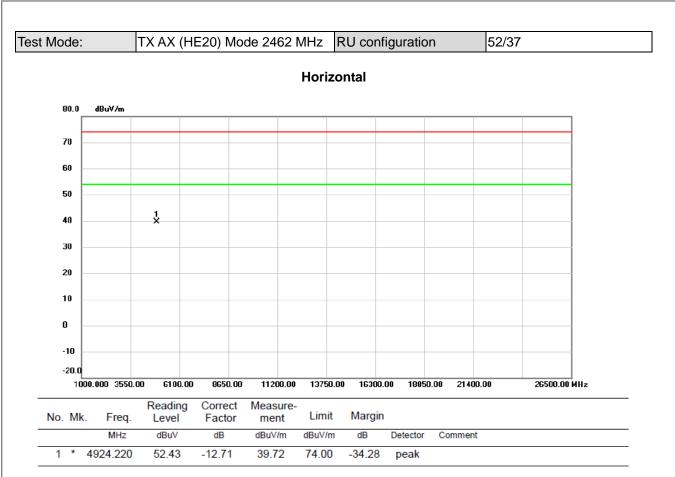
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





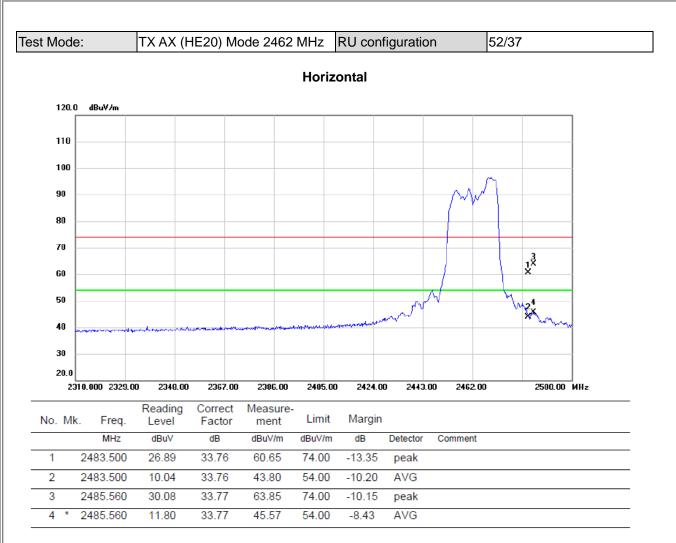
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





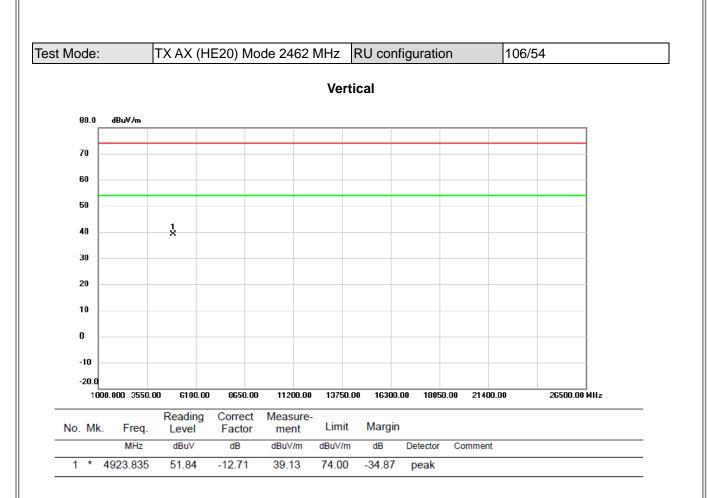
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





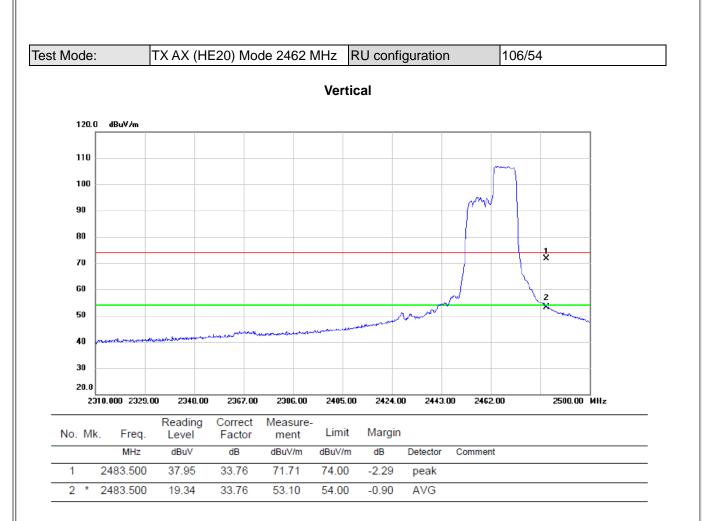
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





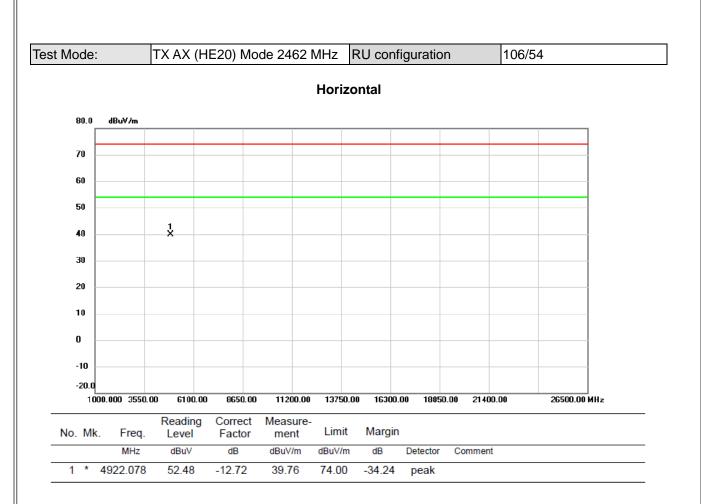
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





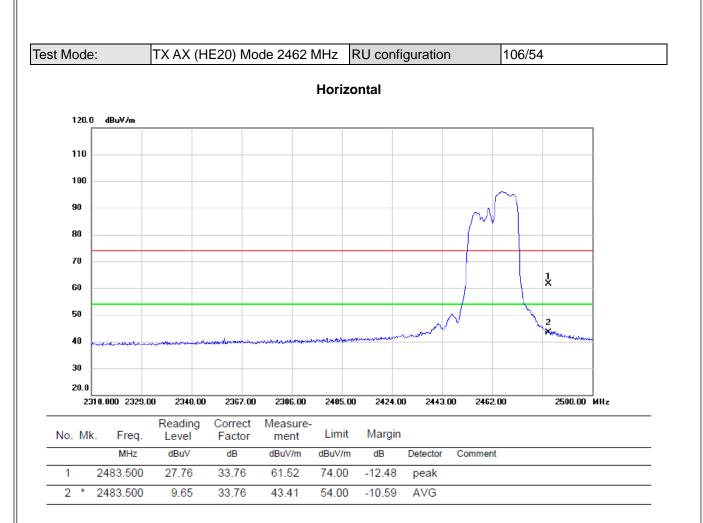
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





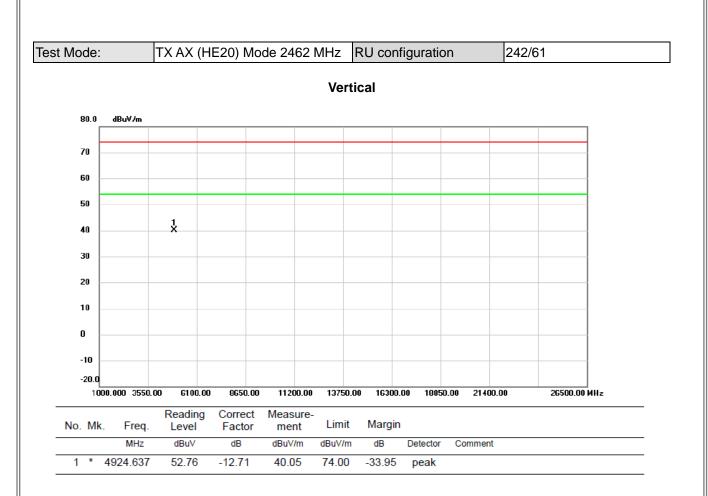
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

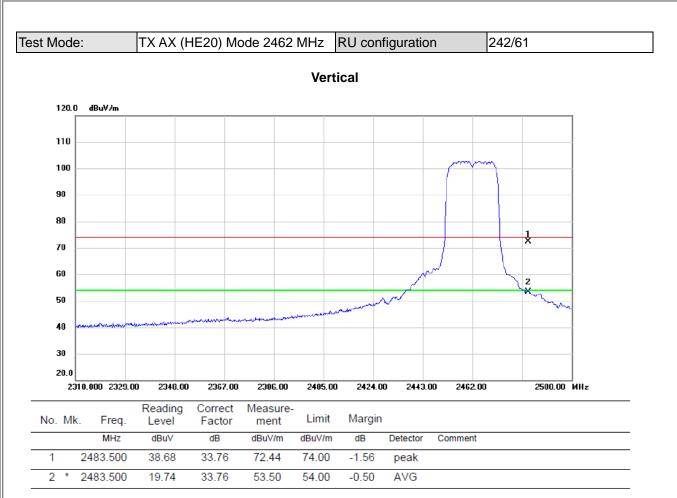




(1) Measurement Value = Reading Level + Correct Factor.

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





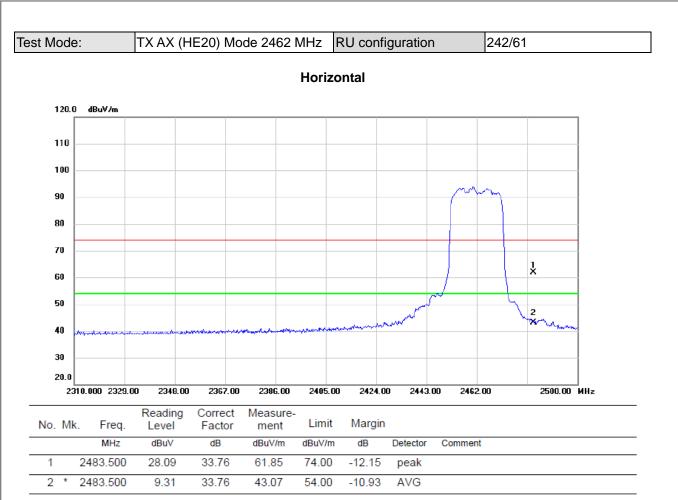
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





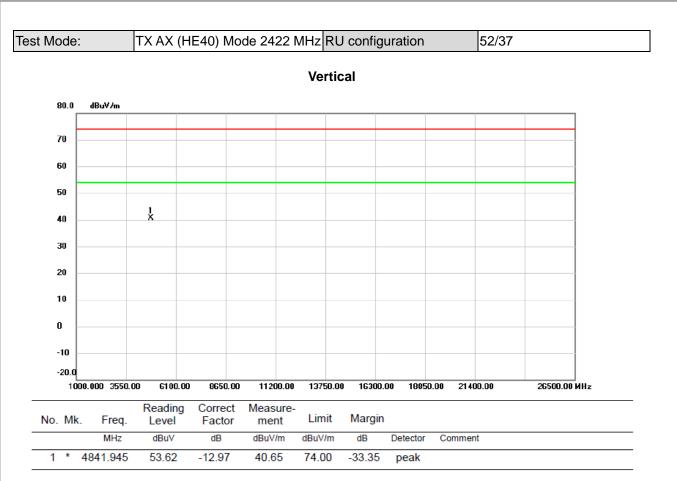
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





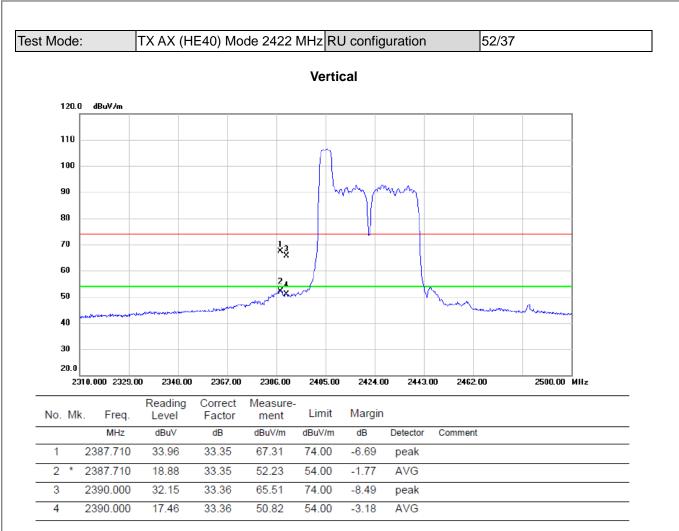
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





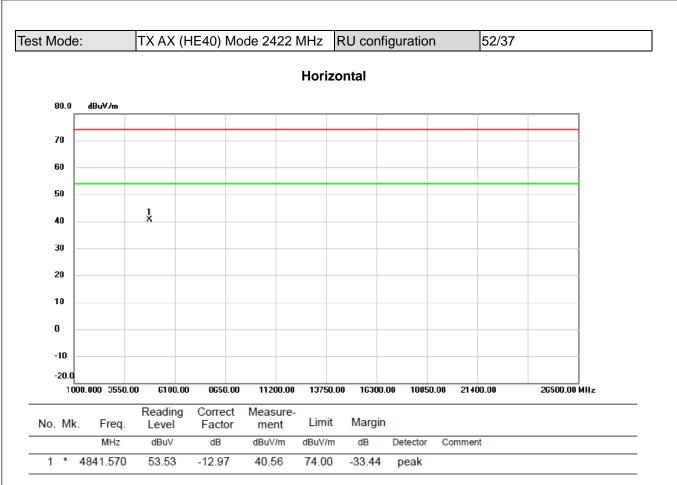
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





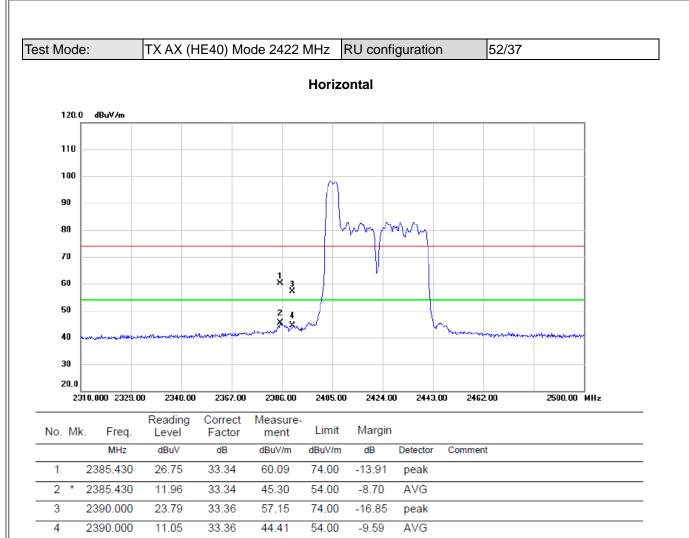
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





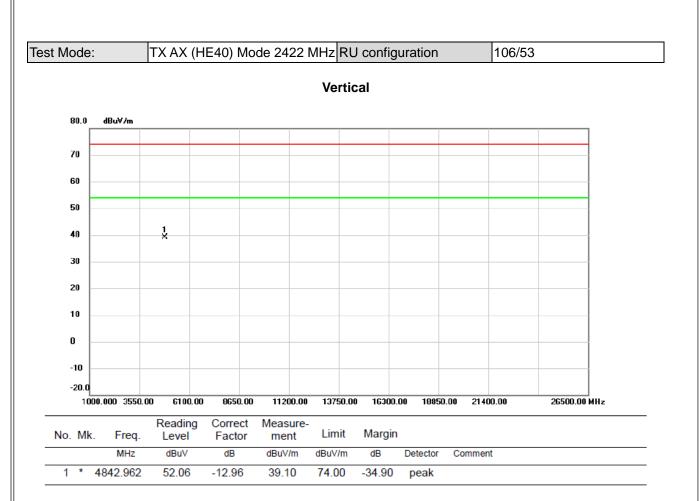
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





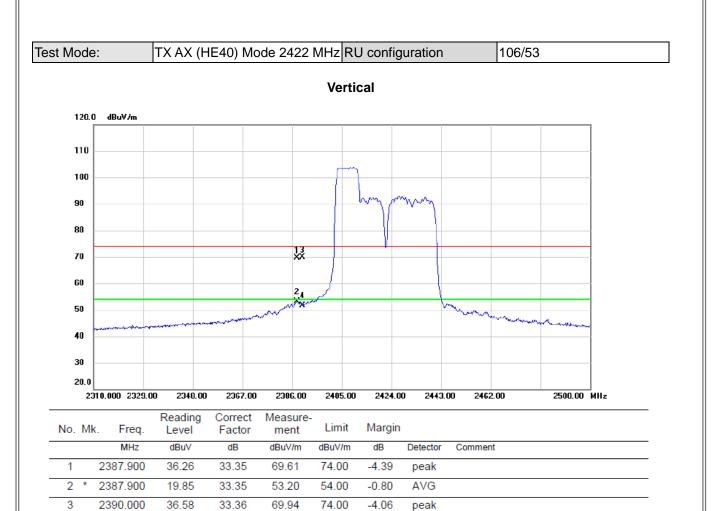
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





4

2390.000

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

33.36

51.62

54.00

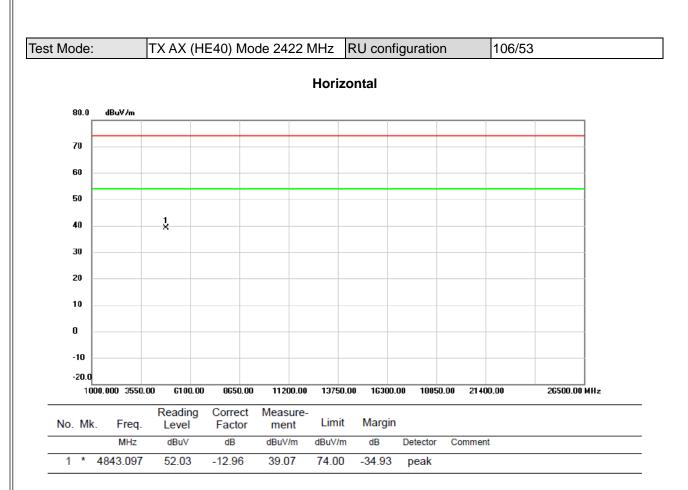
-2.38

AVG

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

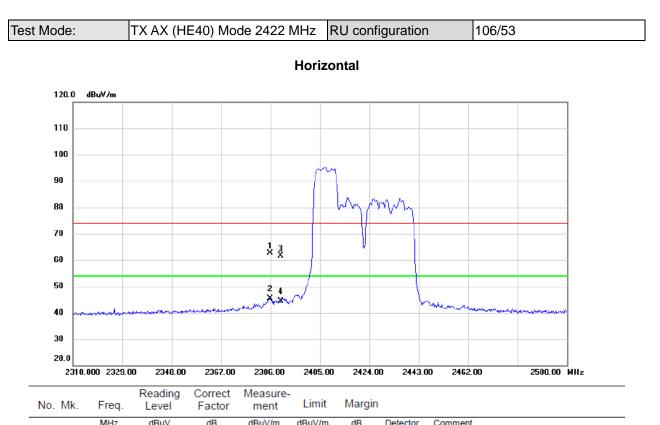
18.26





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

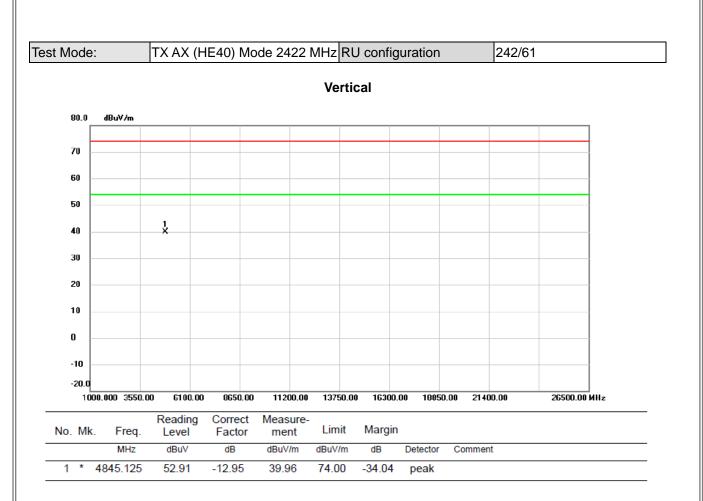




	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
 1	2385.810	29.32	33.35	62.67	74.00	-11.33	peak	
2 *	2385.810	11.93	33.35	45.28	54.00	-8.72	AVG	
3	2390.000	28.22	33.36	61.58	74.00	-12.42	peak	
 4	2390.000	10.95	33.36	44.31	54.00	-9.69	AVG	

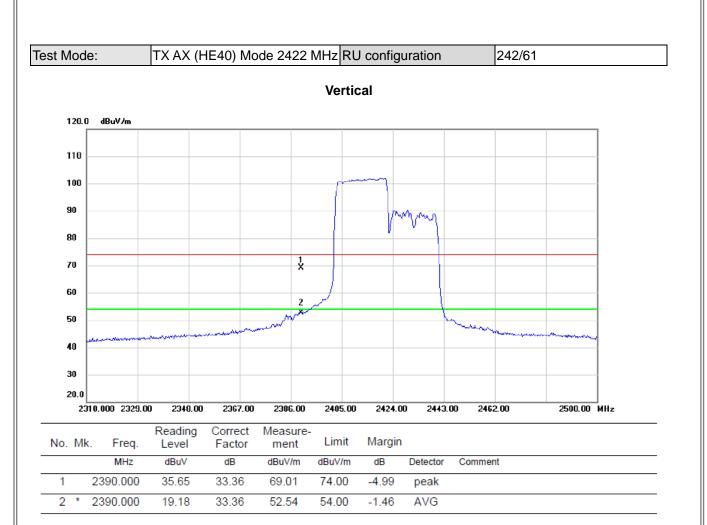
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





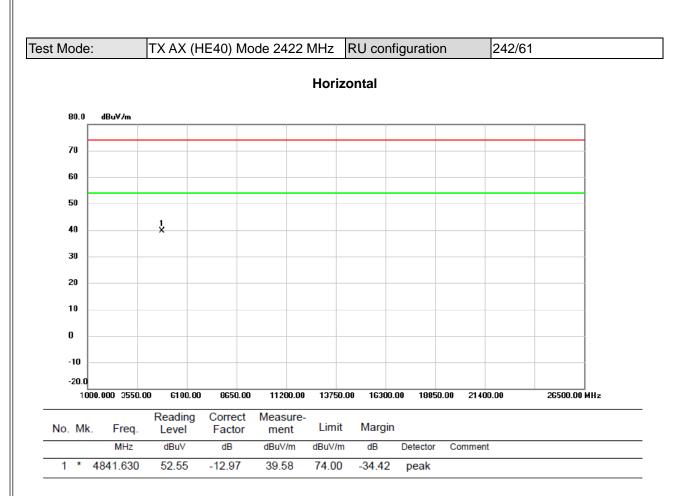
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





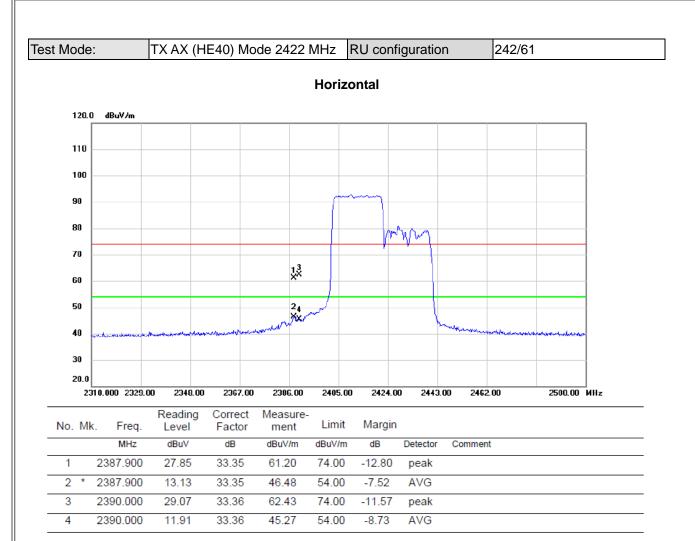
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





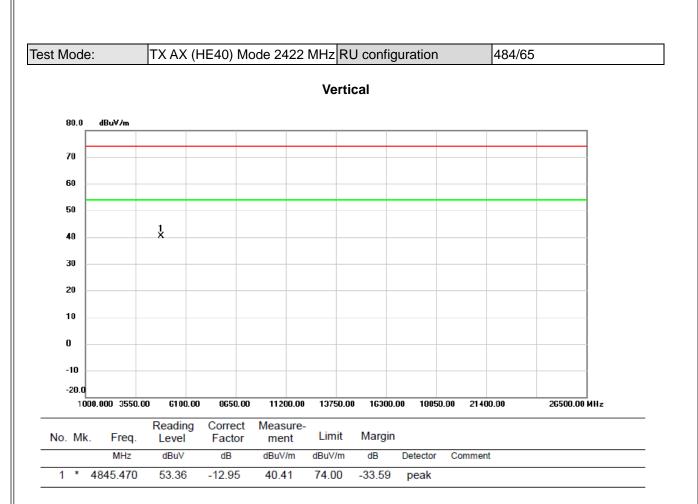
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





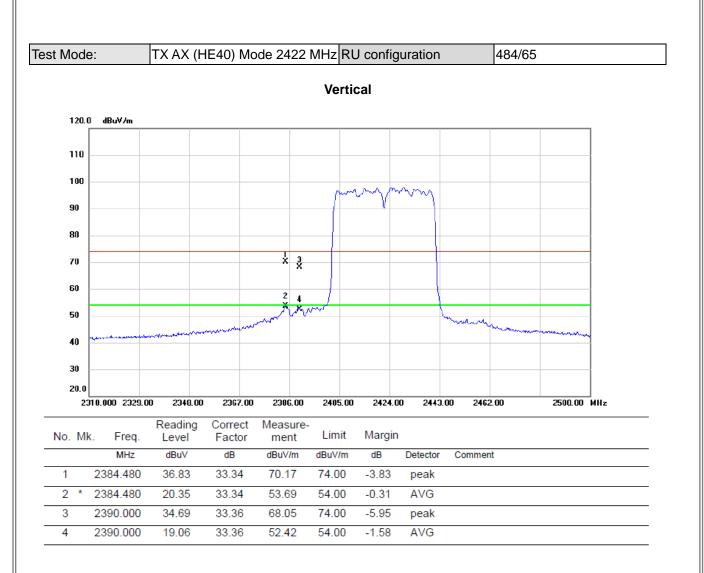
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





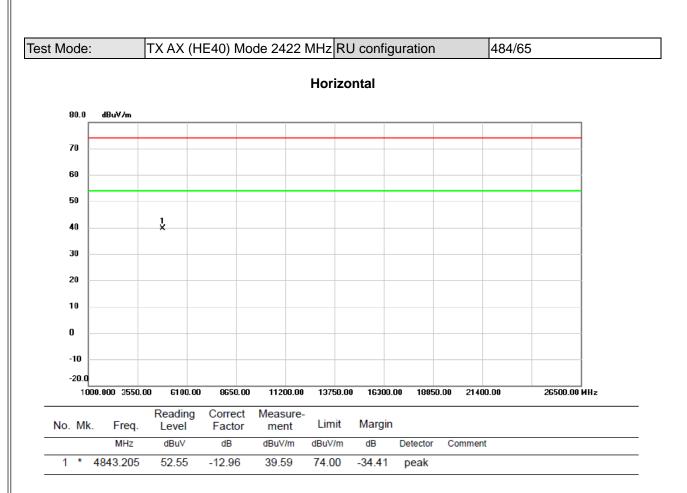
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





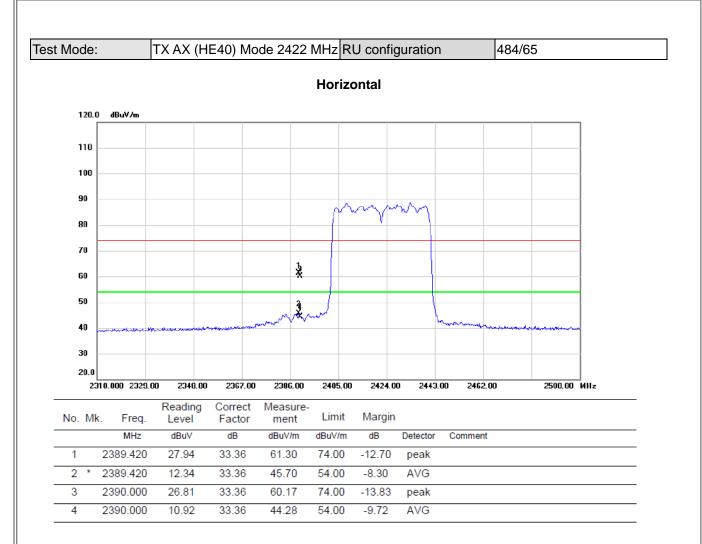
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





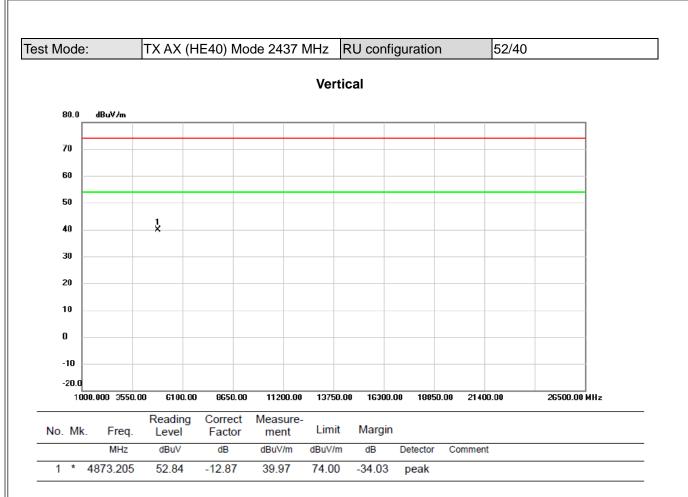
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





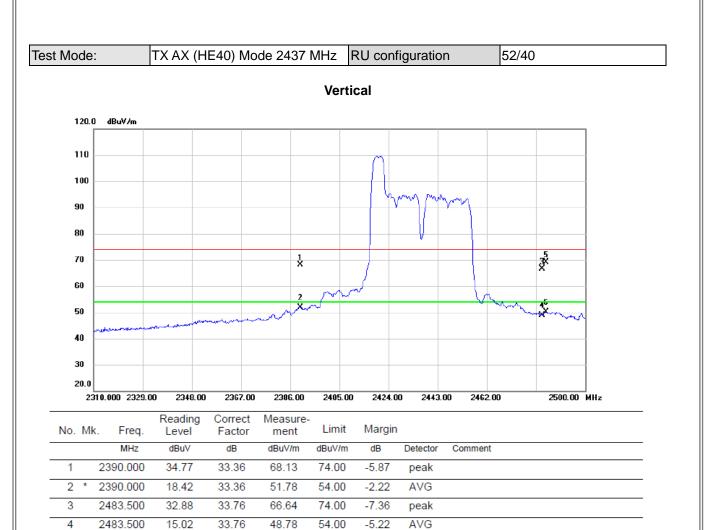
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





5

6

2484.800

2484.800

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

33.77

33.77

69.16

50.23

74.00

54.00

-4.84

-3.77

peak

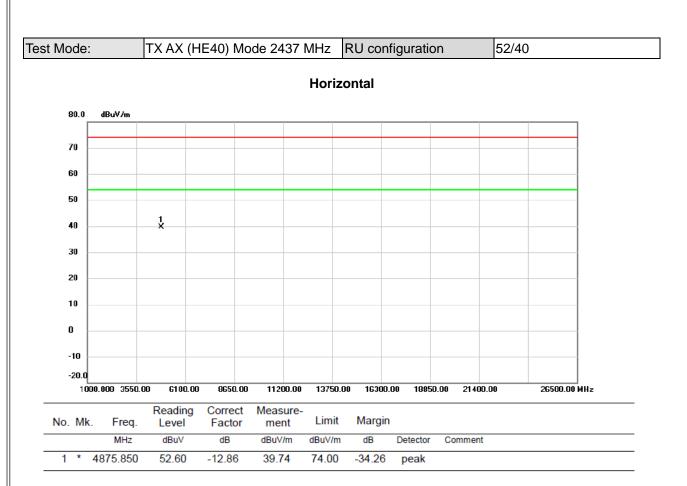
AVG

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

35.39

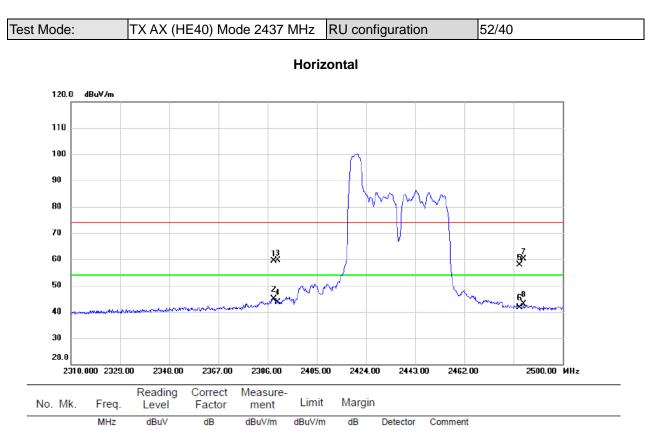
16.46





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

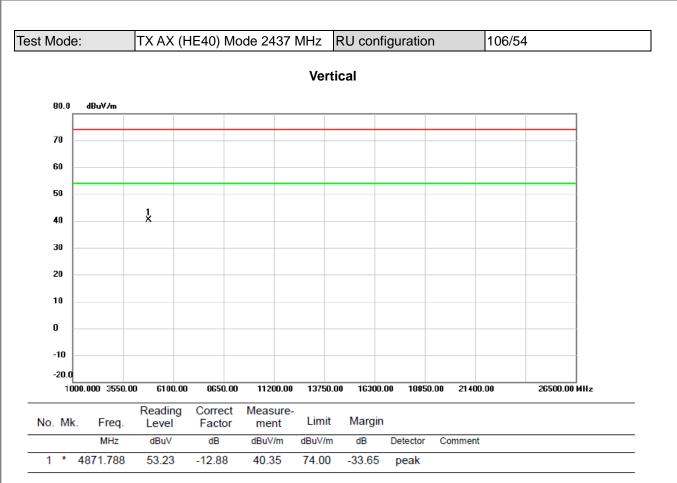




				Lover	1 actor	mont				
-			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1	2	388.470	26.02	33.35	59.37	74.00	-14.63	peak	
-	2	* 2	388.470	11.49	33.35	44.84	54.00	-9.16	AVG	
-	3	2	390.000	26.36	33.36	59.72	74.00	-14.28	peak	
-	4	2	390.000	10.23	33.36	43.59	54.00	-10.41	AVG	
-	5	2	483.500	24.17	33.76	57.93	74.00	-16.07	peak	
-	6	2	483.500	7.99	33.76	41.75	54.00	-12.25	AVG	
-	7	2	484.800	26.28	33.77	60.05	74.00	-13.95	peak	
-	8	2	484.800	9.11	33.77	42.88	54.00	-11.12	AVG	

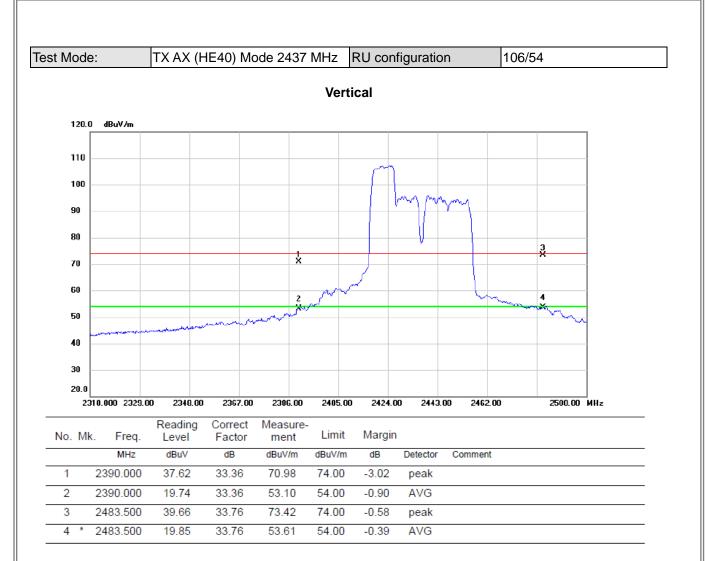
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





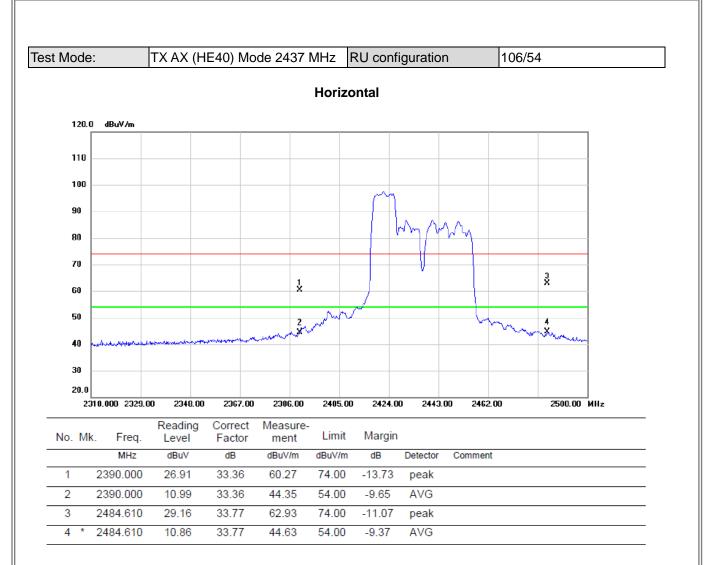
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





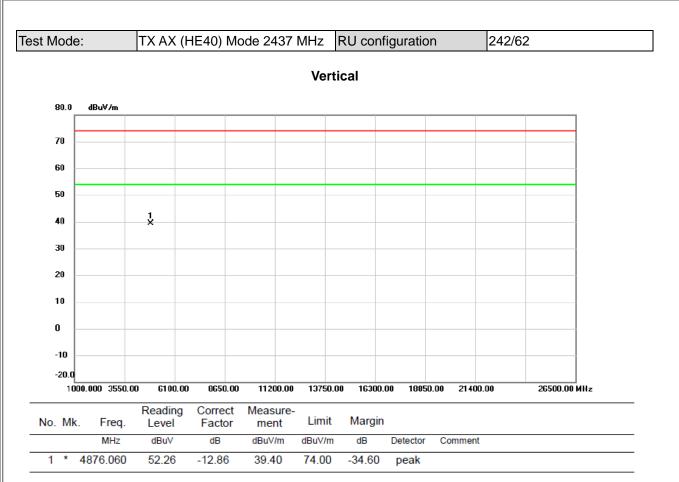
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





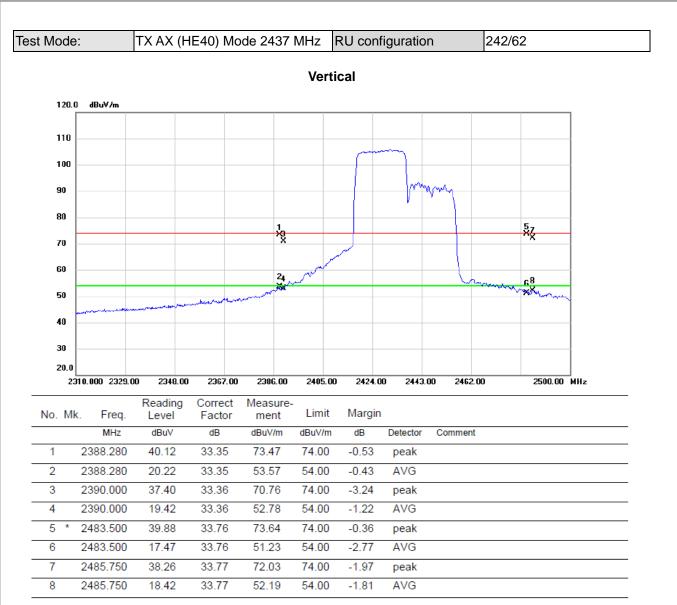
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





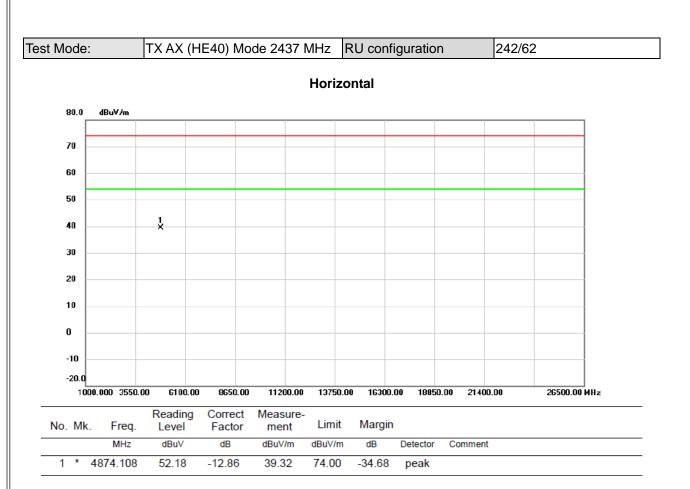
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





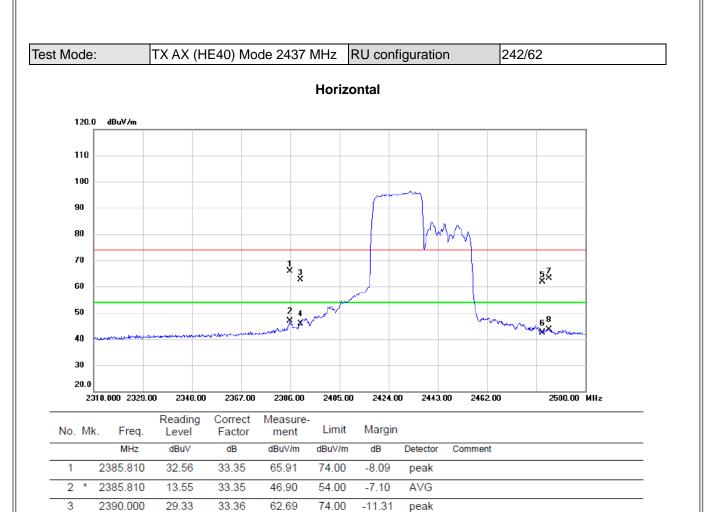
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





54.00

74.00

54.00

74.00

54.00

-8.17

-12.12

-11.74

-10.89

-10.30

AVG

peak

AVG

peak

AVG

45.83

61.88

42.26

63.11

43.70

RF	MΔ	Rk	(S·	

4

5

6

7

8

2390.000

2483.500

2483.500

2485.940

2485.940

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

12.47

28.12

8.50

29.34

9.93

33.36

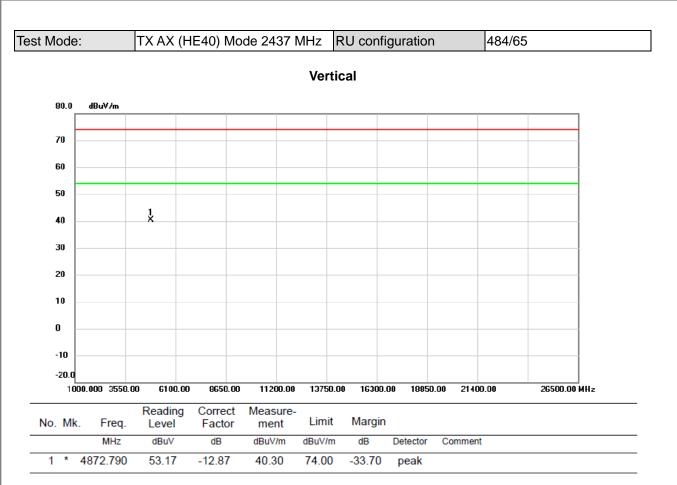
33.76

33.76

33.77

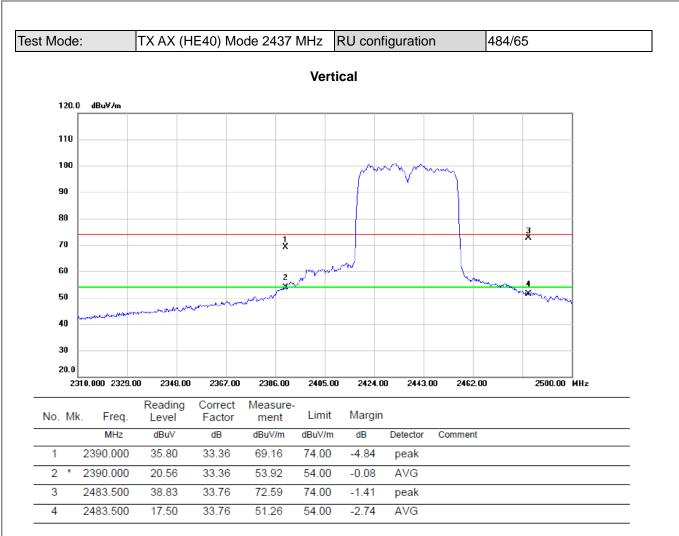
33.77





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





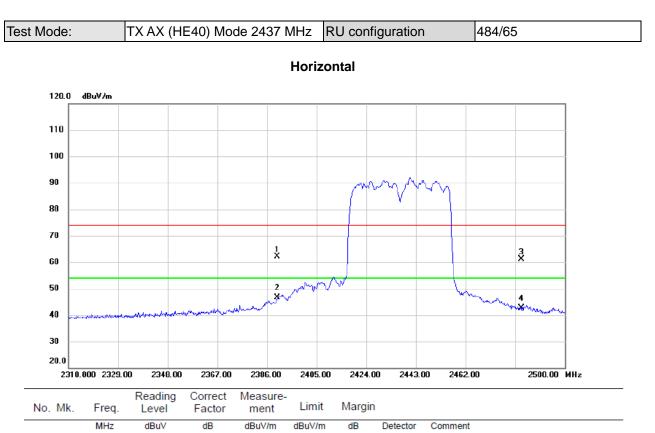
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
 1	2390.000	28.72	33.36	62.08	74.00	-11.92	peak	
2 *	2390.000	13.35	33.36	46.71	54.00	-7.29	AVG	
3	2483.500	27.45	33.76	61.21	74.00	-12.79	peak	
 4	2483.500	8.86	33.76	42.62	54.00	-11.38	AVG	

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