

FCC Radio Test Report

FCC ID: XMR2019SC650TNA

This report concerns: Original Grant

Project No.	:	2001H013
Equipment	:	Smart Module
Brand Name	:	QUECTEL
Test Model	:	SC650T-NA
Series Model	:	N/A
Applicant	:	Quectel Wireless Solutions Co., Ltd
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Manufacturer	:	Quectel Wireless Solutions Co., Ltd.
Address	:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin
		Road, Minhang District, Shanghai, China 200233.
Date of Receipt	:	Jan. 15, 2020
Date of Test	:	Jan. 15, 2020~Feb. 27, 2020
Issued Date	:	Mar. 16, 2020
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SH2020011452
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.

Iscaa Min

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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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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Mar. 16, 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. I	Radiated	emissions	test:
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Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
SH-CB01		9 KHz~30 MHz	V	3.79
		9 KHz~30 MHz	Н	3.57
	CISPR	30 MHz~200 MHz	V	4.04
		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	22°C	56%	DC 3.8V	Forest Li
Radiated Emissions-30 MHz to 1GHz	22°C	58%	DC 3.8V	Forest Li
Radiated Emissions-Above 1000 MHz	22°C	58%	DC 3.8V	Forest Li
Bandwidth	23°C	59%	DC 3.8V	Forest Li
Maximum output power & e.i.r.p.	23°C	59%	DC 3.8V	Forest Li
Conducted Spurious Emissions	23°C	59%	DC 3.8V	Forest Li
Power Spectral Density	23°C	59%	DC 3.8V	Forest Li



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Smart Module
Brand Name	QUECTEL
Test Model	SC650T-NA
Series Model	N/A
Model Difference(s)	N/A
Software Version	SC650TNAPAR05A03
Hardware Version	R1.0
Power Source	DC power supply.
Power Rating	DC 3.8V
Operation Frequency	2412 MHz ~ 2462 MHz
Modulation Type	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 150 Mbps
Maximum Output Power Non-Beamforming	IEEE 802.11b: 20.24 dBm (0.1057 W) IEEE 802.11g: 23.27 dBm (0.2123 W) IEEE 802.11n (HT20): 23.22 dBm (0.2099 W) IEEE 802.11n (HT40): 23.41 dBm (0.2193 W)

Note:

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

CH01 - CH11 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n (HT20) CH03 - CH09 for IEEE 802.11n (HT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

3. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Saintenna	SAA31092A	Dipole	IPEX	5.38

2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09
Mode 5	TX N40 Mode Channel 06

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

AC power line conducted emissions test	
Final Test Mode:	Description
Mode 5	TX N40 Mode Channel 06

Radiated emissions test - Below 1GHz	
Final Test Mode:	Description
Mode 5	TX N40 Mode Channel 06

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

Conducted test		
Final Test Mode:	Description	
Mode 1	TX B Mode Channel 01/06/11	
Mode 2	TX G Mode Channel 01/06/11	
Mode 3	TX N-20 MHz Mode Channel 01/06/11	
Mode 4	TX N-40 MHz Mode Channel 03/06/09	



NOTE:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) 802.11b mode: CCK (1 Mbps)
 - 802.11g mode: OFDM (6 Mbps)
 - 802.11n HT20 mode : BPSK (6.5 Mbps)
 - 802.11n HT40 mode : BPSK (13.5 Mbps)

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

- (3) For radiated emission below 1 GHz test, the IEEE 802.11n40 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.
- (5) The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

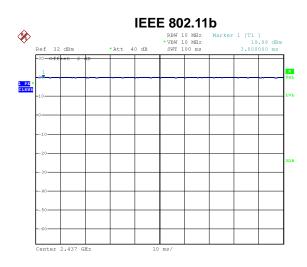
2.3 PARAMETERS OF TEST SOFTWARE

Test Software		QRCT	
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	17	17	17
IEEE 802.11g	15	16	14
IEEE 802.11n (HT20)	14	15	14
Frequency (MHz)	2422	2437	2452
IEEE 802.11n (HT40)	13	14	11



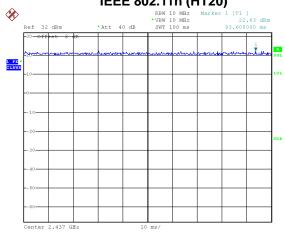
2.4 DUTY CYCLE

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: 25.FEB.2020 18:12:14

Duty cycle = 100.000 ms / 100.000 ms = 100% Duty Factor = 10 log(1/Duty cycle) = 0.00 IEEE 802.11n (HT20)



Date: 25.FEB.2020 18:13:19

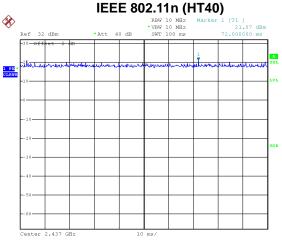
Duty cycle = 100.000 ms / 100.000 ms = 100% Duty Factor = 10 log(1/Duty cycle) = 0.00

REF 10 ME Marker 1 [7] ref 32 dBm *Att 40 dB SWT 10 000 ms 10 000 ms

IEEE 802.11g

Date: 25.FEB.2020 18:12:46

Duty cycle = 100.000 ms / 100.000 ms = 100%Duty Factor = $10 \log(1/\text{Duty cycle}) = 0.00$



Date: 25.FEB.2020 18:14:00

Duty cycle = 100.000 ms / 100.000 ms = 100% Duty Factor = 10 log(1/Duty cycle) = 0.00

NOTE:

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

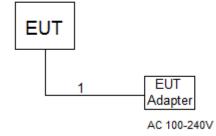
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 0.01 kHz (Duty cycle > 98%).

For IEEE 802.11n (HT40):

For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 0.01 kHz (Duty cycle > 98%).



2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.6 SUPPORT UNITS

Item	Equipment	Brand	Model/Type No.	Series No.
1	Adapter	-	YHSW-050100U/T	-

ltem	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	N/A	N/A	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

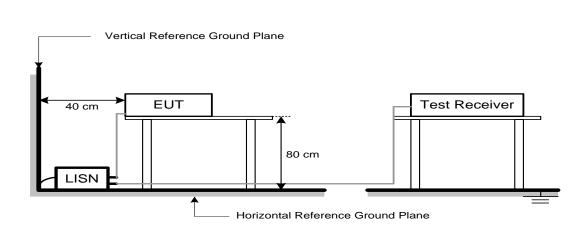
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.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

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

NOTE:

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



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

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

4.2 TEST PROCEDURE

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

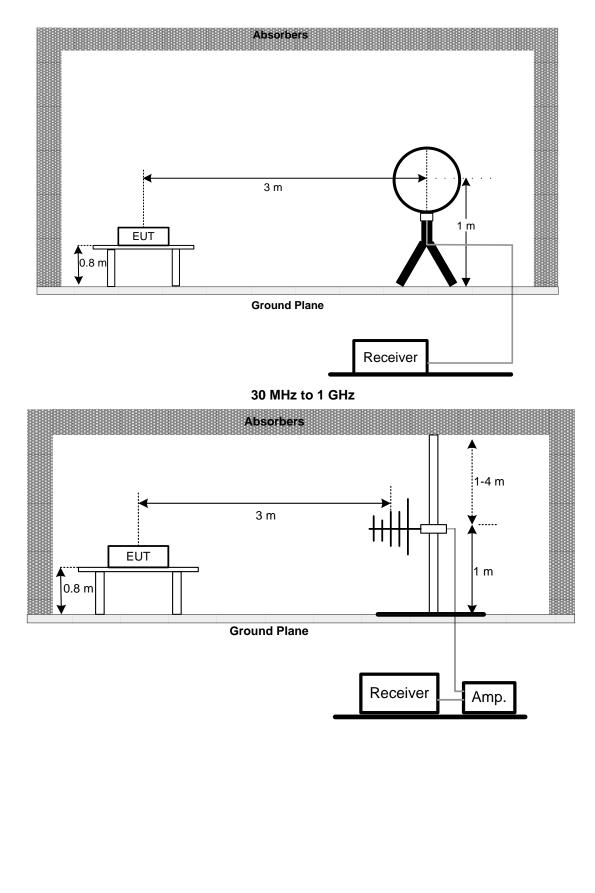
4.3 DEVIATION FROM TEST STANDARD

No deviation



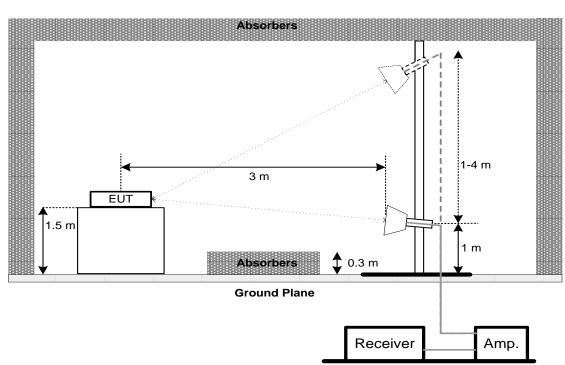
4.4 TEST SETUP











4.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULTS - 30 MHZ TO 1000 MHZ

Please refer to the APPENDIX B.

4.7 TEST RESULTS - ABOVE 1000 MHZ

Please refer to the APPENDIX C.

Remark:

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



5. BANDWIDTH TEST

5.1 LIMIT

FCC Part15, Subpart C (15.247)					
Section Test Item Limit					
15.247(a)(2)	6 dB Bandwidth	Minimum 500 kHz			
	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 D.



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 E.



7. CONDUCTED SPURIOUS EMISSIONS

7.1 LIMIT

For FCC

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 F.



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			
13.247(e)	r ower opeonal Density	(in any 3 kHz)			

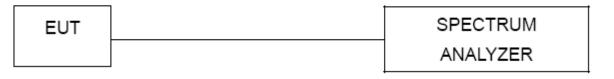
8.2 TEST PROCEDURE

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

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX G.



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. 29, 2020		
2	TWO-LINE V-NETWORK	R&S	ENV216	101340	Sep. 01, 2020		
3	Test Cable	emci	EMCRG400-BM-N M-10000	170628	Apr. 17, 2020		
4	EMI Test Receiver	R&S	ESCI	100082	Mar. 29, 2020		
5	50Ω Terminator	SHX	TF2-1G-A	17051602	Mar. 29, 2020		
6	50Ω coaxial switch	Anritsu	MP59B	6201750902	Mar. 29, 2020		
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	Mar. 29, 2020		
2	EMI Test Receiver	R&S	ESCI	100082	Mar. 29, 2020		
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	Mar. 29, 2020			
2	Pre-Amplifier	emci	EMC9135	980400	Mar. 29, 2020			
3	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 29, 2020			
4	Test Cable	emci	EMC104-SM-SM-7 000	170330	Apr. 17, 2020			
5	Test Cable	emci	EMC104-SM-SM-1 000	170331	Apr. 17, 2020			
6	Test Cable	emci	EMC104-SM-NM-3 500	170621	Apr. 17, 2020			
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	Mar. 29, 2020			
2	Pre-Amplifier	emci	EMC012645SE	980421	Mar. 29, 2020			
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480545	Mar. 29, 2020			
4	Test Cable	emci	EMC104-SM-SM-7 000	170330	Apr. 17, 2020			
5	Test Cable	emci	EMC104-SM-SM-1 000	170331	Apr. 17, 2020			
6	Test Cable	emci	EMC104-SM-NM-3 500	170621	Apr. 17, 2020			
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A			
8	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 29, 2020			
9	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3116C	00203919	Mar. 29, 2020			
10	Pre-Amplifier	emci	EMC184045SE	980409	Mar. 29, 2020			
11	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Mar. 29, 2020			
12	Test Cable	emci	EMC102-KM-KM-8 00	170654	Apr. 17, 2020			
13	Test Cable	emci	Super Reliable-40G-SS11- 7000	W0030860001	Apr. 17, 2020			
14	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A			

	Bandwidth					
Ite	em	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
	1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

	Maximum Output Power					
	Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
ſ	1	Peak Power Analyze	Keysight	8990B	MY51000507	Mar. 29, 2020
	2	Wideband Power Sensor	Keysight	N9123A	MY58310003	Mar. 29, 2020

	Antenna Conducted Spurious Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020	

Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

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

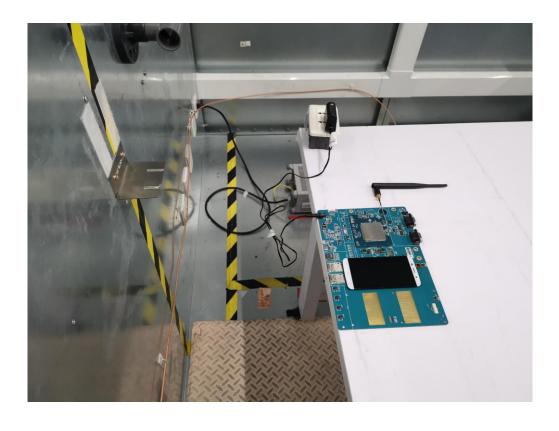
All calibration period of equipment list is one year.



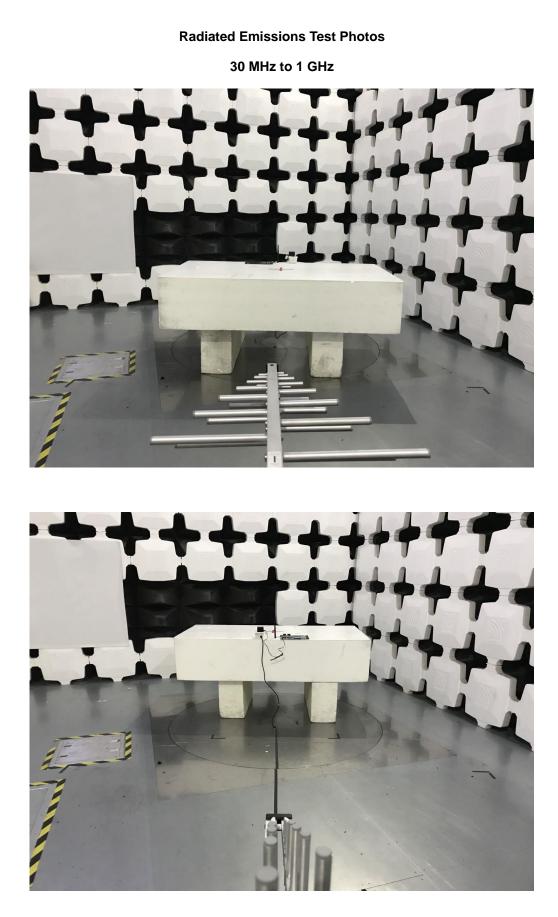
10. EUT TEST PHOTO

Conducted Emissions Test Photos

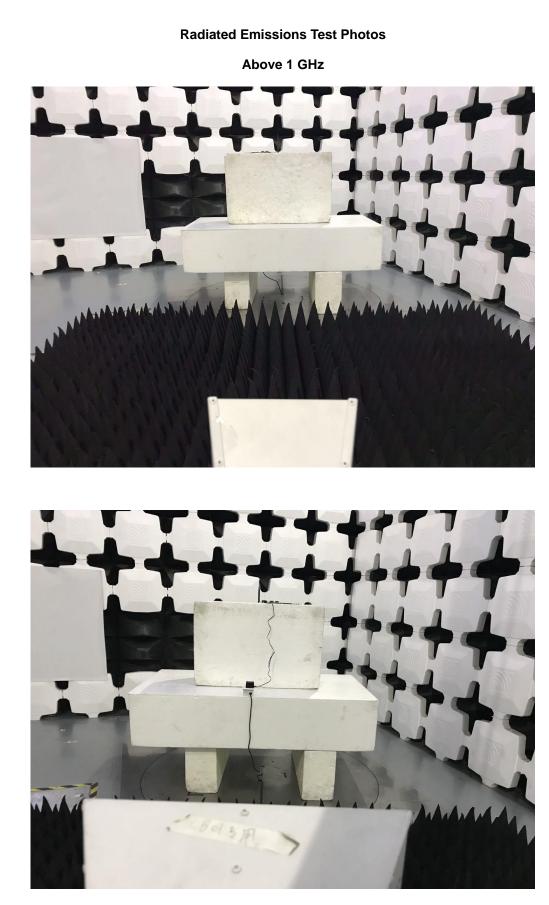




3TL



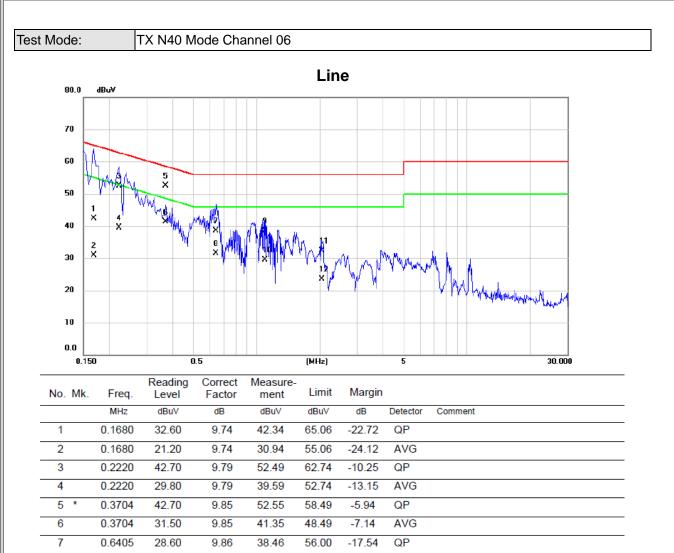
BIL





APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS





REMARKS:

8

9

10

11

12

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

21.70

28.80

19.80

22.60

13.70

9.86

9.75

9.75

9.80

9.80

31.56

38.55

29.55

32.40

23.50

46.00

56.00

46.00

56.00

46.00

-14.44

-17.45

-16.45

-23.60

-22.50

AVG

QP

AVG QP

AVG

0.6405

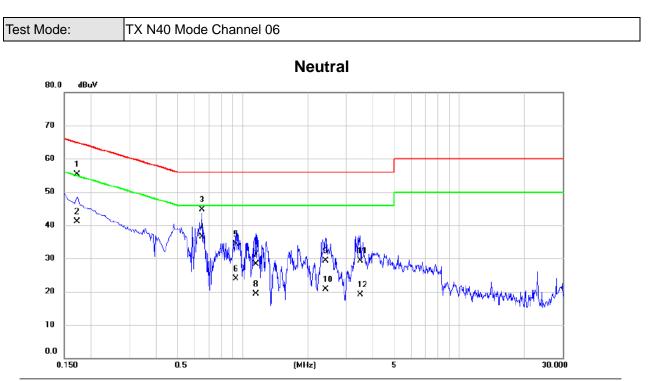
1.0950

1.0950

2.0355

2.0355





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1725	45.60	9.61	55.21	64.84	-9.63	QP	
2		0.1725	31.50	9.61	41.11	54.84	-13.73	AVG	
3		0.6495	34.90	9.71	44.61	56.00	-11.39	QP	
4	*	0.6495	26.70	9.71	36.41	46.00	-9.59	AVG	
5		0.9330	24.50	9.72	34.22	56.00	-21.78	QP	
6		0.9330	14.10	9.72	23.82	46.00	-22.18	AVG	
7		1.1490	18.50	9.73	28.23	56.00	-27.77	QP	
8		1.1490	9.50	9.73	19.23	46.00	-26.77	AVG	
9		2.4135	19.50	9.81	29.31	56.00	-26.69	QP	
10		2.4135	10.90	9.81	20.71	46.00	-25.29	AVG	
11		3.4980	19.50	9.87	29.37	56.00	-26.63	QP	
12		3.4980	9.20	9.87	19.07	46.00	-26.93	AVG	

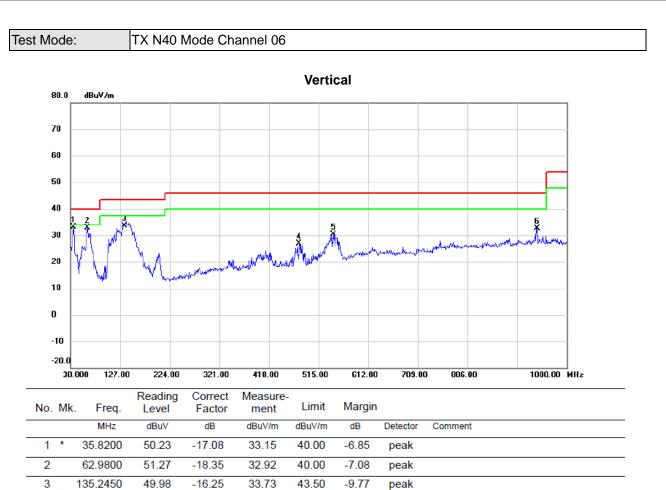
REMARKS:

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



APPENDIX B - RADIATED EMISSION - 30 MHZ TO 1000 MHZ





REMARKS:

4

5

6

477.1700

543.6150

941.8000

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

-12.83

-11.42

-5.19

27.00

30.48

32.63

46.00

46.00

46.00

-19.00

-15.52

-13.37

peak peak

peak

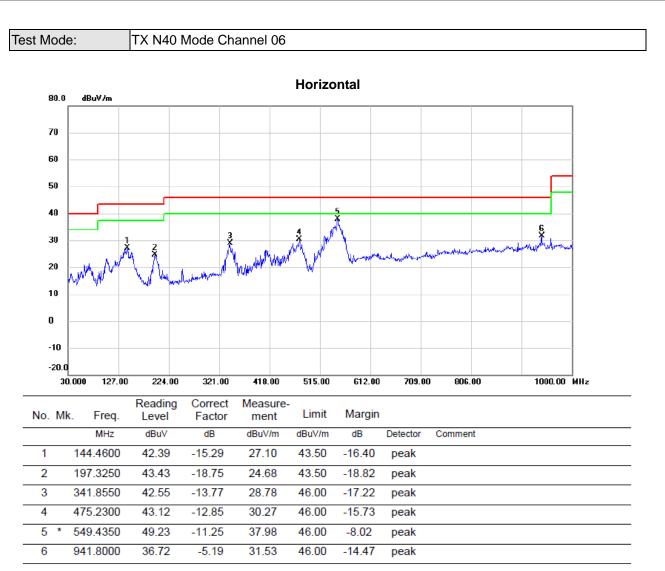
(2) Margin Level = Measurement Value - Limit Value.

39.83

41.90

37.82





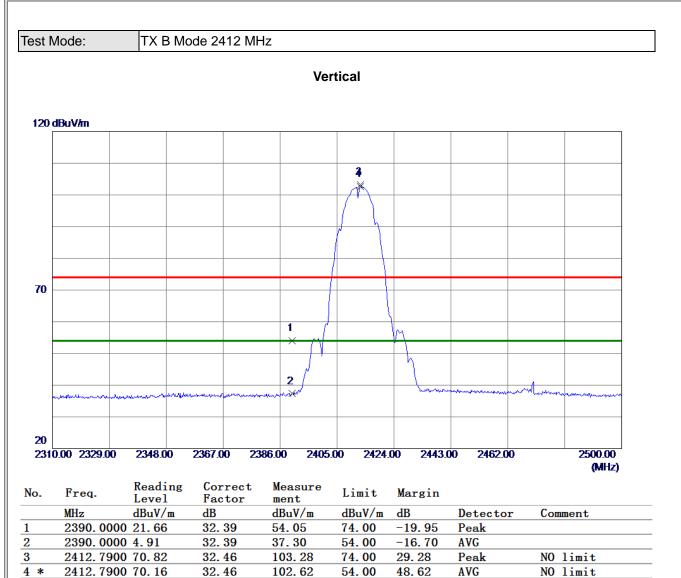
REMARKS:

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



APPENDIX C - RADIATED EMISSION- ABOVE 1000 MHZ





REMARKS:

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



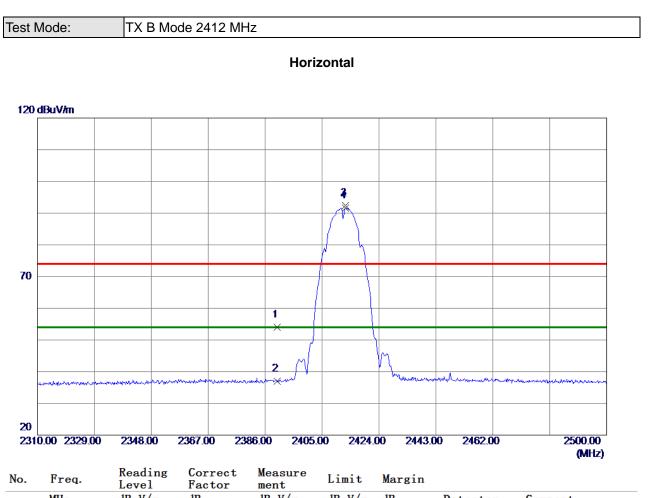


REMARKS:

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

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

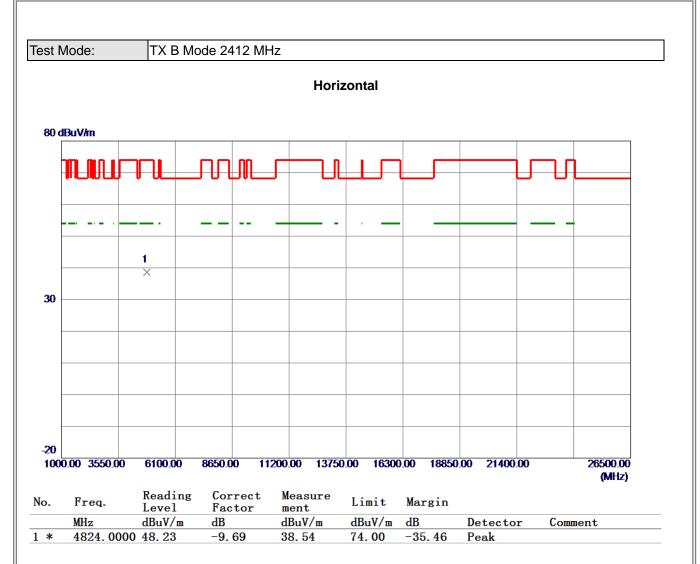




		20102		monto				
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	21.61	32.39	54.00	74.00	-20.00	Peak	
2	2390.0000	4.66	32.39	37.05	54. 00	-16.95	AVG	
3	2412.7900	59.97	32.46	92.43	74.00	18.43	Peak	NO limit
4 *	2412.7900	59.19	32.46	91.65	54.00	37.65	AVG	NO limit

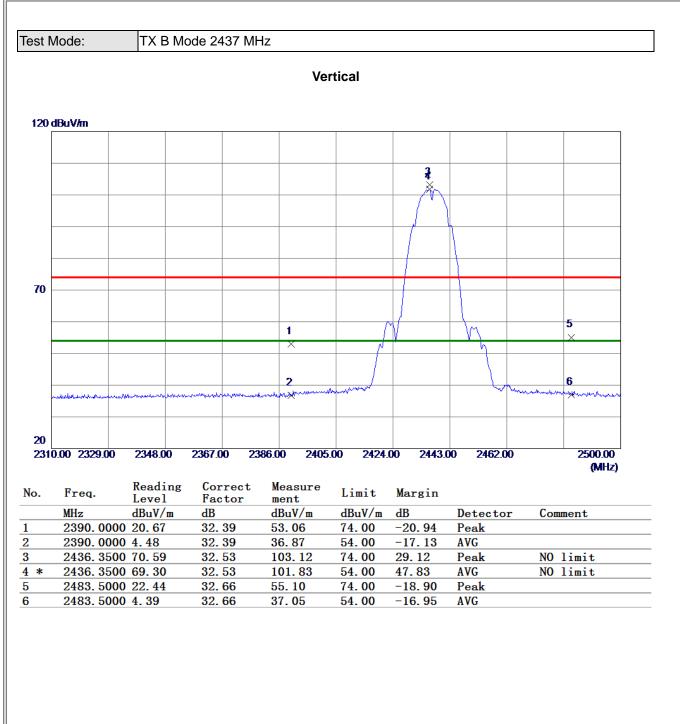
(1) Measurement Value = Reading Level + Correct Factor.





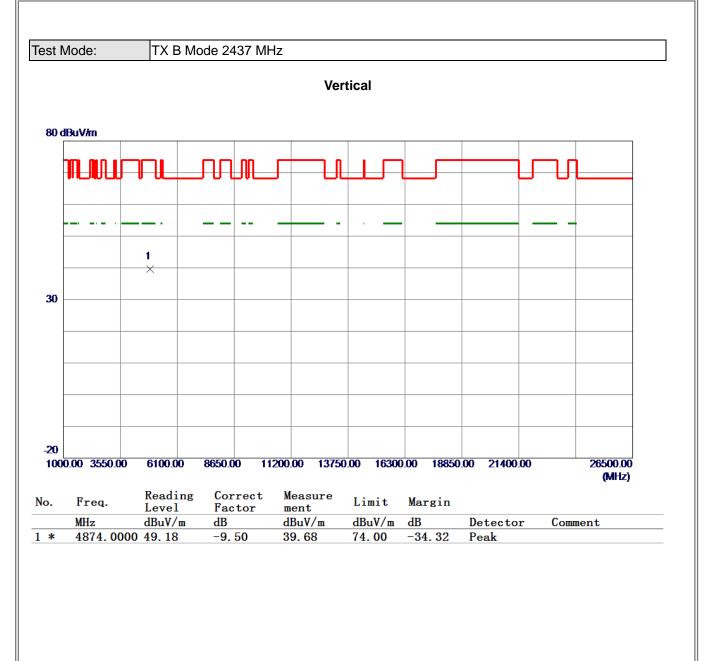
(1) Measurement Value = Reading Level + Correct Factor.





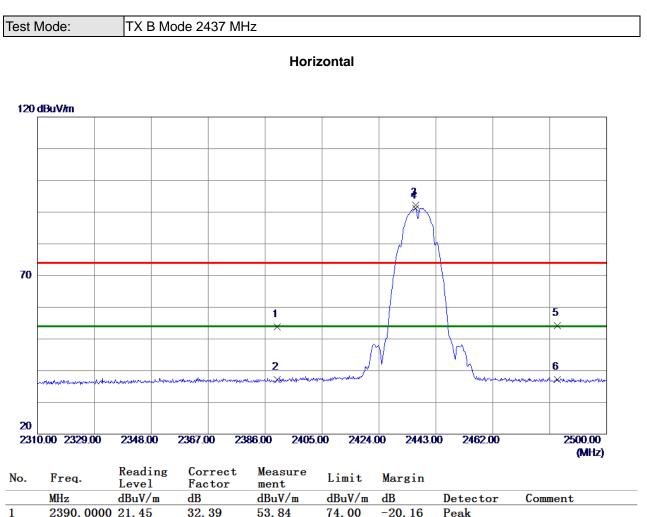
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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

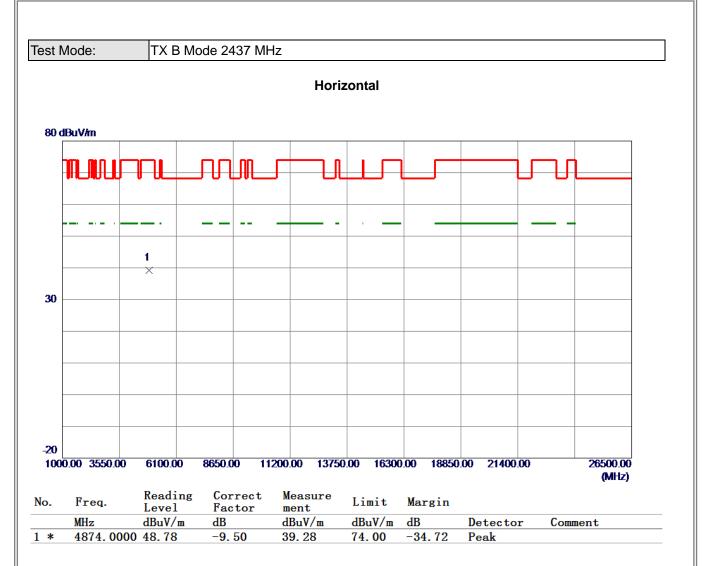




	M112	ubut/m	uD	ubut/m	ubut/m	uD	Dettettor	COmmerce
1	2390.0000	21.45	32.39	53.84	74.00	-20.16	Peak	
2	2390.0000	4.72	32.39	37.11	54. 00	-16.89	AVG	
3	2436.1600	59.67	32.53	92.20	74.00	18.20	Peak	NO limit
4 *	2436.1600	58.75	32.53	91.28	54.00	37.28	AVG	NO limit
5	2483. 5000	21.47	32.66	54.13	74.00	-19.87	Peak	
6	2483. 5000	4.47	32.66	37.13	54. 00	-16.87	AVG	

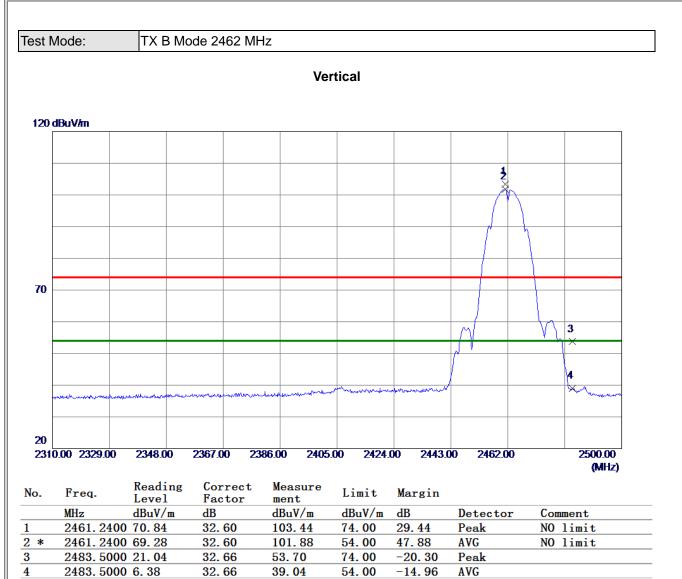
(1) Measurement Value = Reading Level + Correct Factor.





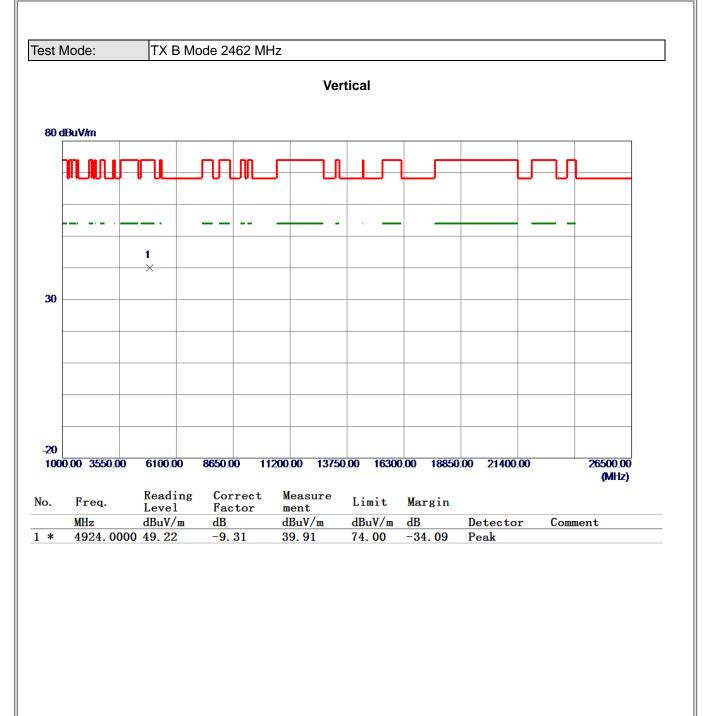
(1) Measurement Value = Reading Level + Correct Factor.





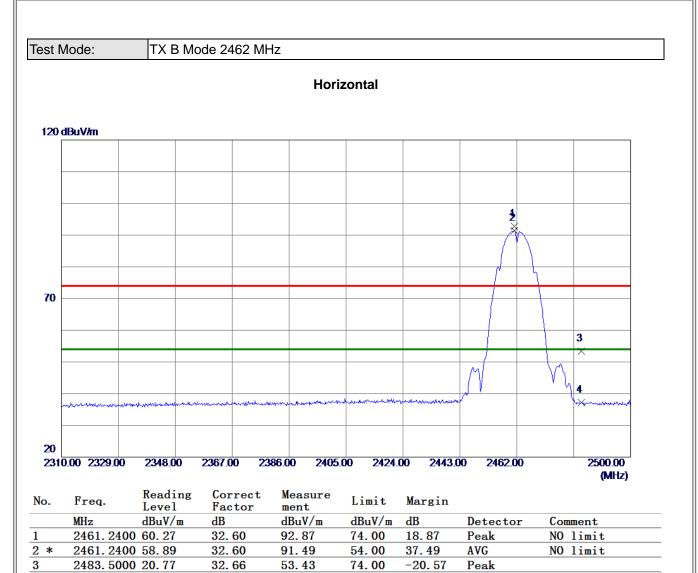
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





4

2483.5000 4.60

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

32.66

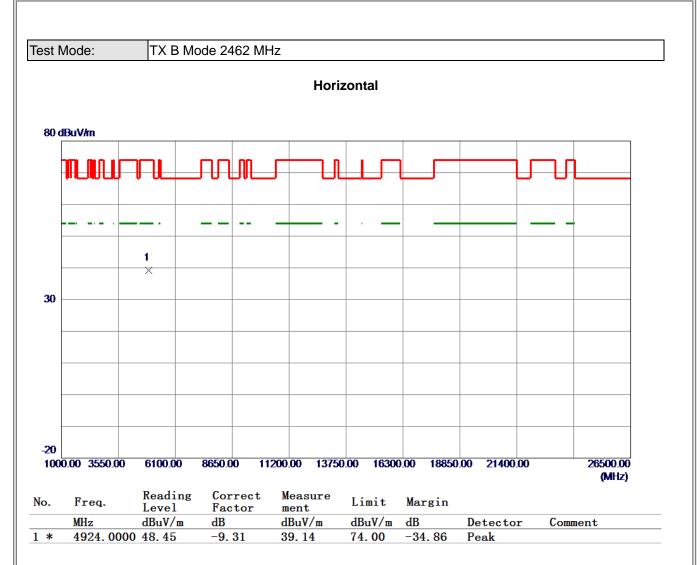
37.26

54. **00**

-16.74

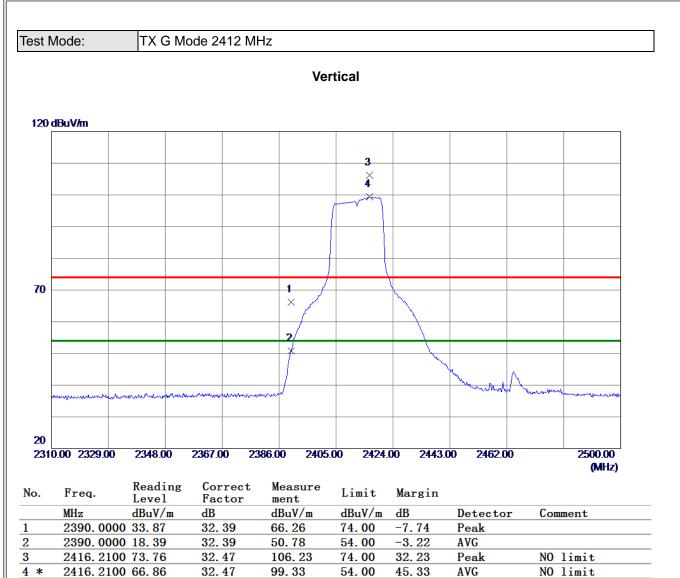
AVG





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





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



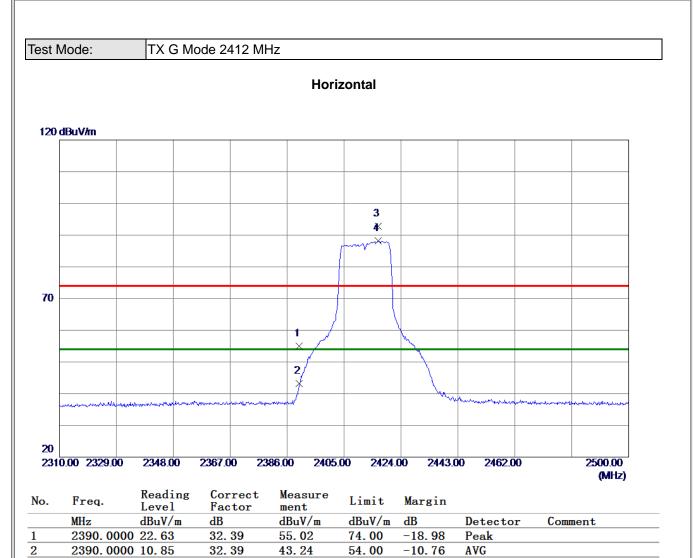


(1) Measurement Value = Reading Level + Correct Factor.



NO limit

NO limit



74.00

54. **00**

92.86

88.15

18.86

34.15

Peak

AVG

REMARKS:

3

4 *

2416.4000 60.39

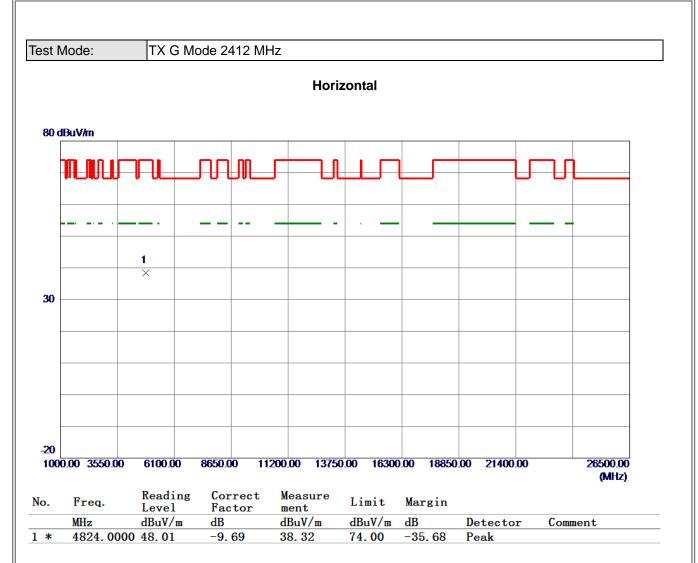
2416.4000 55.68

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

32.47

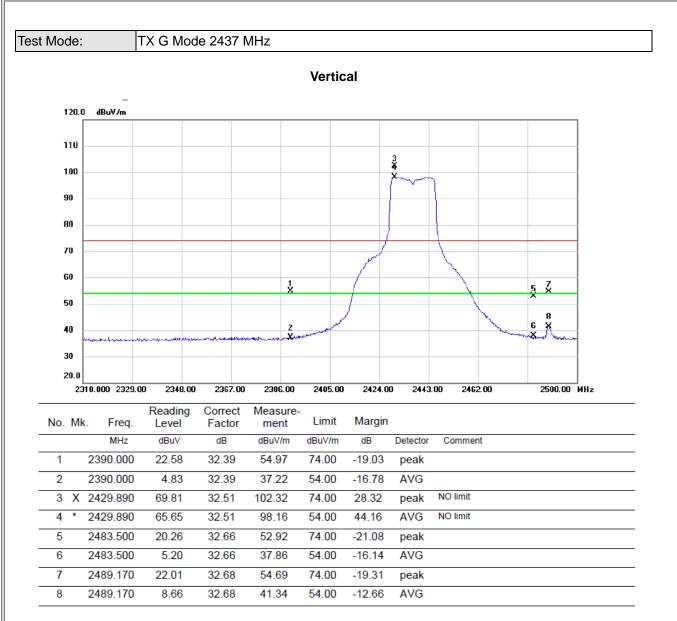
32.47





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





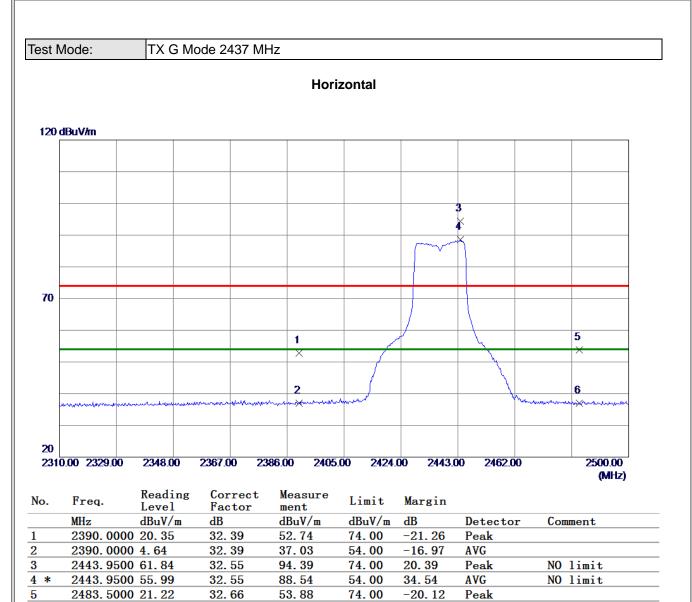
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





54.00

-16.95

AVG

REMARKS:

6

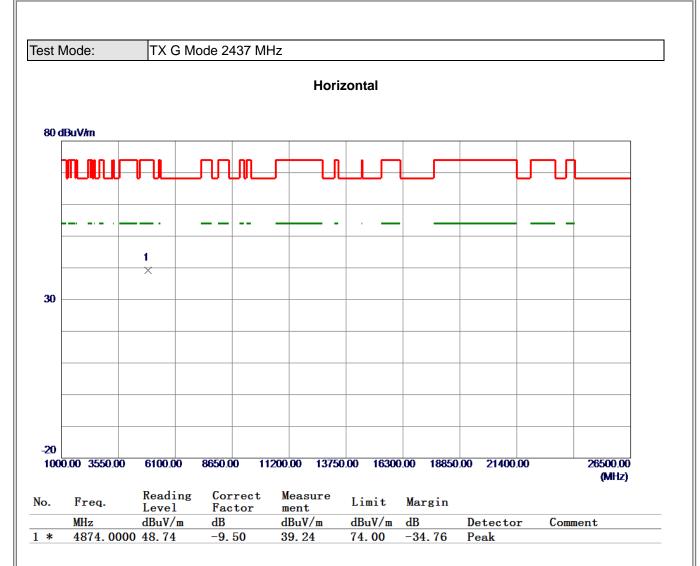
2483. 5000 4. 39

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

32.66

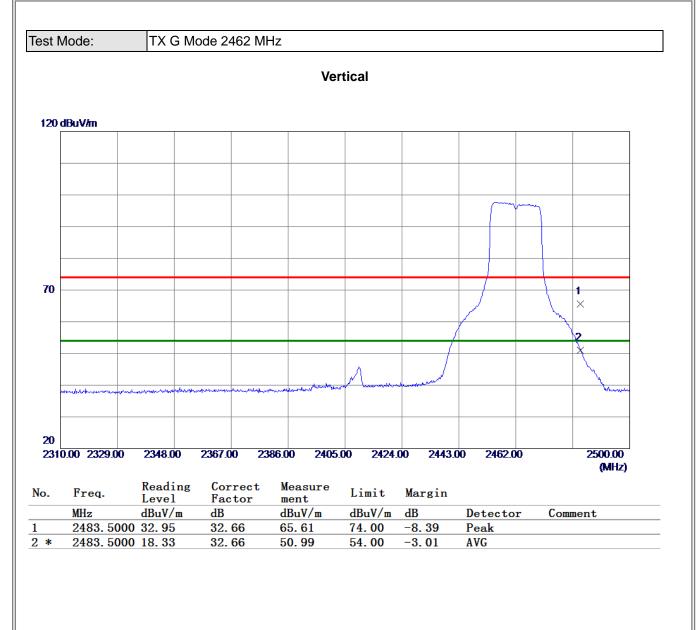
37.05





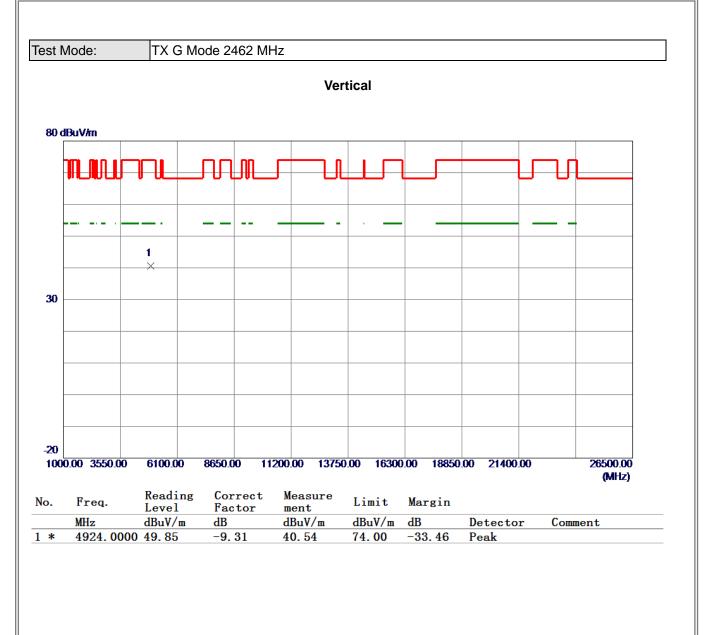
(1) Measurement Value = Reading Level + Correct Factor.





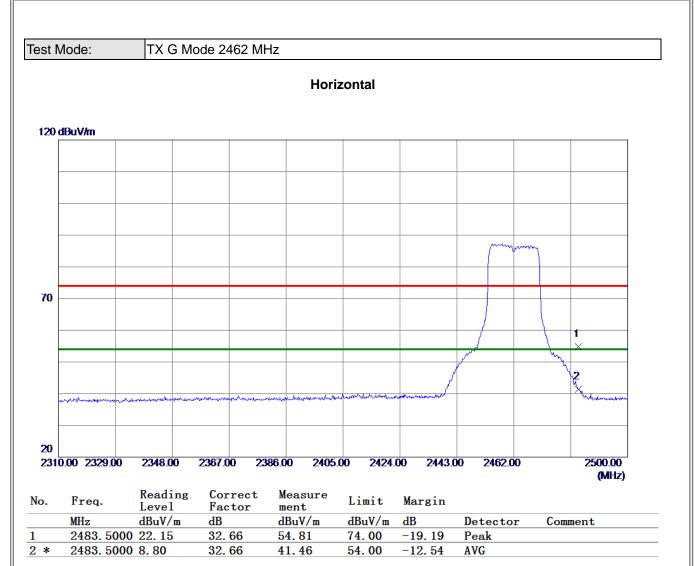
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





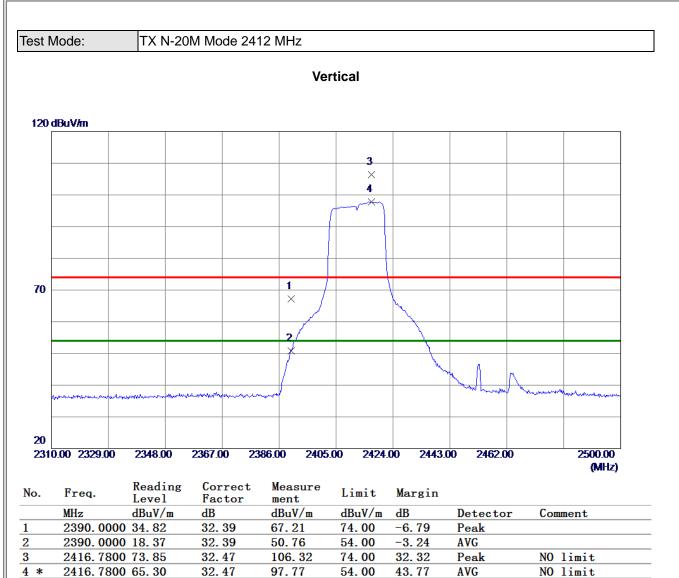
(1) Measurement Value = Reading Level + Correct Factor.





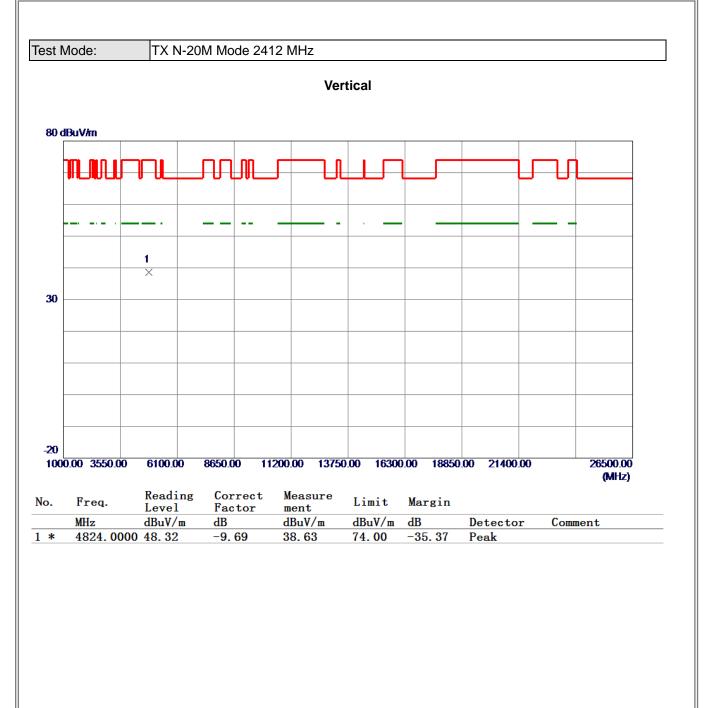
(1) Measurement Value = Reading Level + Correct Factor.





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



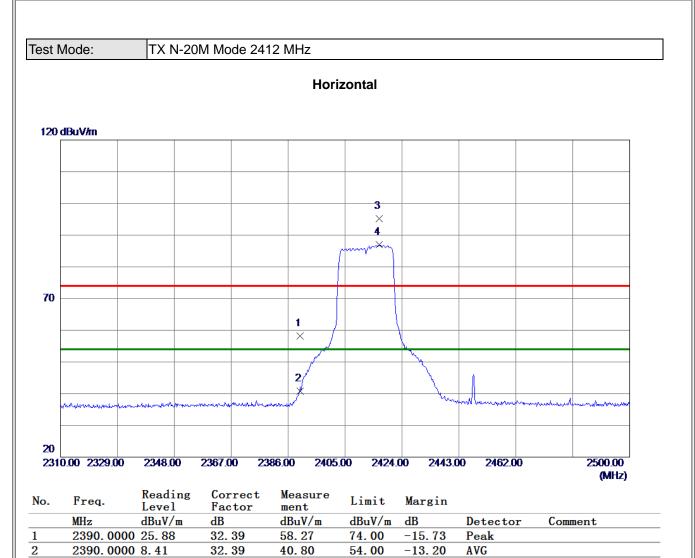


(1) Measurement Value = Reading Level + Correct Factor.



NO limit

NO limit



21.27

32.91

Peak

AVG

74.00

54. **00**

REMARKS:

3

4 *

2416. 4000 62. 80

2416.4000 54.44

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

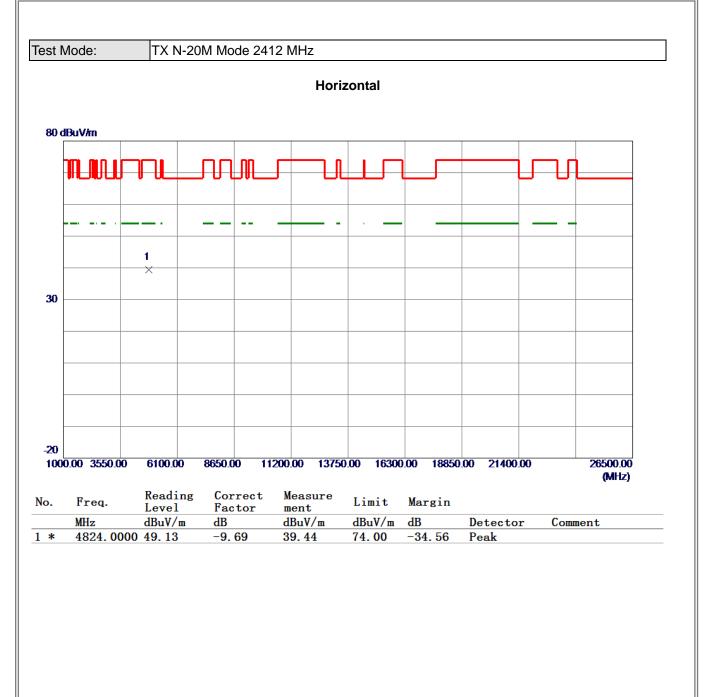
32.47

32.47

95.27

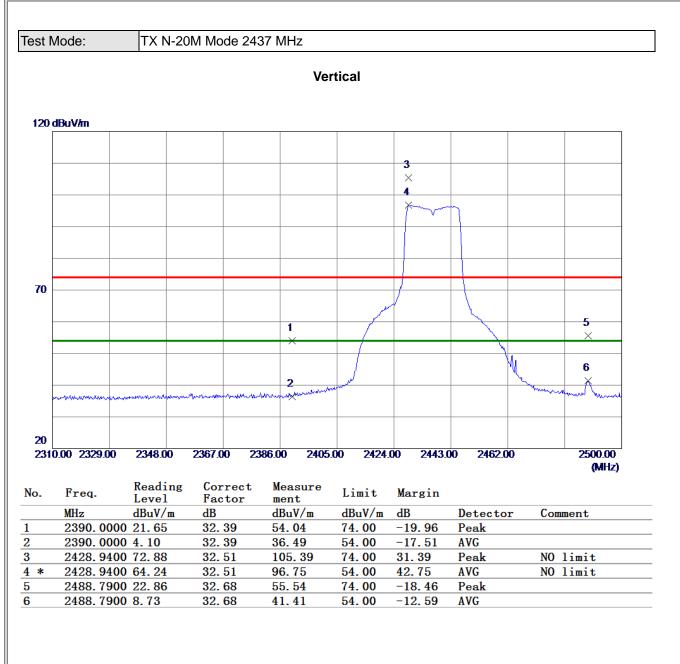
86.91





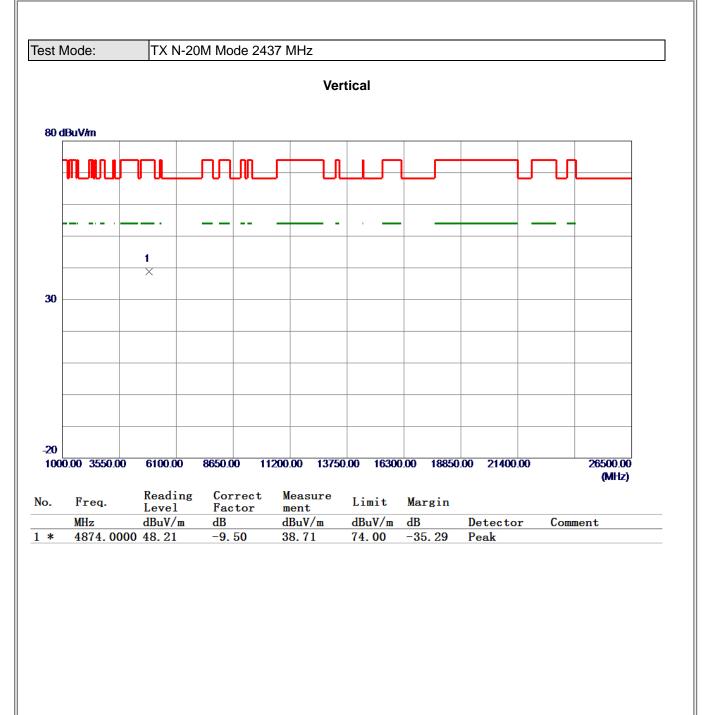
(1) Measurement Value = Reading Level + Correct Factor.





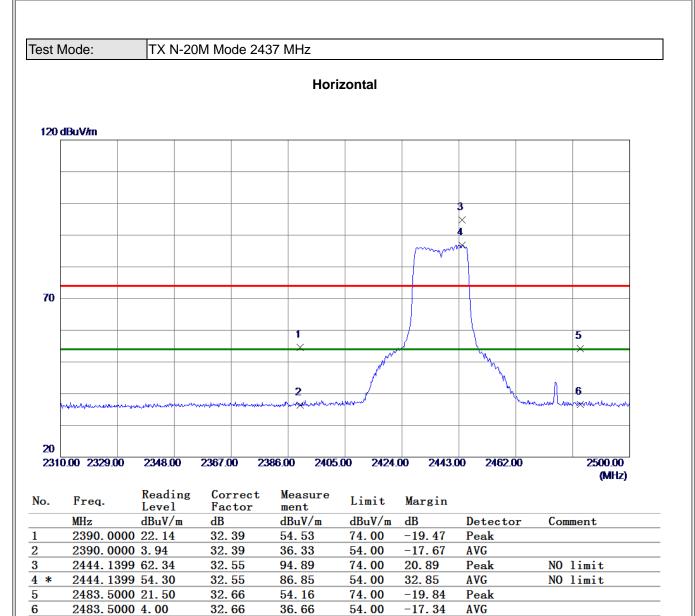
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





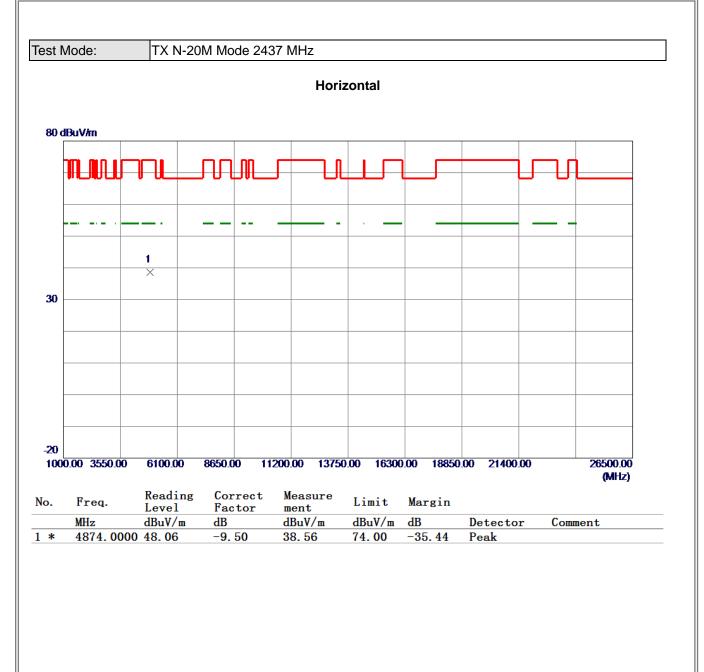
(1) Measurement Value = Reading Level + Correct Factor.





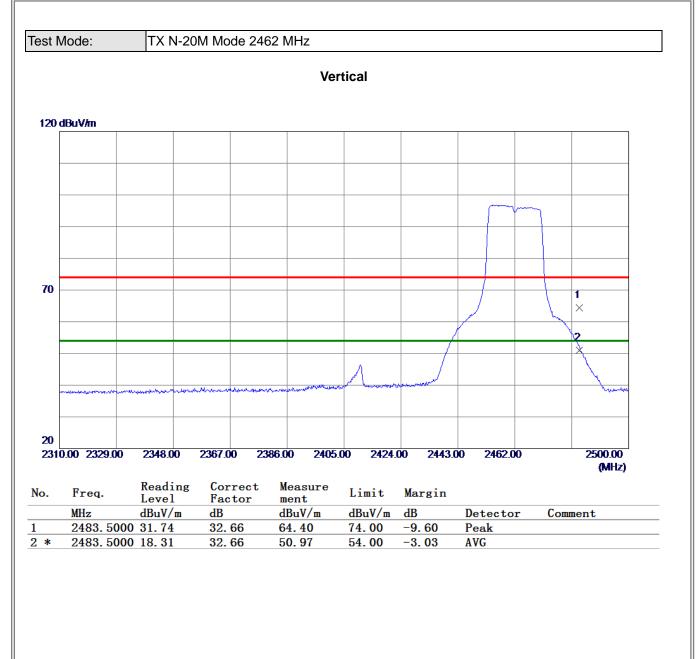
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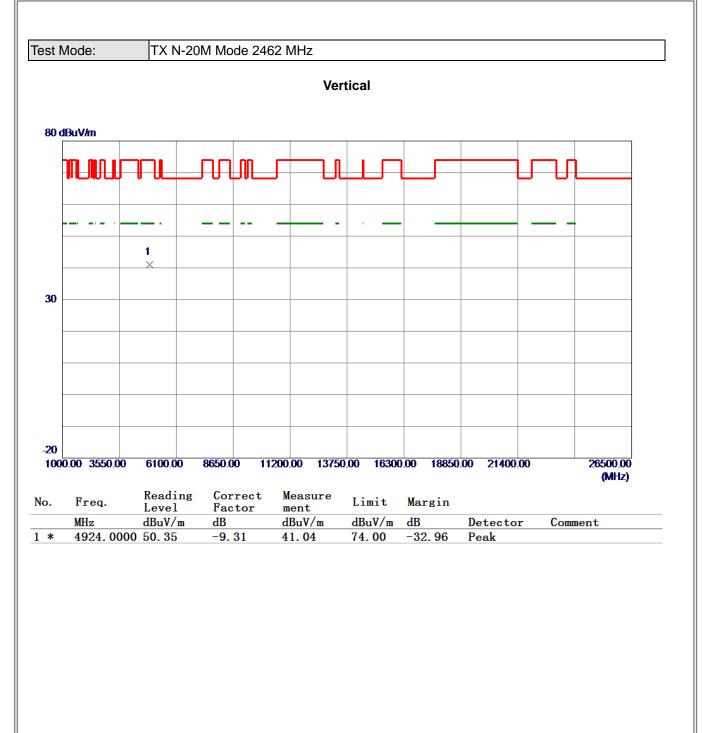
(1) Measurement Value = Reading Level + Correct Factor.





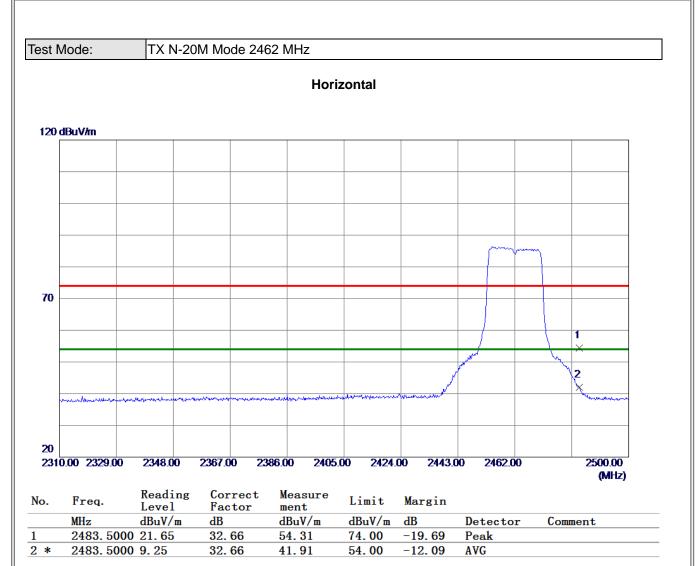
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





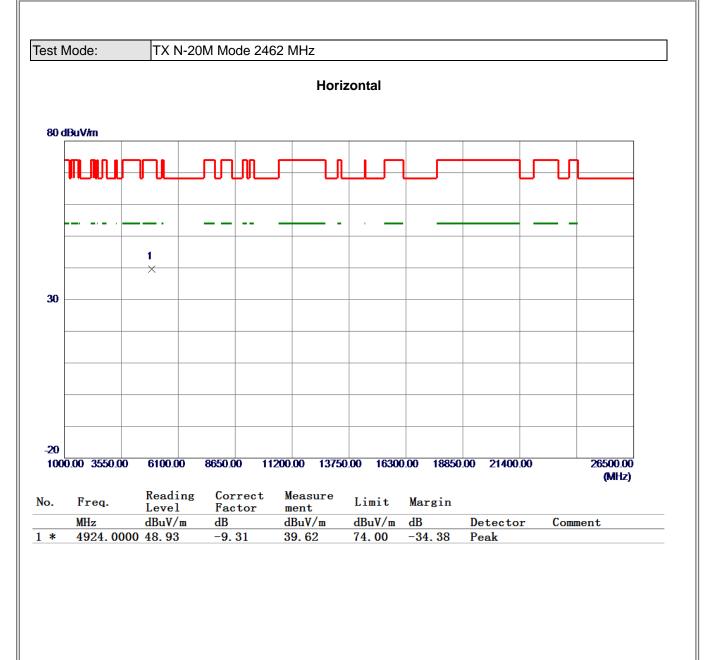
(1) Measurement Value = Reading Level + Correct Factor.





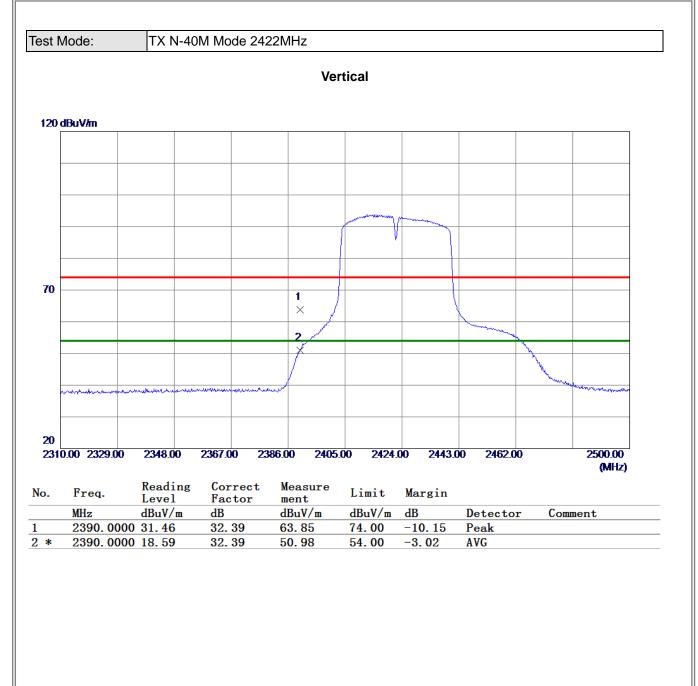
(1) Measurement Value = Reading Level + Correct Factor.





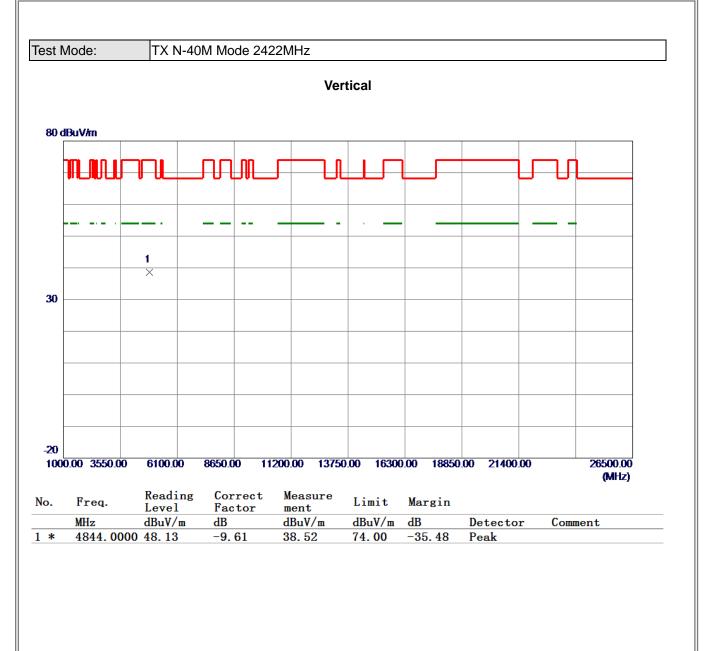
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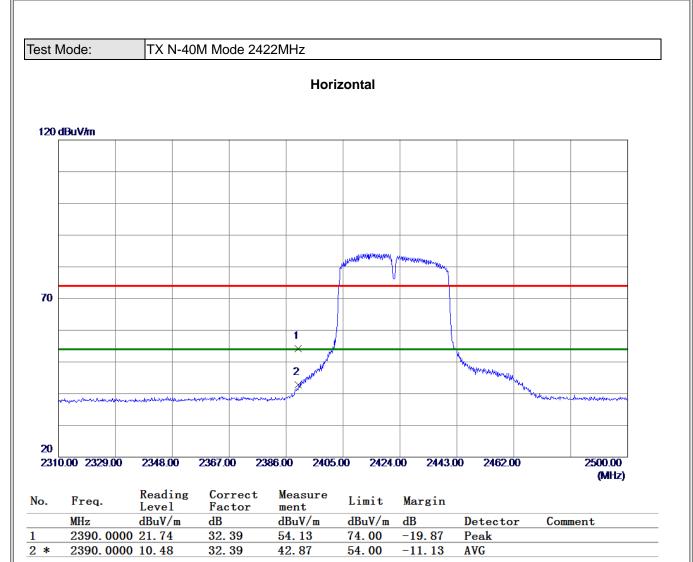
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





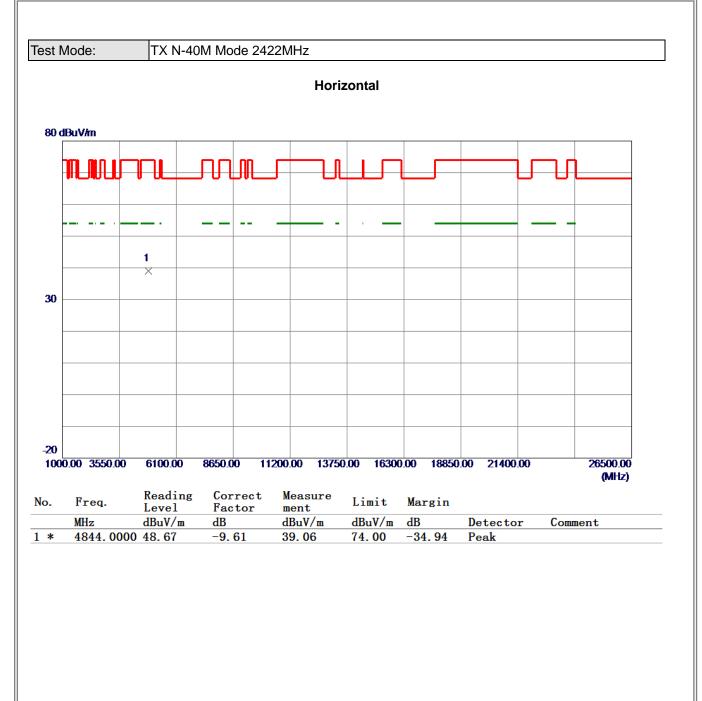
(1) Measurement Value = Reading Level + Correct Factor.





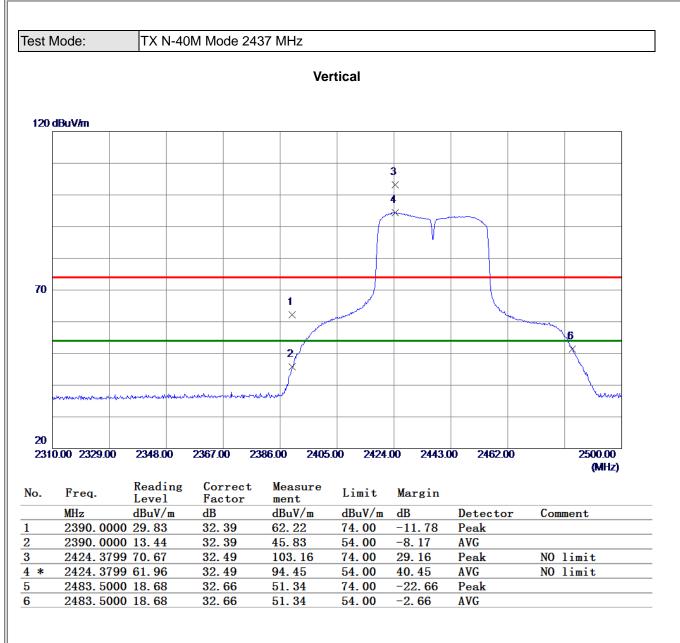
(1) Measurement Value = Reading Level + Correct Factor.





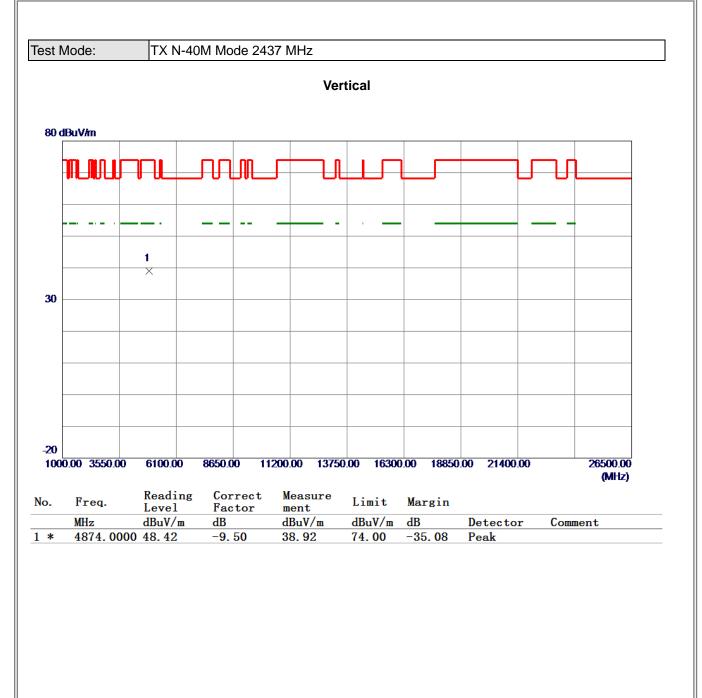
(1) Measurement Value = Reading Level + Correct Factor.





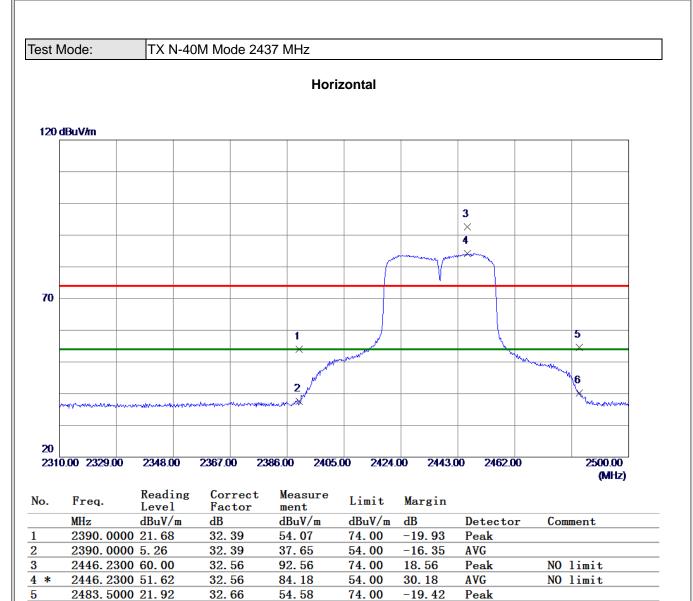
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





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





6

2483.5000 7.59

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

32.66

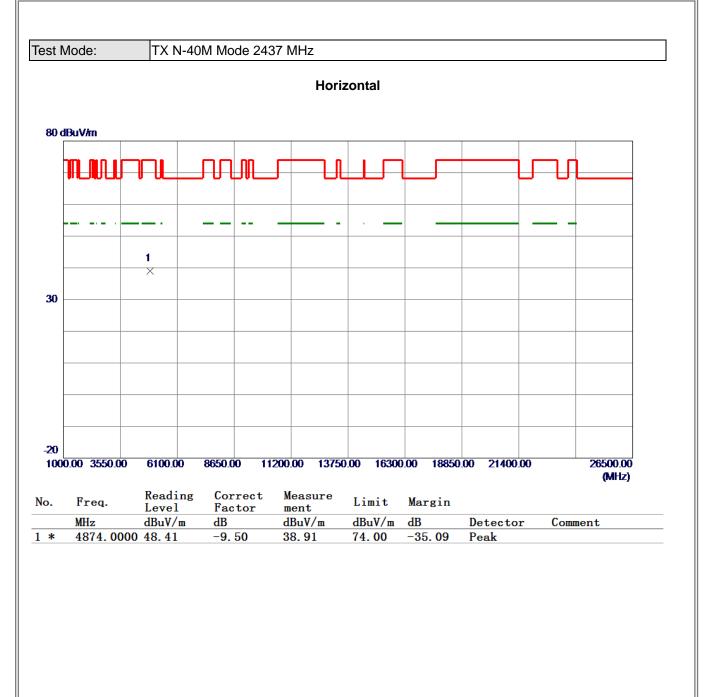
40.25

54.00

-13.75

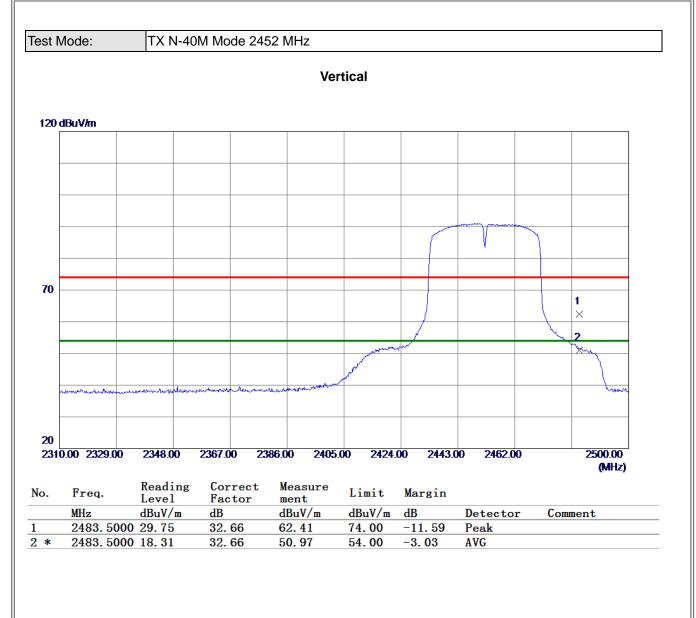
AVG





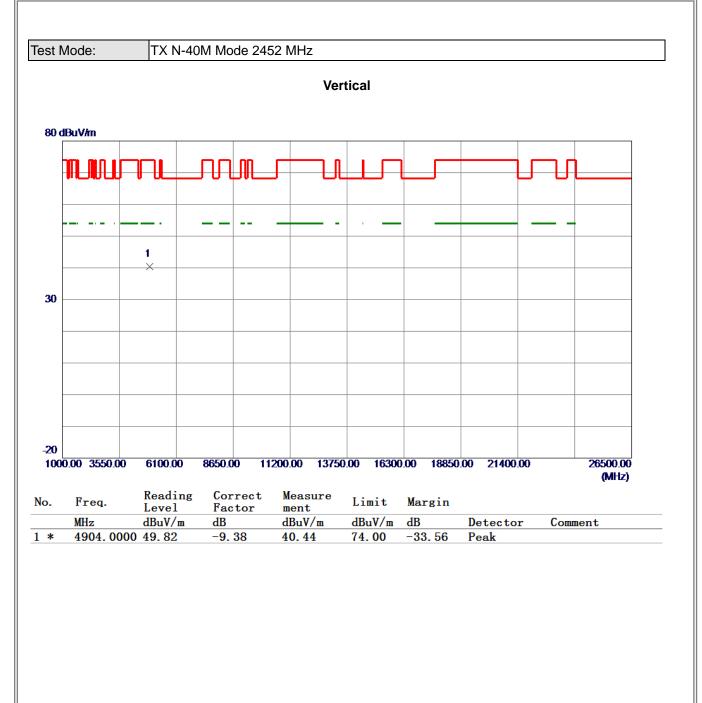
(1) Measurement Value = Reading Level + Correct Factor.





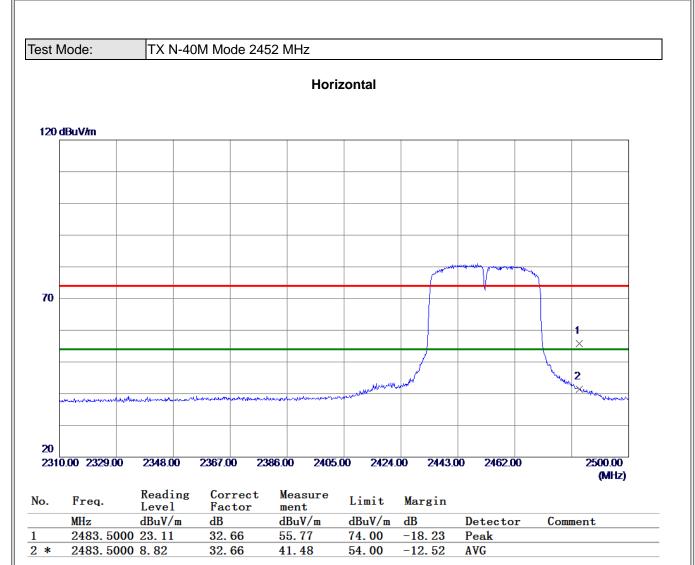
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.





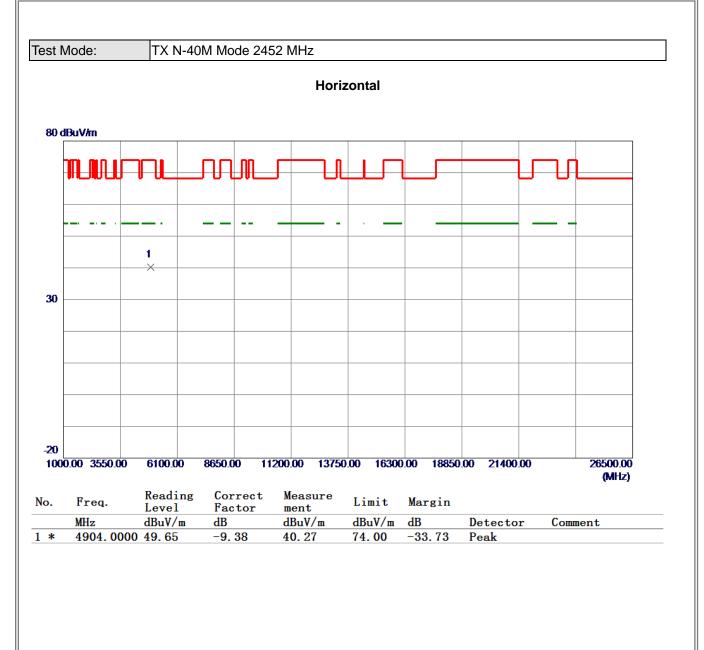
(1) Measurement Value = Reading Level + Correct Factor.





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





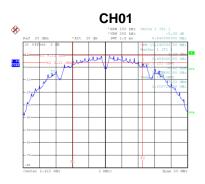
(1) Measurement Value = Reading Level + Correct Factor.

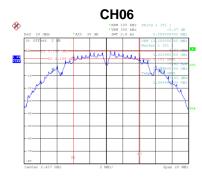


APPENDIX D - BANDWIDTH



Test Mode TX B Mode					
	Frequency	6 dB Bandwidth	6 dB Bandwidth Min. Limit	_	
Channel	(MHz)	(MHz)	(kHz)	Result	
01	2412	8.54	500	Complies	
06	2437	8.09	500	Complies	
11	2462	8.08	500	Complies	





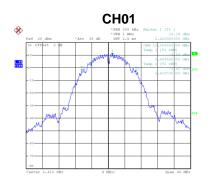


Date: 19.JAN.2020 09:20:39

Date: 19.JAN.2020 09:25:28

Date: 19.JAN.2020 09:27:38

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	13.20	Complies
06	2437	13.36	Complies
11	2462	13.36	Complies







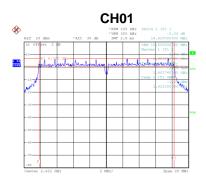
Date: 19.JAN.2020 09:20:46

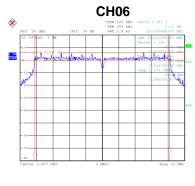
Date: 19.JAN.2020 09:25:35

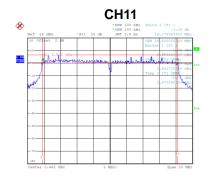
Date: 19.JAN.2020 09:27:45



Test Mode	TX G Mode			
	_			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	16.42	500	Complies
06	2437	16.41	500	Complies
11	2462	16.38	500	Complies







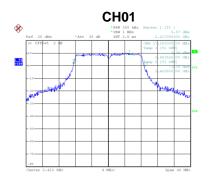
Date: 19.JAN.2020 09:30:04

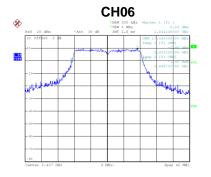
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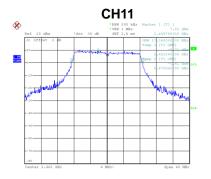
Date: 19.JAN.2020 09:32:19

Date: 19.JAN.2020 09:33:51

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	17.28	Complies
06	2437	17.44	Complies
11	2462	17.36	Complies





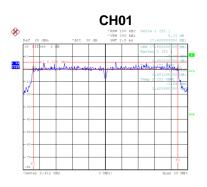


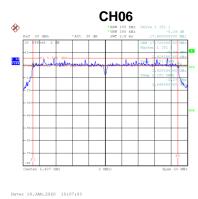
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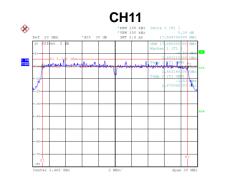
Date: 19.JAN.2020 09:33:57



Test Mode	TX N-20M Mode			
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	17.62	500	Complies
06	2437	17.66	500	Complies
11	2462	17.59	500	Complies

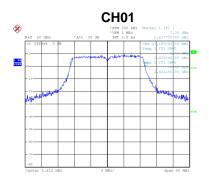


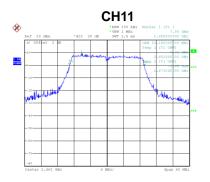




Date: 19.JAN.2020 09:39:12

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	18.16	Complies
06	2437	18.32	Complies
11	2462	18.16	Complies





Date: 19.JAN.2020 09:39:18

Date: 19.JAN.2020 09:40:38

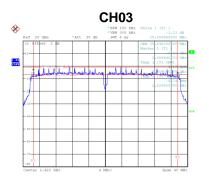
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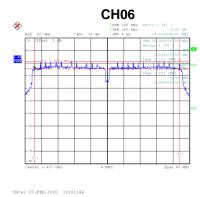
Date: 19.JAN.2020 09:45:58

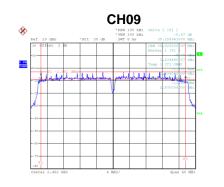


Test Mode TX N-40M Mode	
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Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
03	2422	35.16	500	Complies
06	2437	35.44	500	Complies
09	2452	35.16	500	Complies

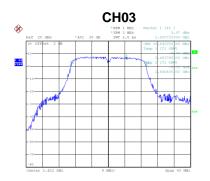


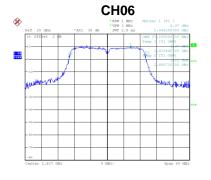


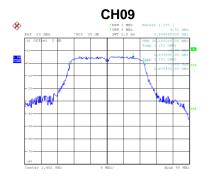


Date: 27.FEB.2020 10:19:55

Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
03	2422	36.64	Complies
06	2437	37.28	Complies
09	2452	36.80	Complies







Date: 27.FEB.2020 10:20:03

Date: 27.FEB.2020 10:21:51

Date: 27.FEB.2020 10:23:22

Date: 27.FEB.2020 10:23:16



APPENDIX E - MAXIMUM OUTPUT POWER



BIL

Test Mode

TX B Mode

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	20.16	30.00	1.0000	Complies
06	2437	20.08	30.00	1.0000	Complies
11	2462	20.24	30.00	1.0000	Complies

Test Mode

TX G Mode

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	23.13	30.00	1.0000	Complies
06	2437	23.27	30.00	1.0000	Complies
11	2462	23.21	30.00	1.0000	Complies

Test Mode

TX N-20M Mode

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	23.12	30.00	1.0000	Complies
06	2437	23.22	30.00	1.0000	Complies
11	2462	23.02	30.00	1.0000	Complies

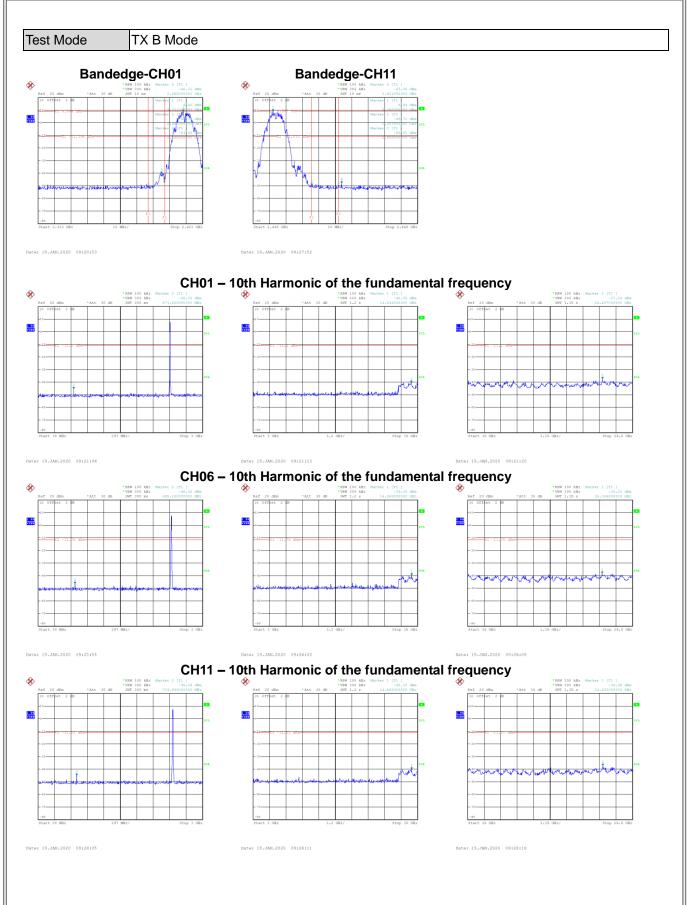
Test Mode TX N-40M Mode

Channel	Frequency (MHz)	Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	22.97	30.00	1.0000	Complies
06	2437	23.41	30.00	1.0000	Complies
09	2452	20.34	30.00	1.0000	Complies

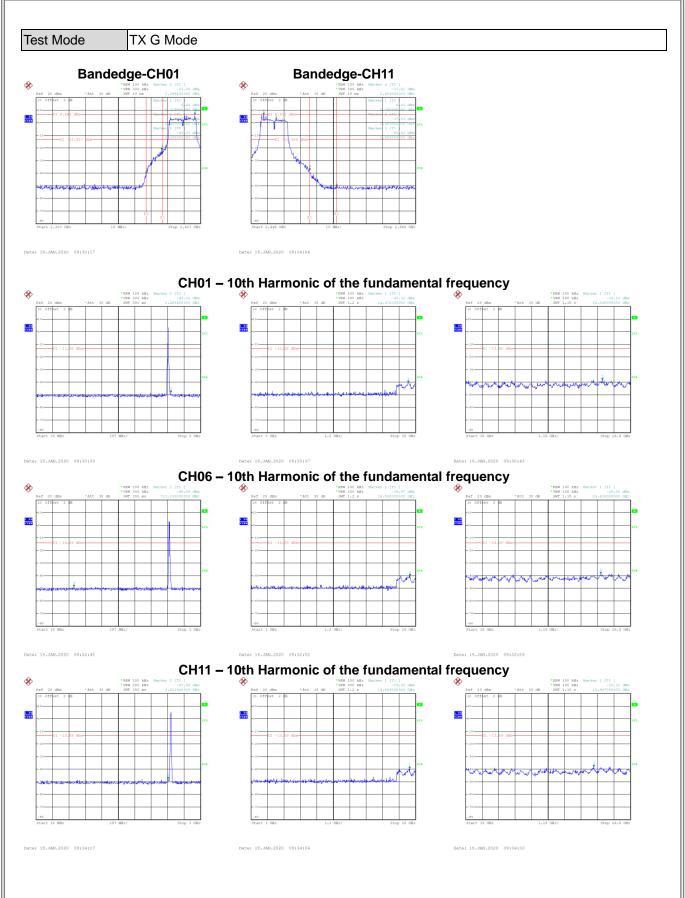


APPENDIX F - CONDUCTED SPURIOUS EMISSIONS

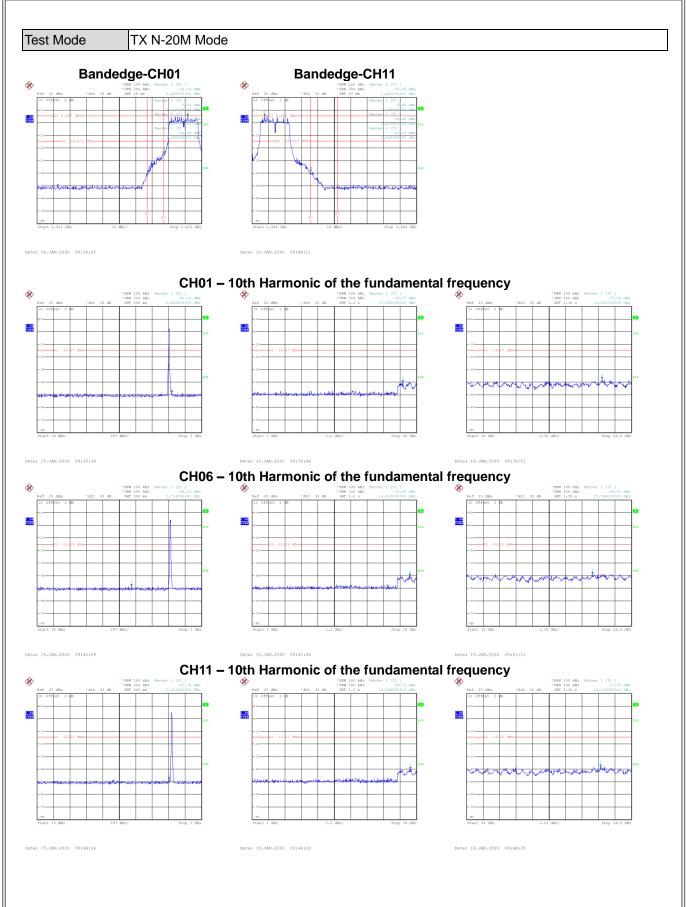




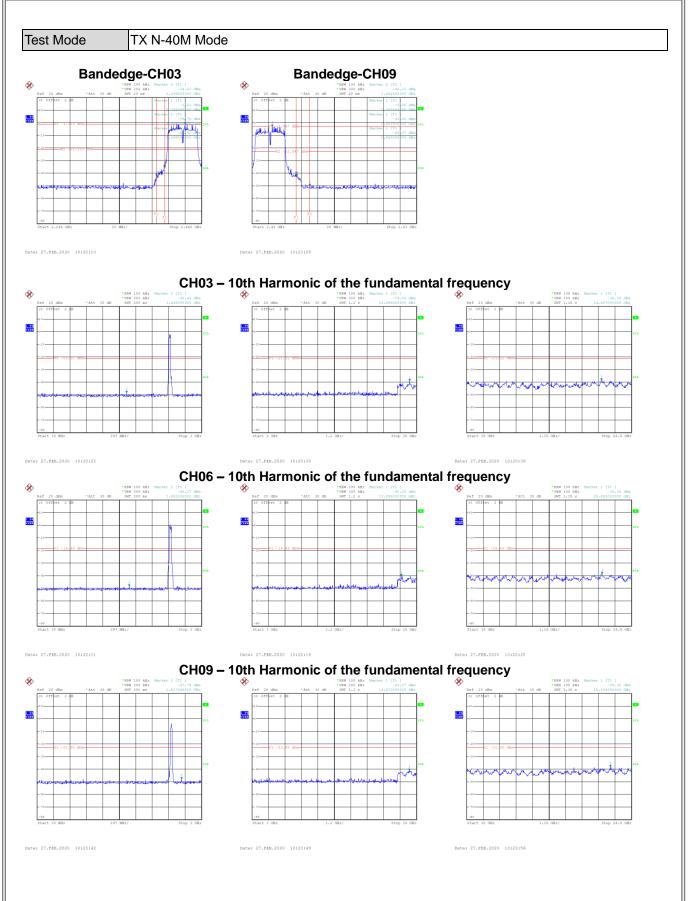










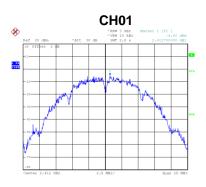




APPENDIX G - POWER SPECTRAL DENSITY



Test Mode	TX B Mode			
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
01	2412	-4.80	8	Complies
06	2437	-5.32	8	Complies
11	2462	-5.41	8	Complies





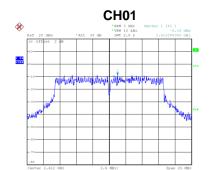


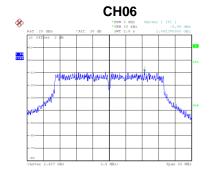
Date: 19.JAN.2020 09:56:51

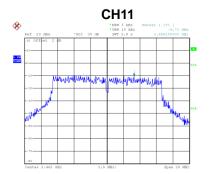
Test Mode

TX G Mode

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
01	2412	-8.18	8	Complies
06	2437	-8.99	8	Complies
11	2462	-9.73	8	Complies







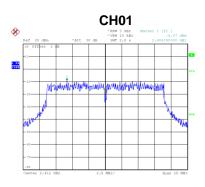
Date: 19.JAN.2020 09:59:45

Date: 19.JAN.2020 10:00:35

Date: 19.JAN.2020 10:01:17



Test Mode	TX N-20M Mode			
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
01	2412	-8.87	8	Complies
06	2437	-8.43	8	Complies
11	2462	-10.21	8	Complies





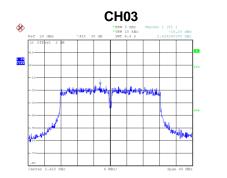


Test Mode

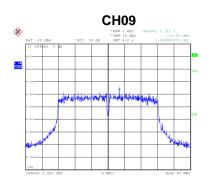
Date: 19.JAN.2020 10:02:12

TX N-40M Mode

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
03	2422	-15.20	8	Complies
06	2437	-12.39	8	Complies
09	2452	-16.93	8	Complies



Date: 27.FEB.2020 10:26:31



Date: 27.FEB.2020 10:27:16

Date: 27.FEB.2020 10:25:46

End of Test Report