

# FCC Radio Test Report

## FCC ID: 2AXJ4A54

**This report concerns: Original Grant**

**Project No.** : 2008C144  
**Equipment** : AC1200 Dual Band Wi-Fi Router  
**Brand Name** : tp-link  
**Test Model** : Archer A54  
**Series Model** : N/A  
**Applicant** : TP-Link Corporation Limited  
**Address** : Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong  
**Manufacturer** : TP-Link Corporation Limited  
**Address** : Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong  
**Date of Receipt** : Aug. 24, 2020  
**Date of Test** : Oct. 10, 2020 ~ Nov. 19, 2020  
**Issued Date** : Dec. 17, 2020  
**Report Version** : R01  
**Test Sample** : Engineering Sample No.: DG2020082754 for conducted, DG2020082427 for radiated.  
**Standard(s)** : FCC Part15, Subpart C (15.247)  
ANSI C63.10-2013  
FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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



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**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.	Dec. 03, 2020
R01	Added the test setup photos for RF conducted test.	Dec. 17, 2020

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

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

Note:

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

## 1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3,Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's Test Firm Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

## 1.2 MEASUREMENT UNCERTAINTY

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

The BTL measurement uncertainty as below table:

### A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.68

### B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9kHz ~ 30MHz	V	3.79
		9kHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.26
		30MHz ~ 200MHz	H	3.38
		200MHz ~ 1,000MHz	V	3.98
		200MHz ~ 1,000MHz	H	3.94
		1GHz ~ 6GHz	-	3.96
		6GHz ~ 18GHz	-	5.24
		18GHz ~ 26.5GHz	-	3.62
		26.5GHz ~ 40GHz	-	4.00

### C. Other Measurement:

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

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

### 1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25°C	53%	AC 120V/60Hz	Grani Zhou
Radiated Emissions-9K-30MHz	25°C	60%	AC 120V/60Hz	Grani Zhou
Radiated Emissions-30 MHz to 1GHz	26°C	52%	AC 120V/60Hz	Grani Zhou
Radiated Emissions-Above 1000 MHz	24°C	60%	AC 120V/60Hz	Grani Zhou
Bandwidth	21°C	45%	AC 120V/60Hz	Hayden Chen
Maximum Average Output Power	21°C	45%	AC 120V/60Hz	Hayden Chen
Conducted Spurious Emissions	21°C	45%	AC 120V/60Hz	Laughing Zhang
Power Spectral Density	21°C	45%	AC 120V/60Hz	Hayden Chen



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	AC1200 Dual Band Wi-Fi Router
Brand Name	tp-link
Test Model	Archer A54
Series Model	N/A
Model Difference(s)	N/A
Power Source	DC voltage supplied from AC adapter. Model: T090085-2B1
Power Rating	I/P: 100-240V~ 50/60Hz 0.3A O/P: 9.0V $\equiv$ 0.85A
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 300 Mbps
Maximum Average Output Power	IEEE 802.11b: 22.22 dBm (0.1667 W) IEEE 802.11g: 22.57 dBm (0.1807 W) IEEE 802.11n (HT20): 22.75 dBm (0.1884 W) IEEE 802.11n (HT40): 20.47 dBm (0.1114 W)



Note:

- 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		3101501031	Internal	Weld	1
2		3101503220	Internal	Weld	1

#### Note:

This EUT supports CDD, and all antennas have the same gain, Directional gain =  $G_{ANT} + \text{Array Gain}$ .

For power measurements, Array Gain = 0 dB ( $N_{ANT} \leq 4$ ), so the Directional gain=1.00.

For power spectral density measurements,  $N_{ANT} = 2$ ,  $N_{SS} = 1$ . So Directional gain =  $G_{ANT} + \text{Array Gain} = G_{ANT} + 10\log(N_{ANT}/N_{SS})$  dB =  $1.00 + 10\log(2/1)$  dBi = 4.01

### 4. Table for Antenna Configuration:

Operating Mode	2TX
TX Mode	
IEEE 802.11b	V (Ant. 1 + Ant. 2)
IEEE 802.11g	V (Ant. 1 + Ant. 2)
IEEE 802.11n(20 MHz)	V (Ant. 1 + Ant. 2)
IEEE 802.11n(40 MHz)	V (Ant. 1 + Ant. 2)

## 2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX B Mode Channel 01/06/11
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 N20 Mode Channel 06
Mode 6	TX B Mode Channel 01/02/06/10/11
Mode 7	TX G Mode Channel 01/02/06/10/11
Mode 8	TX N-20 MHz Mode Channel 01/02/06/10/11
Mode 9	TX N-40 MHz Mode Channel 03//04/06/08/09

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

AC power line conducted emissions test	
Final Test Mode:	Description
Mode 5	TX N20 Mode Channel 06

Radiated emissions test - Below 1GHz	
Final Test Mode:	Description
Mode 5	TX N20 Mode Channel 06

Radiated emissions test- Above 1GHz	
Final Test Mode:	Description
Mode 6	TX B Mode Channel 01/02/06/10/11
Mode 7	TX G Mode Channel 01/02/06/10/11
Mode 8	TX N-20 MHz Mode Channel 01/02/06/10/11
Mode 9	TX N-40 MHz Mode Channel 03//04/06/08/09

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) All the bit rate of transmitter have been tested and found the lowest rate is found to be the worst case and recorded.
- (3) For radiated emission below 1 GHz test, the IEEE 802.11n20 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) For Radiated emissions above 1GHz test, the vertical and horizontal polarities have tested, the worst case is vertical and recorded.

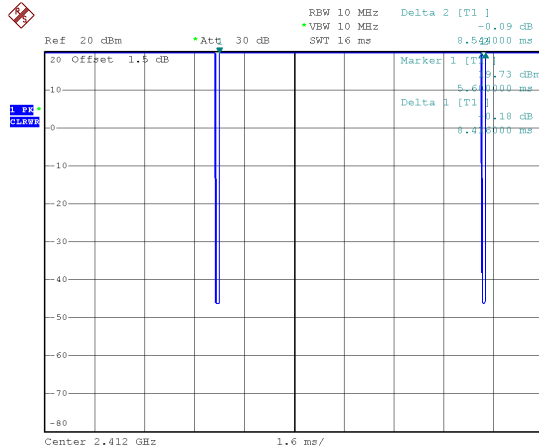
### 2.3 PARAMETERS OF TEST SOFTWARE

Test Software	N/A
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## 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.

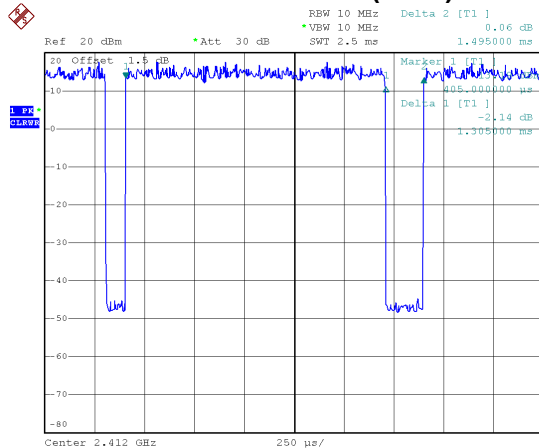
**IEEE 802.11b**



Date: 1.SEP.2020 17:52:02

Duty cycle =  $8.416 \text{ ms} / 8.544 \text{ ms} = 98.50\%$   
 Duty Factor =  $10 \log(1/\text{Duty cycle}) = 0.00$

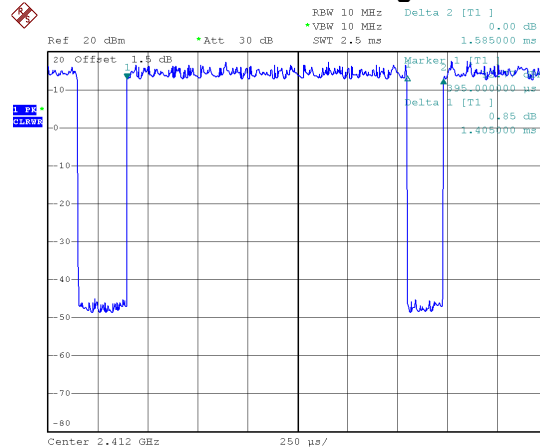
**IEEE 802.11n (HT20)**



Date: 1.SEP.2020 17:53:26

Duty cycle =  $1.305 \text{ ms} / 1.495 \text{ ms} = 87.29\%$   
 Duty Factor =  $10 \log(1/\text{Duty cycle}) = 0.59$

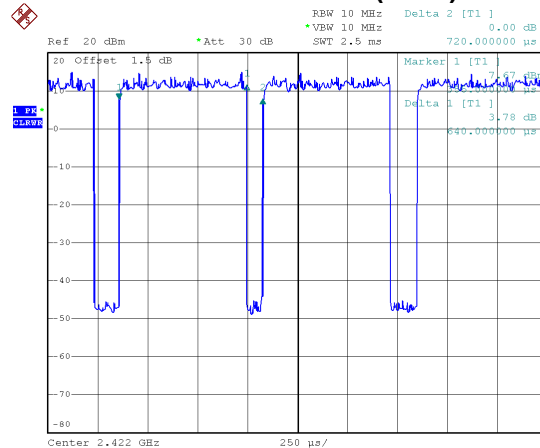
**IEEE 802.11g**



Date: 1.SEP.2020 17:53:05

Duty cycle =  $1.405 \text{ ms} / 1.585 \text{ ms} = 88.64\%$   
 Duty Factor =  $10 \log(1/\text{Duty cycle}) = 0.52$

**IEEE 802.11n (HT40)**



Date: 1.SEP.2020 17:54:18

Duty cycle =  $0.640 \text{ ms} / 0.720 \text{ ms} = 88.89\%$   
 Duty Factor =  $10 \log(1/\text{Duty cycle}) = 0.51$

### NOTE:

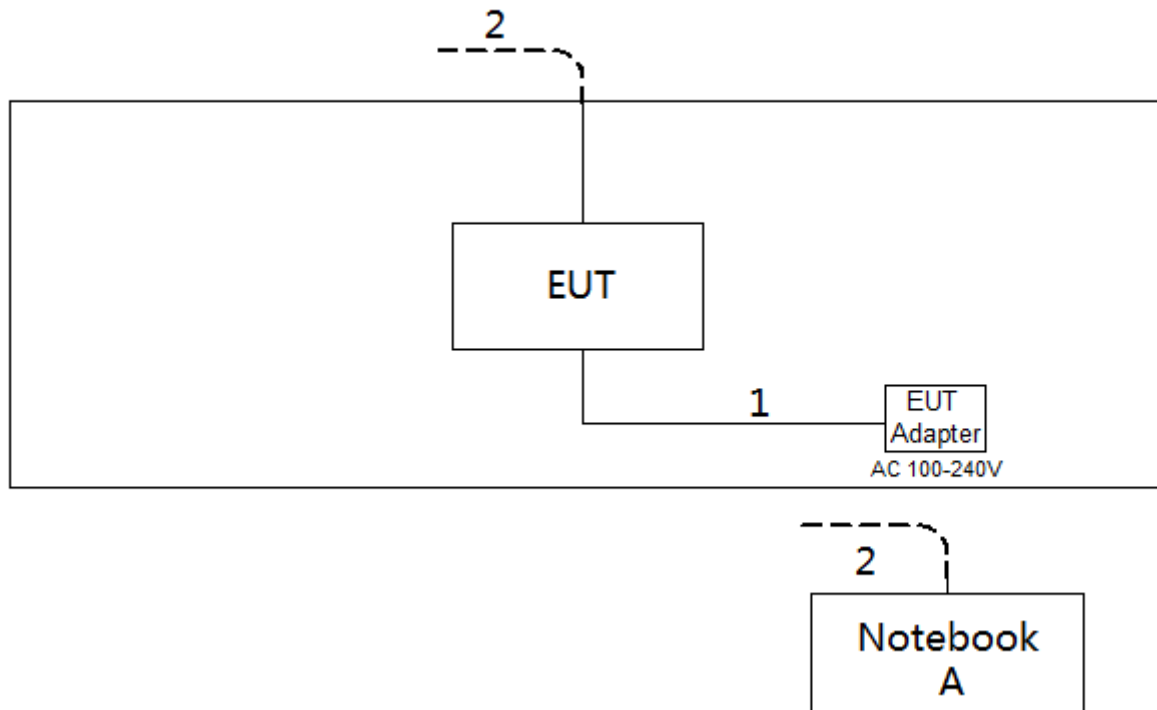
For IEEE 802.11b, IEEE 802.11g and IEEE 802.11n (HT20):

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

For IEEE 802.11n (HT40):

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

## 2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



## 2.6 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
A	Notebook	Dell	Inspiron 15-7559	N/A

Item	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

Frequency of Emission (MHz)	Limit (dB $\mu$ V)	
	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

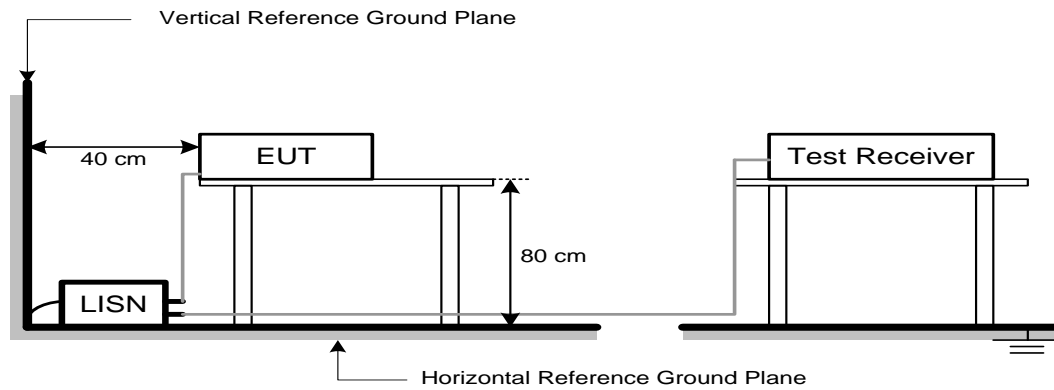
#### 3.2 TEST PROCEDURE

- 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 (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

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

#### NOTE:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

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

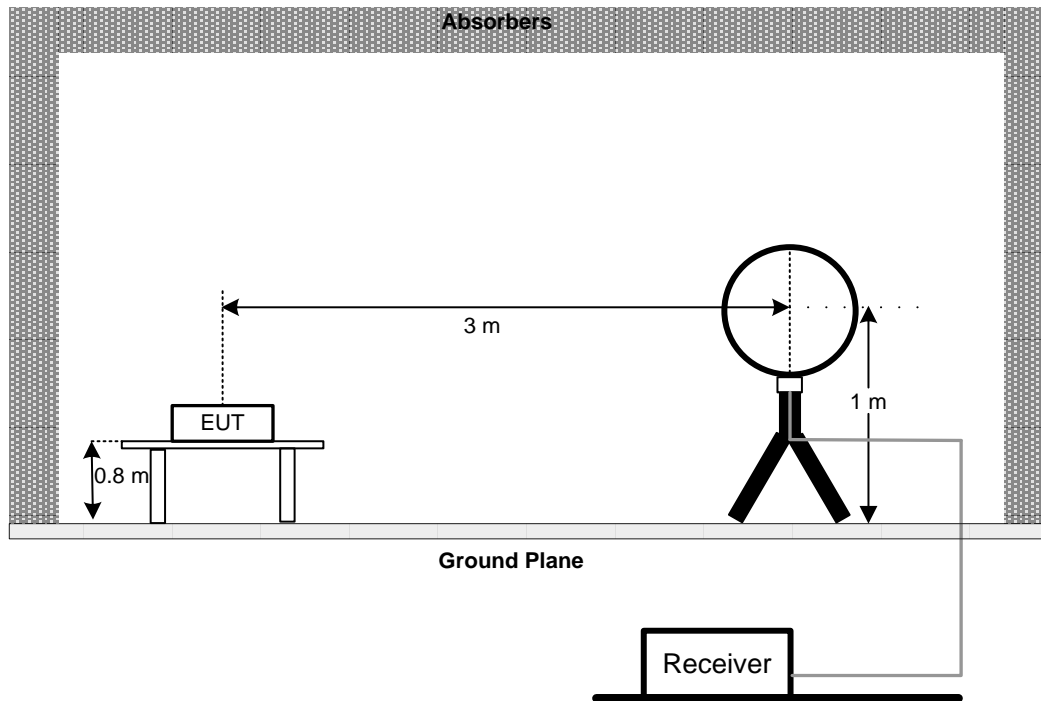
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- The measuring distance 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)
- 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.
- 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).
- 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.
- 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.
- 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)
- For the actual test configuration, please refer to the related Item -EUT Test Photos.

## 4.3 DEVIATION FROM TEST STANDARD

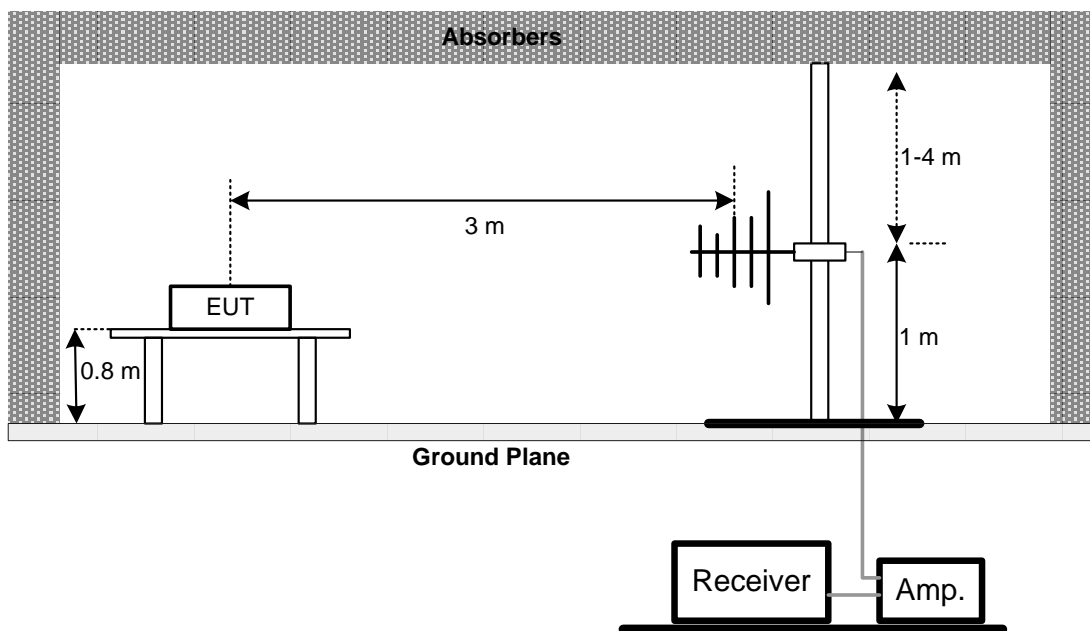
No deviation

## 4.4 TEST SETUP

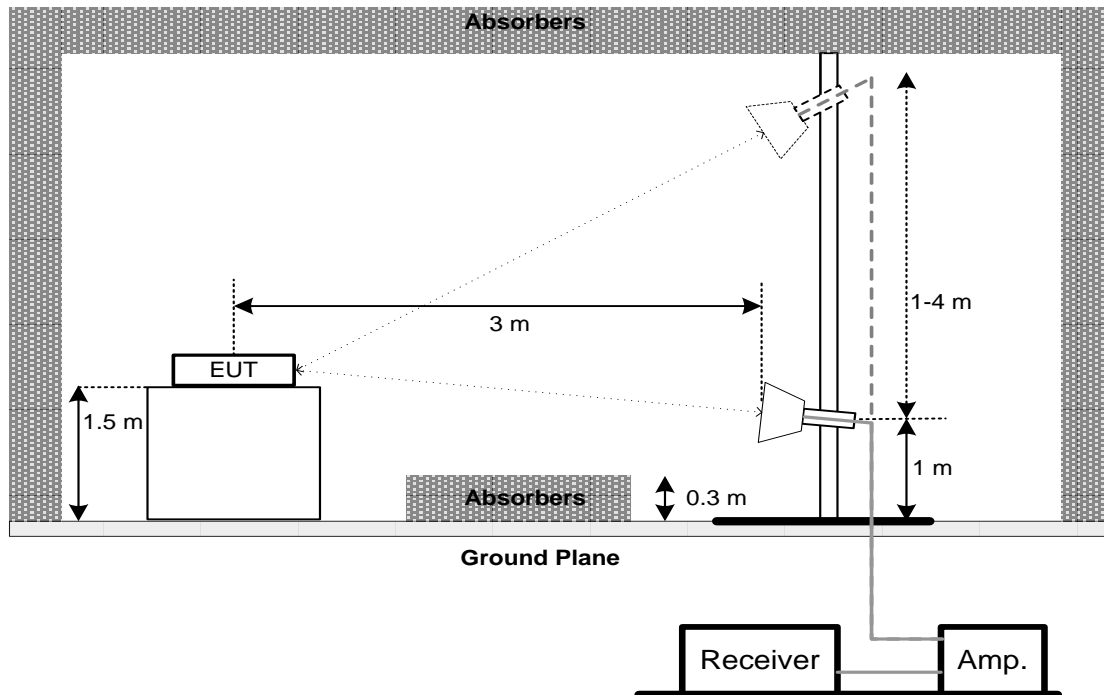
9 kHz-30 MHz



30 MHz to 1 GHz



## Above 1 GHz



### 4.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

### 4.6 TEST RESULTS - 9 KHZ TO 30 MHZ

Please refer to the APPENDIX B

Remark:

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

### 4.7 TEST RESULTS - 30 MHZ TO 1000 MHZ

Please refer to the APPENDIX C.

### 4.8 TEST RESULTS - ABOVE 1000 MHZ

Please refer to the APPENDIX D.

Remark:

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

## 5. BANDWIDTH TEST

### 5.1 LIMIT

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

### 5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- 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.
- The bandwidth was performed in accordance with method 11.8.1 of ANSI C63.10-2013.

### 5.3 DEVIATION FROM STANDARD

No deviation.

### 5.4 TEST SETUP



### 5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

### 5.6 TEST RESULTS

Please refer to the APPENDIX E.

## 6. MAXIMUM AVERAGE OUTPUT POWER TEST

### 6.1 LIMIT

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

### 6.2 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- The maximum conducted output power was performed in accordance with method 11.9.2.3.1 of ANSI C63.10-2013 and FCC KDB 662911 D01 v02r01 Multiple Transmitter Output.

### 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)

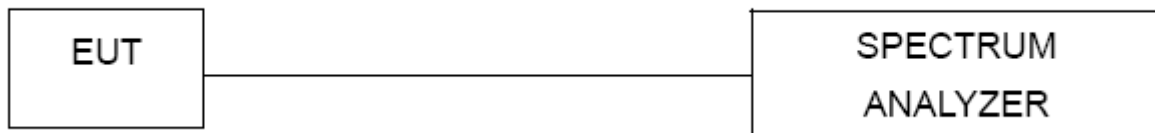
### 8.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Spectrum Setting: RBW=3 kHz, VBW=10 kHz, Sweep time = Auto.
- 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	EMI Test Receiver	R&S	ESCI	100382	Feb. 28, 2021
2	LISN	EMCO	3816/2	52765	Mar. 01, 2021
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 28, 2021
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 01, 2021
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Mar. 10, 2021
7	643 Shield Room	ETS	6*4*3m	N/A	N/A

Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	EM	EM-6876-1	230	Apr. 16, 2021
2	Cable	N/A	RG 213/U	N/A	May 29, 2021
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 28, 2021
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
5	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021

Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2021
2*	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021
3	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 22, 2021
5	Controller	CT	SC100	N/A	N/A
6	Controller	MF	MF-7802	MF780208416	N/A
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
8	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021

Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	May 12, 2021
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jul. 07, 2021
3	Amplifier	Agilent	8449B	3008A02333	Mar. 01, 2021
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 07, 2021
5	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	N/A	EMC104-SM-SM-6 000	N/A	May 09, 2021
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
10	Filter	STI	STI15-9912	N/A	Jul. 25, 2021
11	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021

Bandwidth & Antenna Conducted Spurious Emissions & Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Jul. 25, 2021
2	RF Cable	Tongkaichuan	N/A	N/A	N/A
3	DC Block	Mini	N/A	N/A	N/A
4	EXA Spectrum Analyzer	Keysight	N9010A	MY56480488	Mar. 01, 2021

Maximum Average Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Peak Power Analyzer	Keysight	8990B	MY51000506	Aug. 07, 2021
2	Wideband power sensor	Keysight	N1923A	MY58310004	Jul. 25, 2021
3	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 11, 2021
4	RF Cable	Tongkaichuan	N/A	N/A	N/A

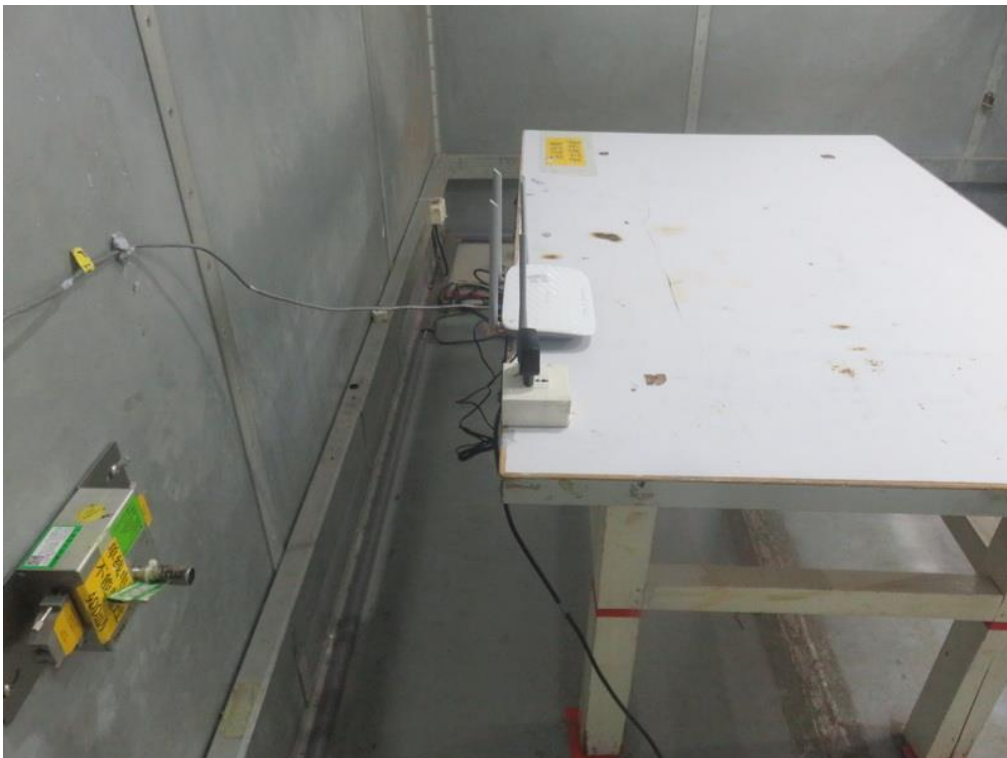
Remark: "N/A" denotes no model name, serial no. or calibration specified.

"\*\*" calibration period of equipment list is three year.

Except \* item, all calibration period of equipment list is one year.

## 10. EUT TEST PHOTO

### AC Power Line Conducted Emissions Test Photos

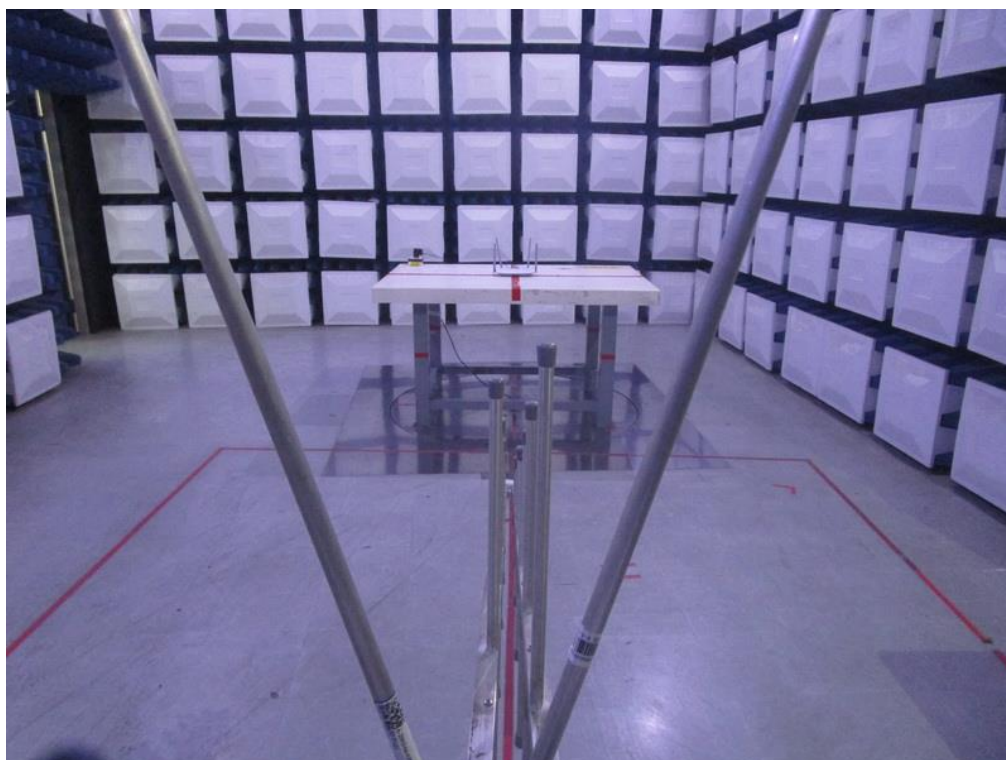


**Radiated Emissions Test Photos****9 kHz to 30 MHz**



## Radiated Emissions Test Photos

30 MHz to 1 GHz



## Radiated Emissions Test Photos

### Above 1 GHz



### Conducted Emissions Test Photos

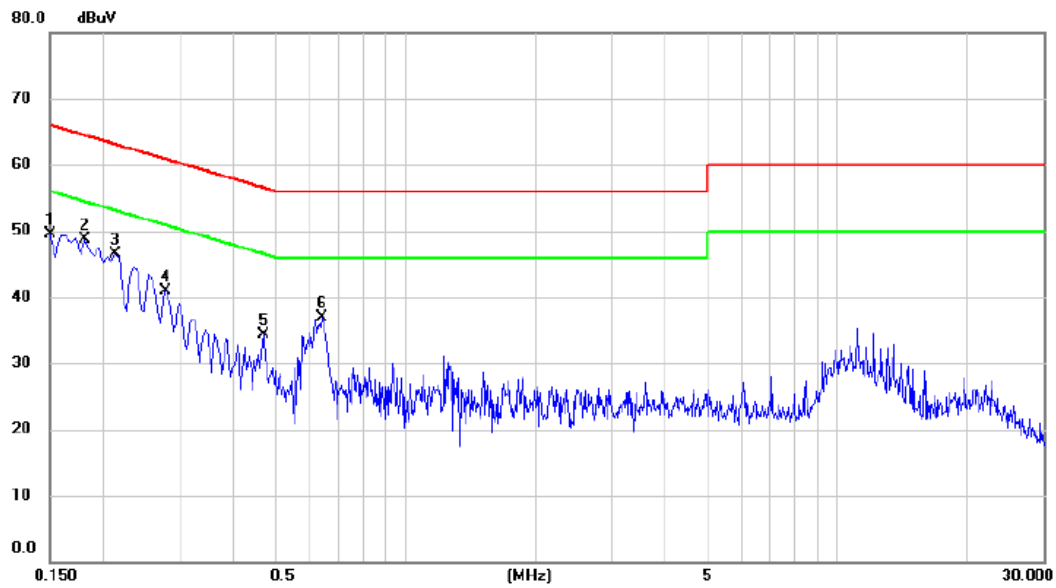


## **APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS**



Test Mode: TX N20 Mode Channel 06

## Line



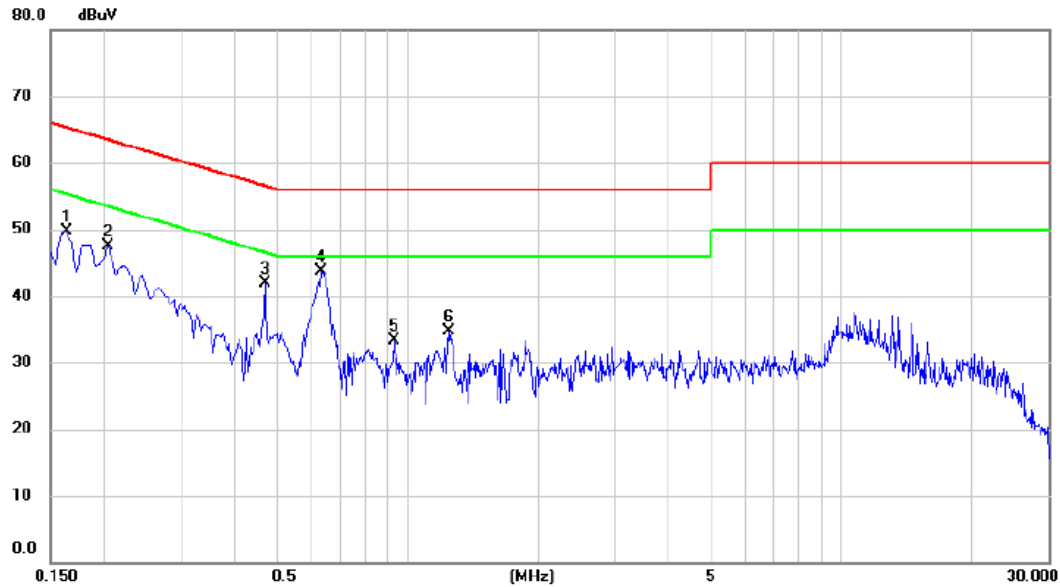
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1500	39.86	9.67	49.53	66.00	-16.47	peak	
2 *	0.1815	38.92	9.85	48.77	64.42	-15.65	peak	
3	0.2130	36.56	9.90	46.46	63.09	-16.63	peak	
4	0.2788	30.93	9.89	40.82	60.85	-20.03	peak	
5	0.4695	24.37	9.94	34.31	56.52	-22.21	peak	
6	0.6405	27.04	9.92	36.96	56.00	-19.04	peak	

### REMARKS:

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

Test Mode: TX N20 Mode Channel 06

## Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1635	39.81	9.85	49.66	65.28	-15.62	peak	
2		0.2040	37.50	10.01	47.51	63.45	-15.94	peak	
3		0.4695	31.84	10.13	41.97	56.52	-14.55	peak	
4	*	0.6315	33.54	10.16	43.70	56.00	-12.30	peak	
5		0.9285	23.00	10.28	33.28	56.00	-22.72	peak	
6		1.2435	24.29	10.33	34.62	56.00	-21.38	peak	

### REMARKS:

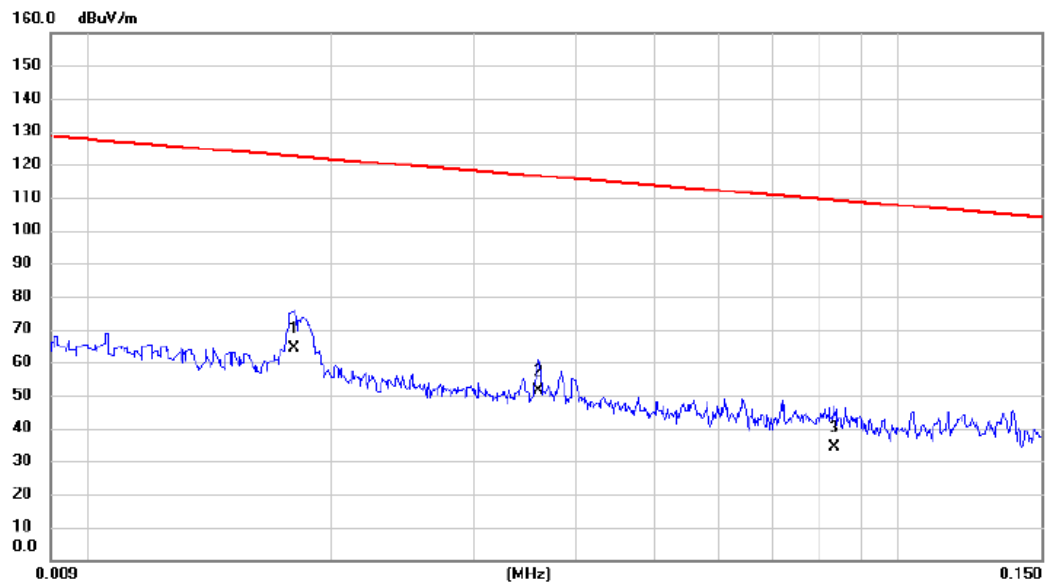
(1) Measurement Value = Reading Level + Correct Factor.

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

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

Test Mode: TX N20 Mode Channel 06

Ant 0°



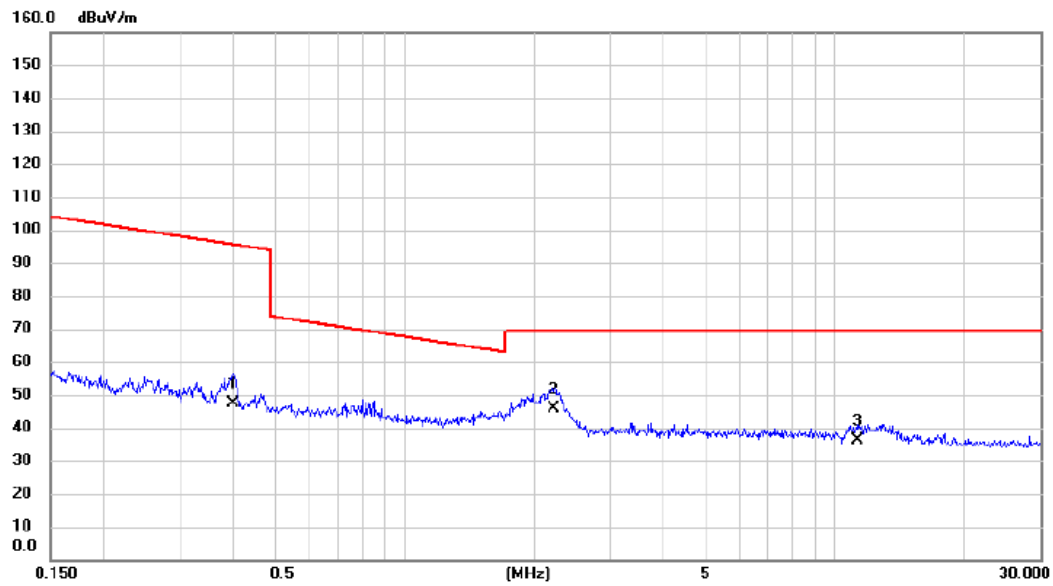
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0180	50.47	13.84	64.31	122.50	-58.19	AVG	
2		0.0360	38.66	12.79	51.45	116.48	-65.03	AVG	
3		0.0833	21.75	12.62	34.37	109.19	-74.82	AVG	

## REMARKS:

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

Test Mode: TX N20 Mode Channel 06

Ant 0°



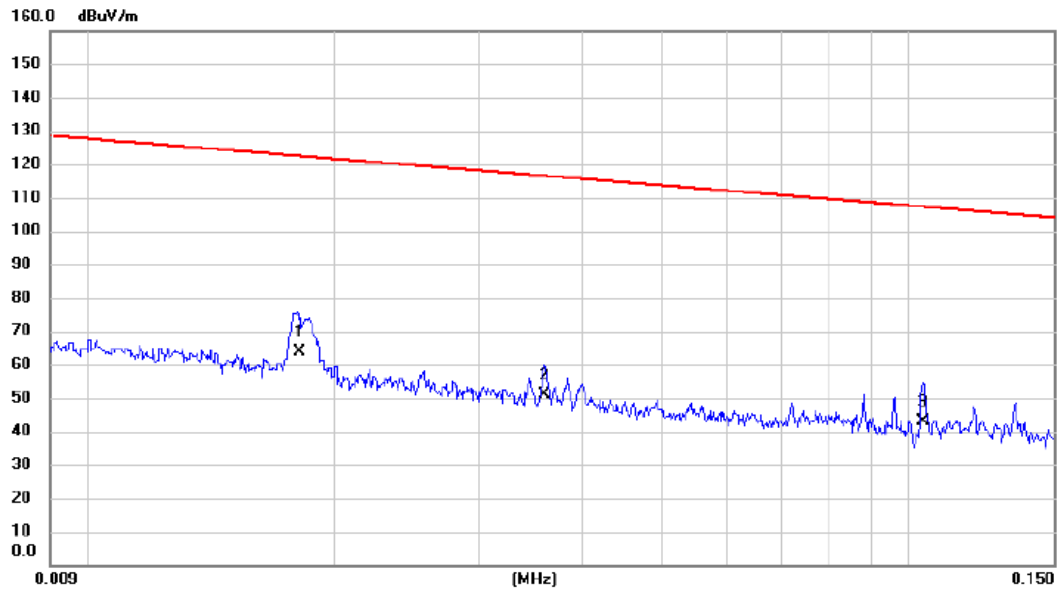
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.3997	35.11	12.26	47.37	95.57	-48.20	AVG	
2	*	2.2132	34.75	11.19	45.94	69.54	-23.60	QP	
3		11.3170	24.80	11.52	36.32	69.54	-33.22	QP	

## REMARKS:

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

Test Mode: TX N20 Mode Channel 06

Ant 90°



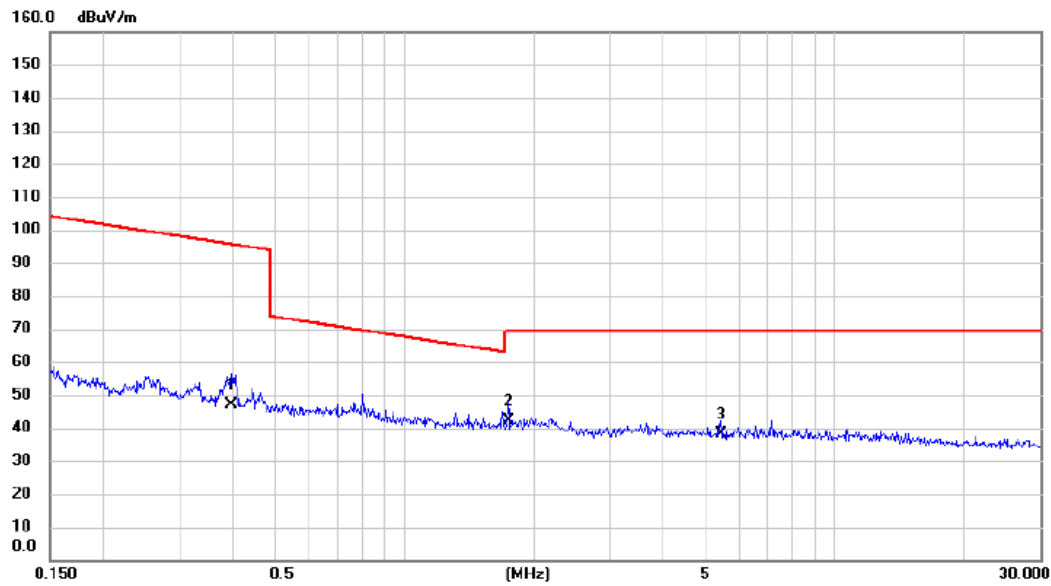
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0181	50.10	13.81	63.91	122.45	-58.54	AVG	
2		0.0360	38.11	12.79	50.90	116.48	-65.58	AVG	
3		0.1041	30.46	12.72	43.18	107.26	-64.08	AVG	

## REMARKS:

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

Test Mode: TX N20 Mode Channel 06

Ant 90°



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.3976	34.57	12.27	46.84	95.62	-48.78	AVG	
2	*	1.7437	30.66	11.43	42.09	69.54	-27.45	QP	
3		5.4474	26.90	11.13	38.03	69.54	-31.51	QP	

## REMARKS:

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

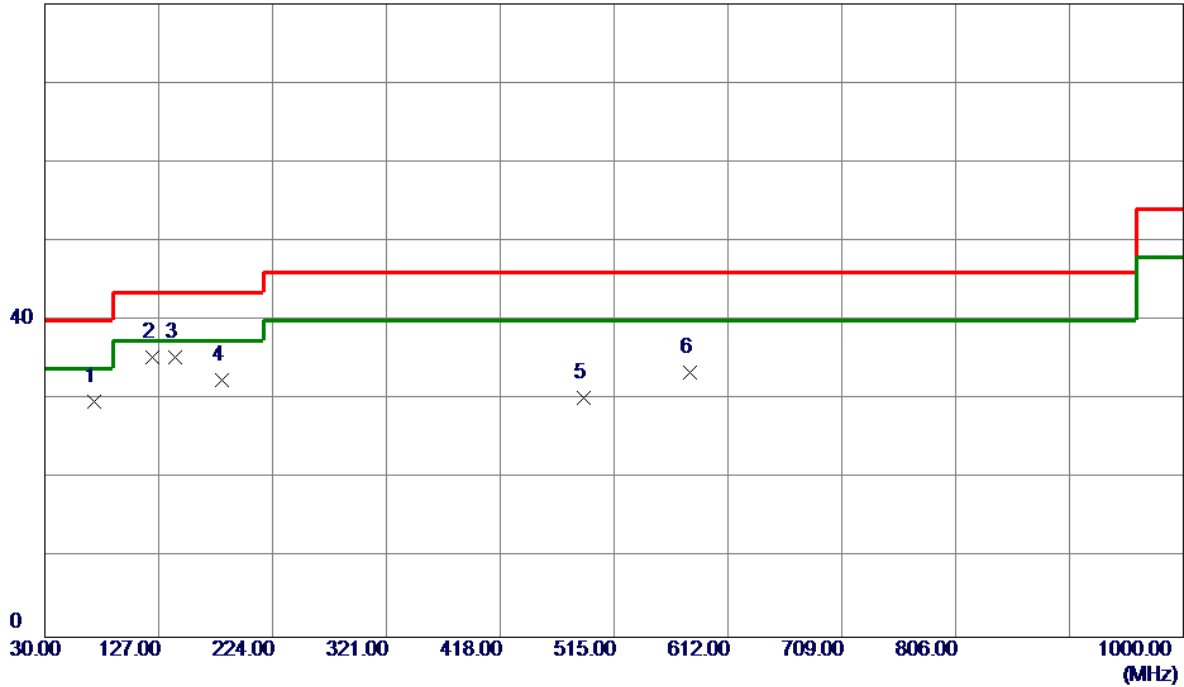
## **APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ**



Test Mode: TX N20 Mode Channel 06

## Vertical

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	71.7100	45.94	-16.23	29.71	40.00	-10.29	Peak	
2 *	121.1800	48.15	-12.74	35.41	43.50	-8.09	Peak	
3	140.5800	47.93	-12.52	35.41	43.50	-8.09	Peak	
4	181.3200	45.47	-12.96	32.51	43.50	-10.99	Peak	
5	488.8100	37.55	-7.35	30.20	46.00	-15.80	Peak	
6	579.9900	39.34	-5.93	33.41	46.00	-12.59	Peak	

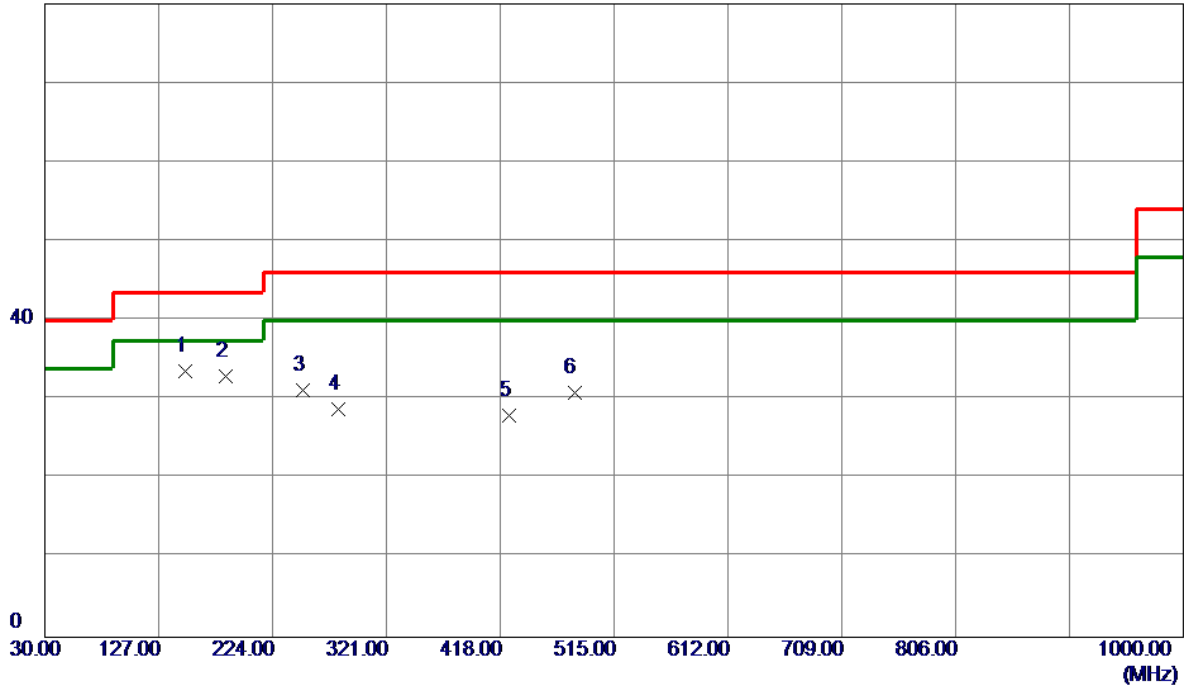
### REMARKS:

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

Test Mode: TX N20 Mode Channel 06

## Horizontal

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	149.3100	45.60	-12.00	33.60	43.50	-9.90	Peak	
2	184.2300	46.30	-13.34	32.96	43.50	-10.54	Peak	
3	250.1900	44.52	-13.28	31.24	46.00	-14.76	Peak	
4	280.2600	40.87	-12.14	28.73	46.00	-17.27	Peak	
5	425.7600	36.32	-8.30	28.02	46.00	-17.98	Peak	
6	481.0500	38.23	-7.40	30.83	46.00	-15.17	Peak	

### REMARKS:

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

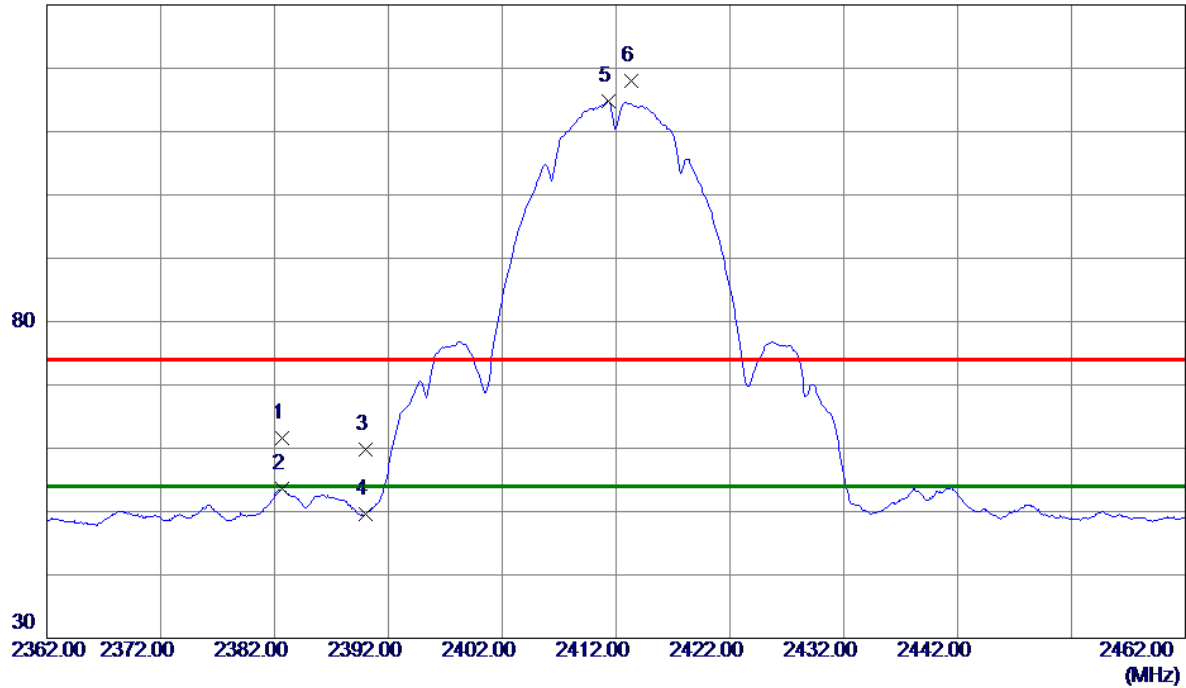
(2) Margin Level = Measurement Value - Limit Value.

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

Test Mode: TX B Mode 2412 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2382.7000	51.07	10.60	61.67	74.00	-12.33	Peak	
2	2382.7000	42.99	10.60	53.59	54.00	-0.41	AVG	
3	2390.0000	49.18	10.62	59.80	74.00	-14.20	Peak	
4	2390.0000	39.07	10.62	49.69	54.00	-4.31	AVG	
5 *	2411.3000	104.02	10.69	114.71	54.00	60.71	AVG	No Limit
6	2413.3000	107.30	10.69	117.99	74.00	43.99	Peak	No Limit

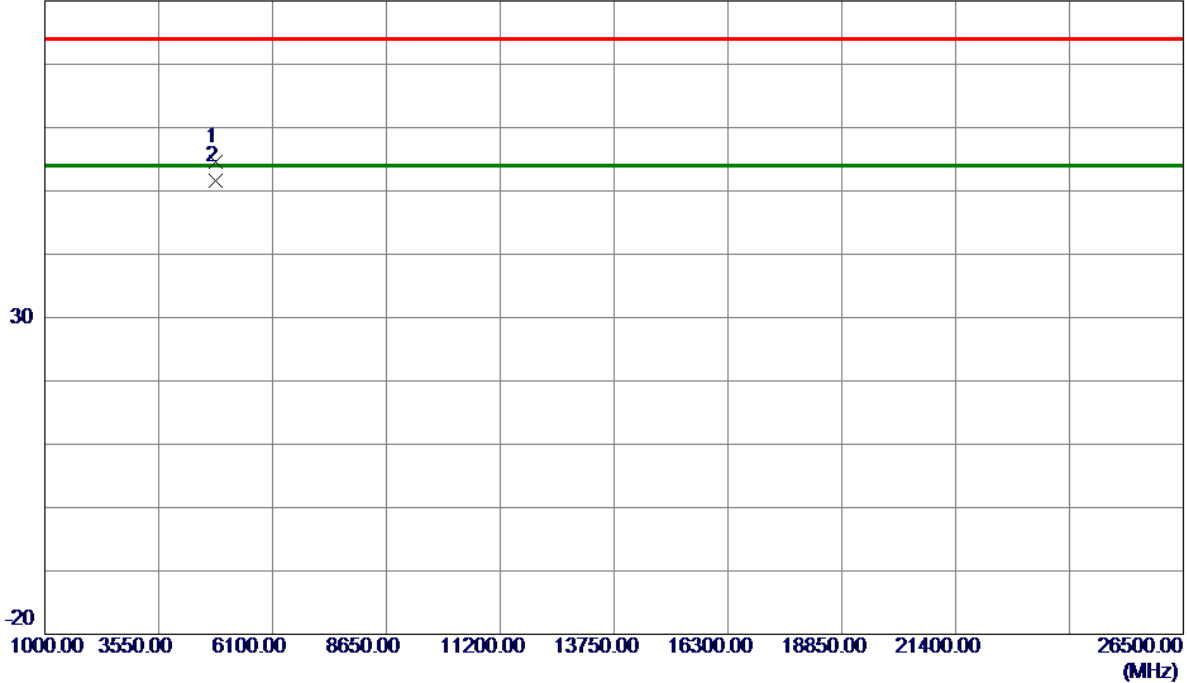
### REMARKS:

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

Test Mode:	TX B Mode 2412 MHz
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## Vertical

80 dBuV/m



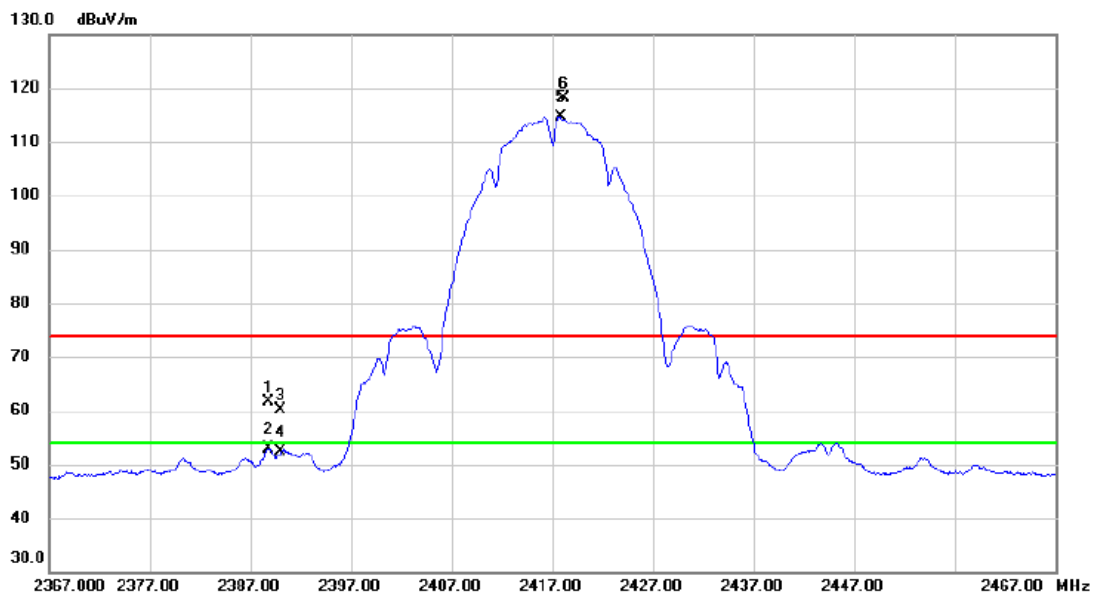
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4823.9700	46.76	7.86	54.62	74.00	-19.38	Peak	
2 *	4823.9900	43.65	7.86	51.51	54.00	-2.49	AVG	

### REMARKS:

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

Test Mode: TX B Mode 2417 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2388.750	51.02	10.63	61.65	74.00	-12.35	peak	
2		2388.750	42.32	10.63	52.95	54.00	-1.05	AVG	
3		2390.000	49.48	10.63	60.11	74.00	-13.89	peak	
4		2390.000	41.71	10.63	52.34	54.00	-1.66	AVG	
5	*	2417.800	103.94	10.70	114.64	54.00	60.64	AVG	No Limit
6	X	2418.200	107.43	10.71	118.14	74.00	44.14	peak	No Limit

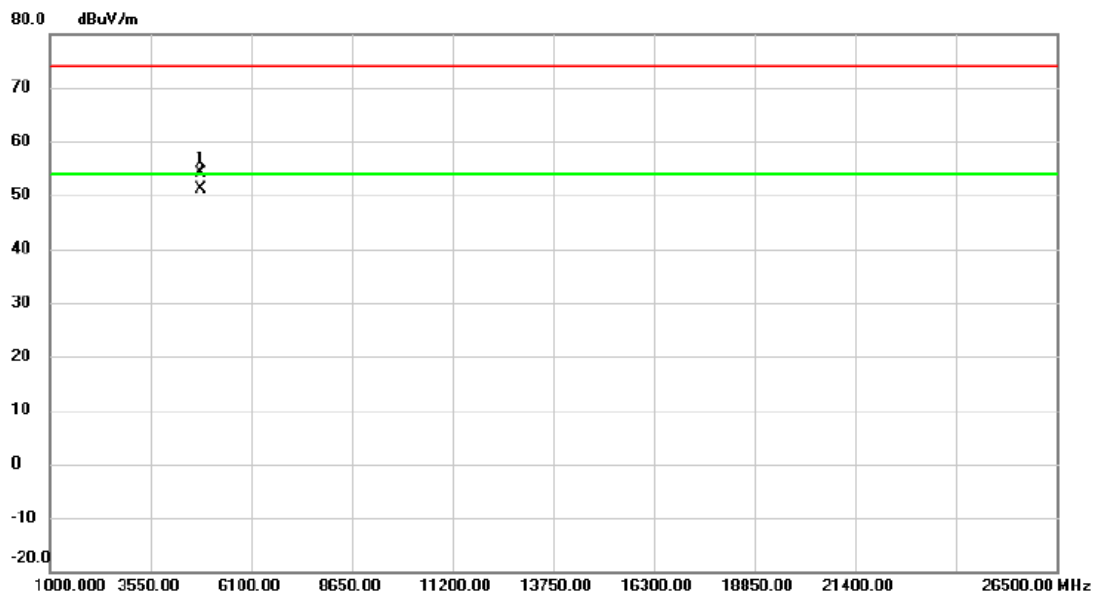
### REMARKS:

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

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

Test Mode: TX B Mode 2417 MHz

## Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4834.028	46.16	7.89	54.05	74.00	-19.95	peak	
2	*	4834.038	43.34	7.89	51.23	54.00	-2.77	AVG	

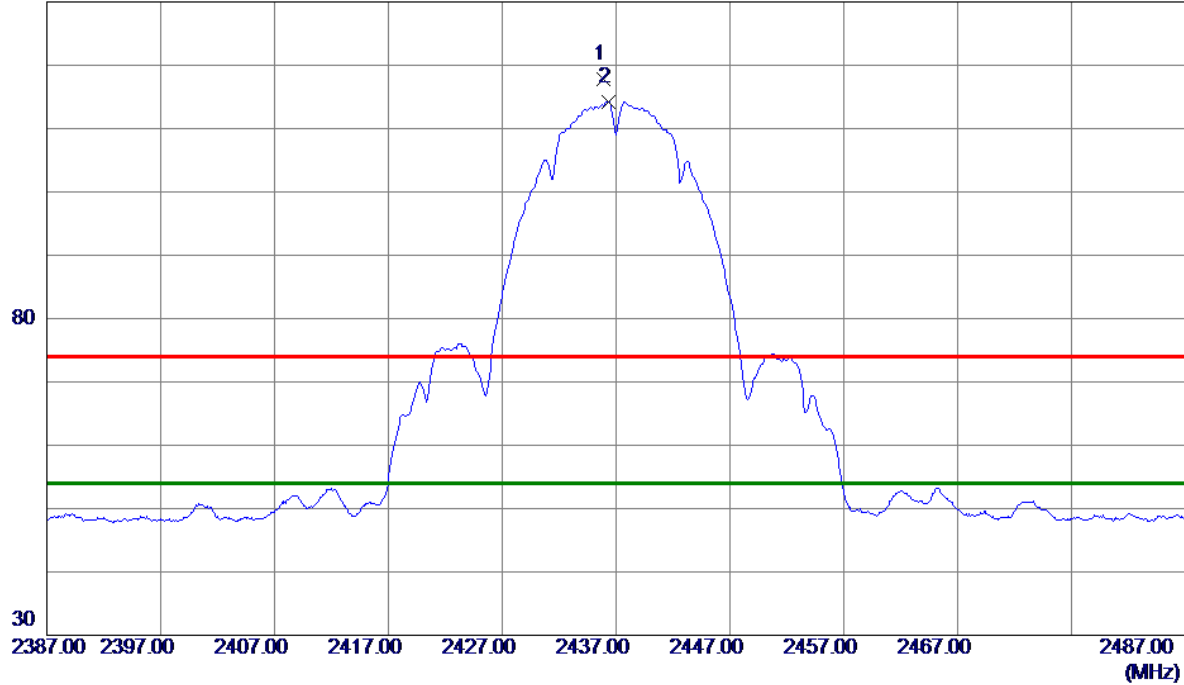
### REMARKS:

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

Test Mode: TX B Mode 2437 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2435.8500	107.04	10.76	117.80	74.00	43.80	Peak	No Limit
2 *	2436.3000	103.53	10.76	114.29	54.00	60.29	AVG	No Limit

### REMARKS:

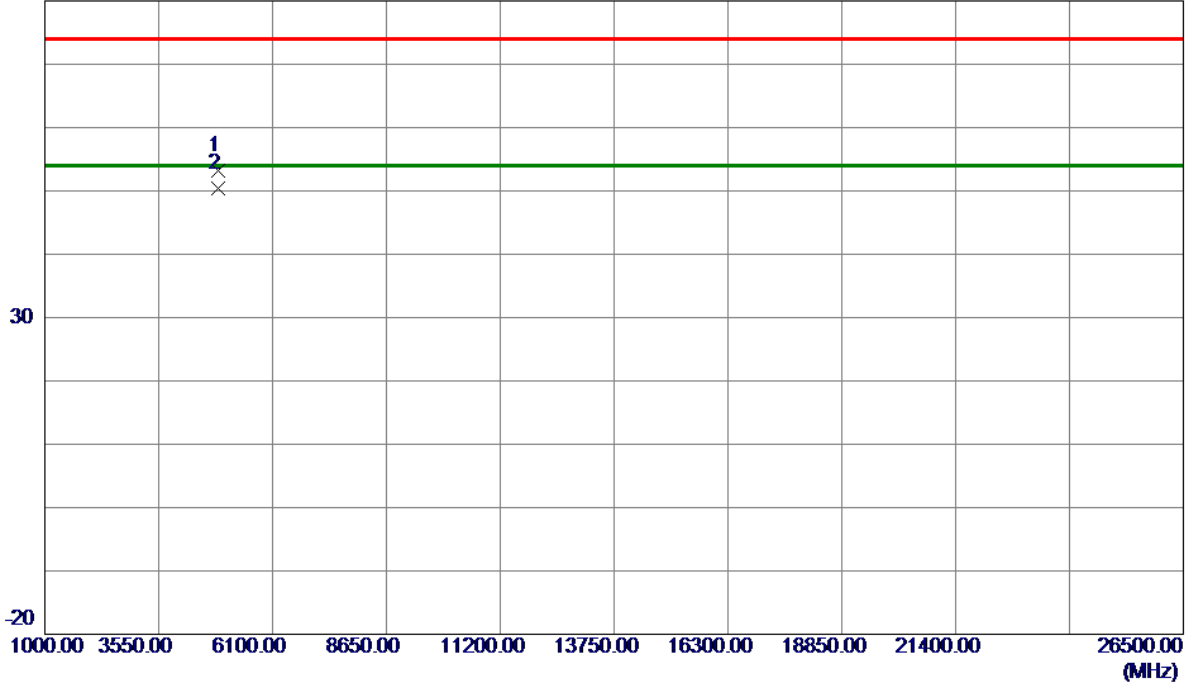
- (1) Measurement Value = Reading Level + Correct Factor.  
(2) Margin Level = Measurement Value - Limit Value.



Test Mode:	TX B Mode 2437 MHz
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## Vertical

80 dBuV/m



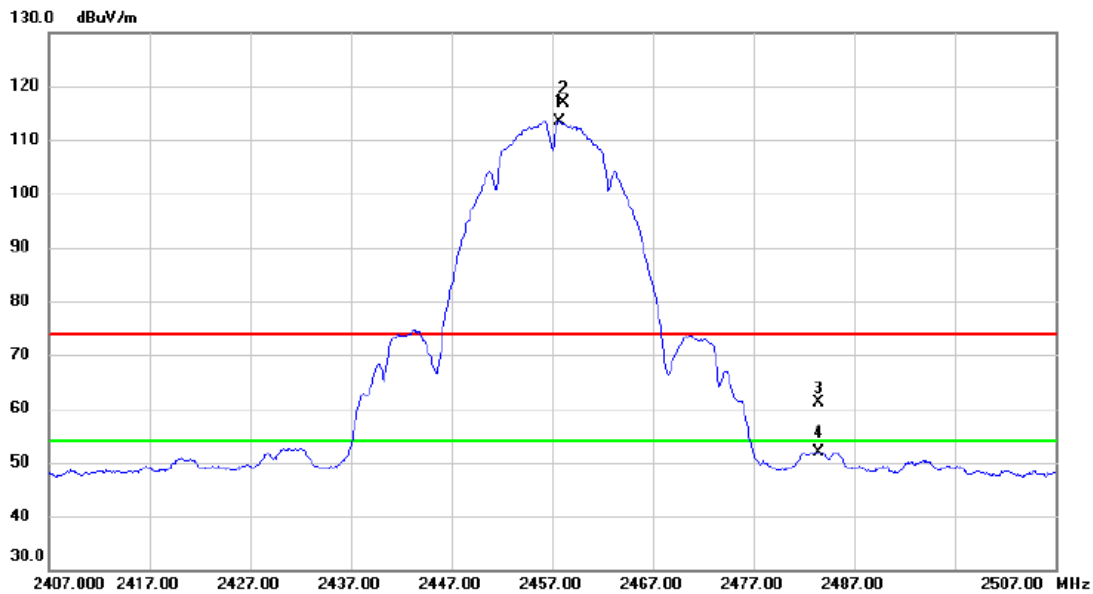
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4873.8950	45.19	8.06	53.25	74.00	-20.75	Peak	
2 *	4874.0280	42.37	8.06	50.43	54.00	-3.57	AVG	

### REMARKS:

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

Test Mode: TX B Mode 2457 MHz

## Vertical



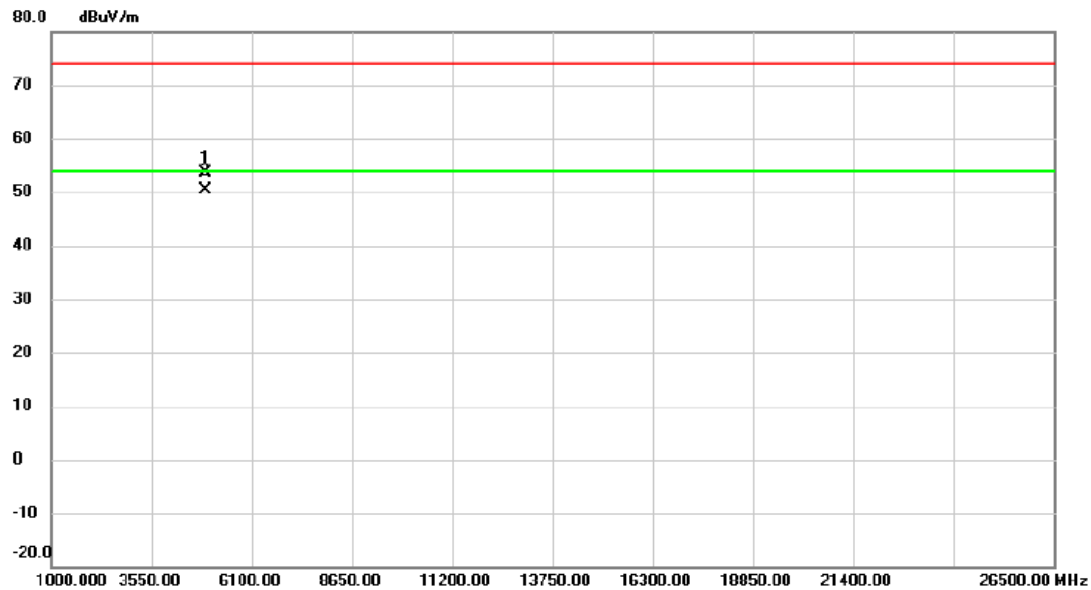
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2457.750	102.64	10.83	113.47	54.00	59.47	AVG	No Limit
2	X	2458.200	106.15	10.83	116.98	74.00	42.98	peak	No Limit
3		2483.500	50.31	10.90	61.21	74.00	-12.79	peak	
4		2483.500	41.06	10.90	51.96	54.00	-2.04	AVG	

### REMARKS:

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

Test Mode: TX B Mode 2457 MHz

## Vertical



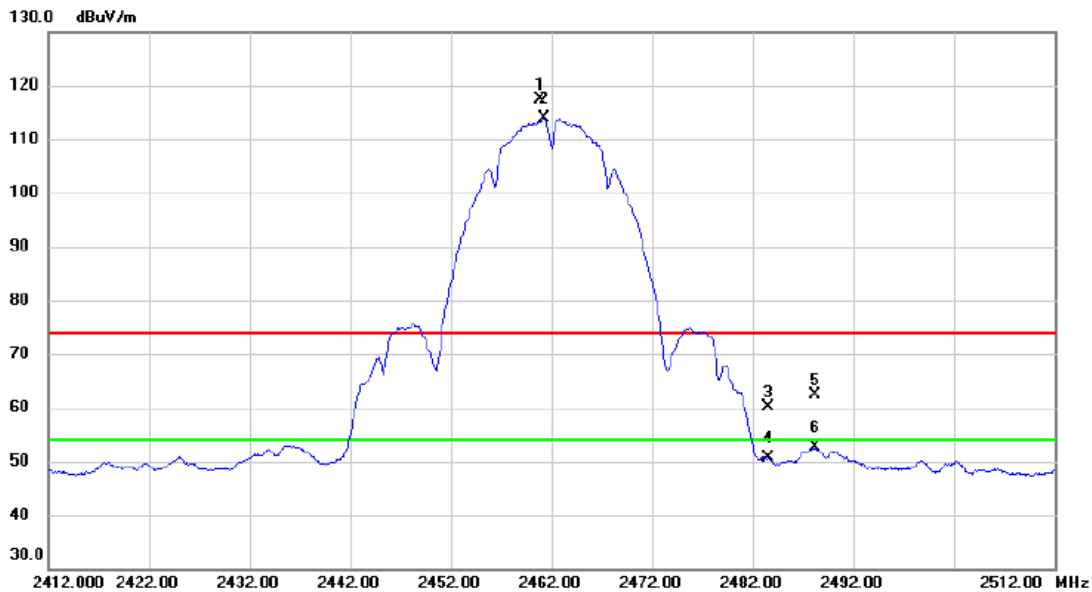
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4913.898	45.33	8.22	53.55	74.00	-20.45	peak	
2	*	4913.980	42.26	8.22	50.48	54.00	-3.52	AVG	

### REMARKS:

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

Test Mode: TX B Mode 2462 MHz

## Vertical



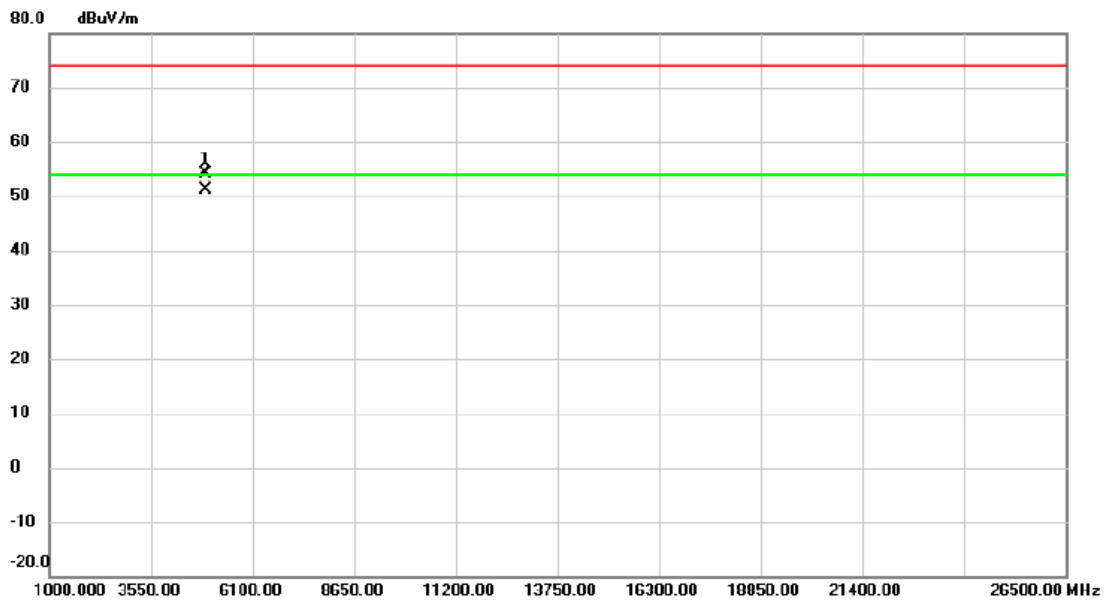
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2460.850	106.49	10.83	117.32	74.00	43.32	peak	No Limit
2	*	2461.300	102.97	10.83	113.80	54.00	59.80	AVG	No Limit
3		2483.500	49.32	10.90	60.22	74.00	-13.78	peak	
4		2483.500	39.64	10.90	50.54	54.00	-3.46	AVG	
5		2488.200	51.48	10.91	62.39	74.00	-11.61	peak	
6		2488.200	41.63	10.91	52.54	54.00	-1.46	AVG	

### REMARKS:

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

Test Mode: TX B Mode 2462 MHz

## Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4923.913	45.75	8.26	54.01	74.00	-19.99	peak	
2	*	4923.990	42.80	8.26	51.06	54.00	-2.94	AVG	

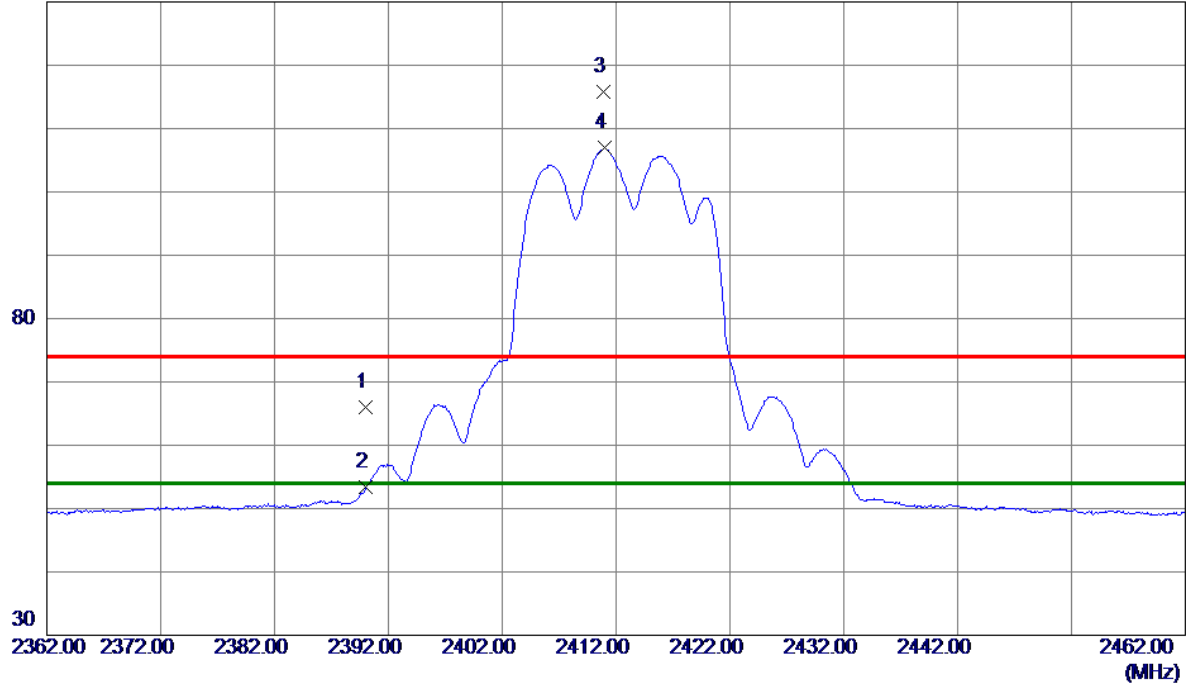
### REMARKS:

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

Test Mode: TX G Mode 2412 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	55.43	10.62	66.05	74.00	-7.95	Peak	
2	2390.0000	42.73	10.62	53.35	54.00	-0.65	AVG	
3	2410.8500	105.05	10.68	115.73	74.00	41.73	Peak	No Limit
4 *	2411.0500	96.31	10.68	106.99	54.00	52.99	AVG	No Limit

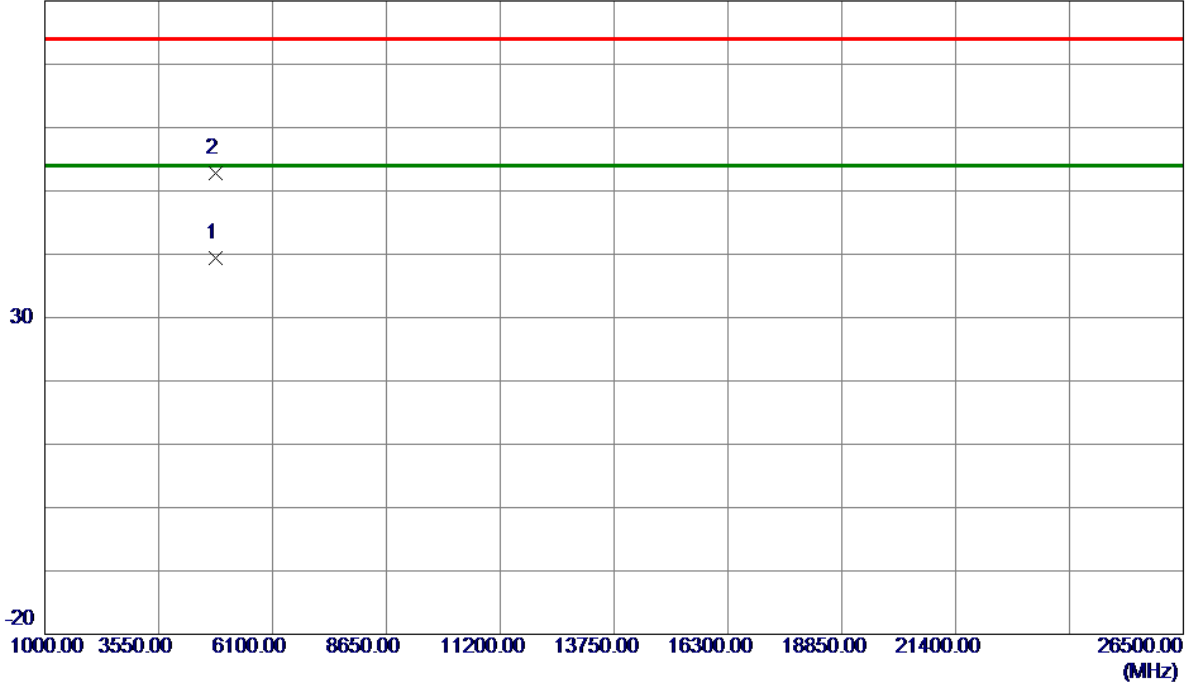
### REMARKS:

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

Test Mode:	TX G Mode 2412 MHz
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## Vertical

80 dBuV/m



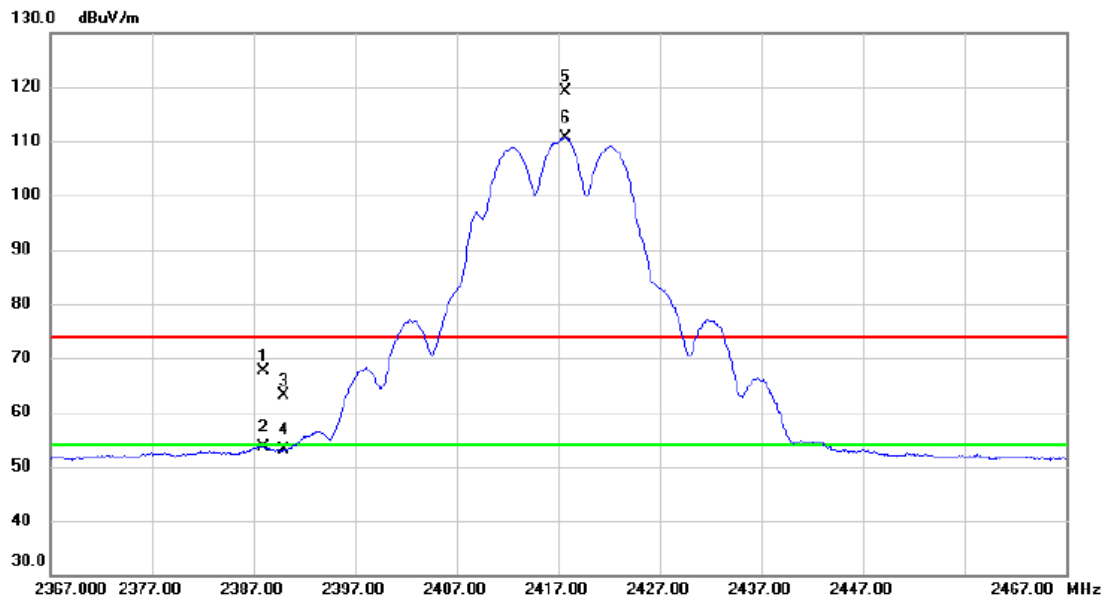
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4824.7599	31.48	7.86	39.34	54.00	-14.66	AVG	
2	4825.5280	44.90	7.86	52.76	74.00	-21.24	Peak	

### REMARKS:

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

Test Mode: TX G Mode 2417 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2387.950	57.03	10.62	67.65	74.00	-6.35	peak	
2		2387.950	42.97	10.62	53.59	54.00	-0.41	AVG	
3		2390.000	52.49	10.63	63.12	74.00	-10.88	peak	
4		2390.000	42.38	10.63	53.01	54.00	-0.99	AVG	
5	X	2417.750	108.53	10.70	119.23	74.00	45.23	peak	No Limit
6	*	2417.750	99.93	10.70	110.63	54.00	56.63	AVG	No Limit

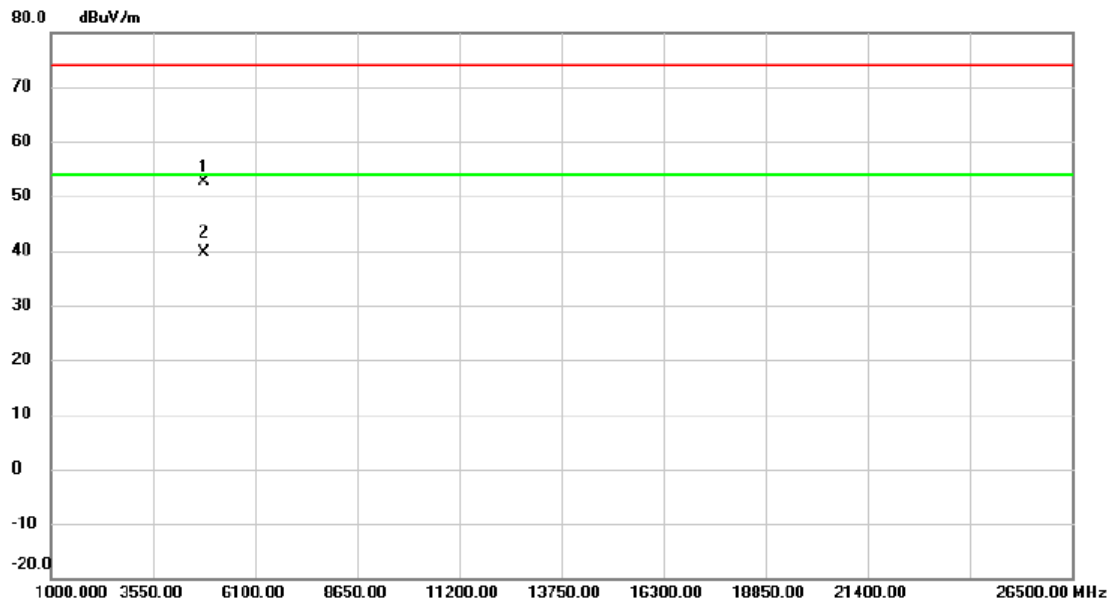
### REMARKS:

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



Test Mode: TX G Mode 2417 MHz

## Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4834.930	44.72	7.90	52.62	74.00	-21.38	peak	
2	*	4835.025	31.73	7.90	39.63	54.00	-14.37	AVG	

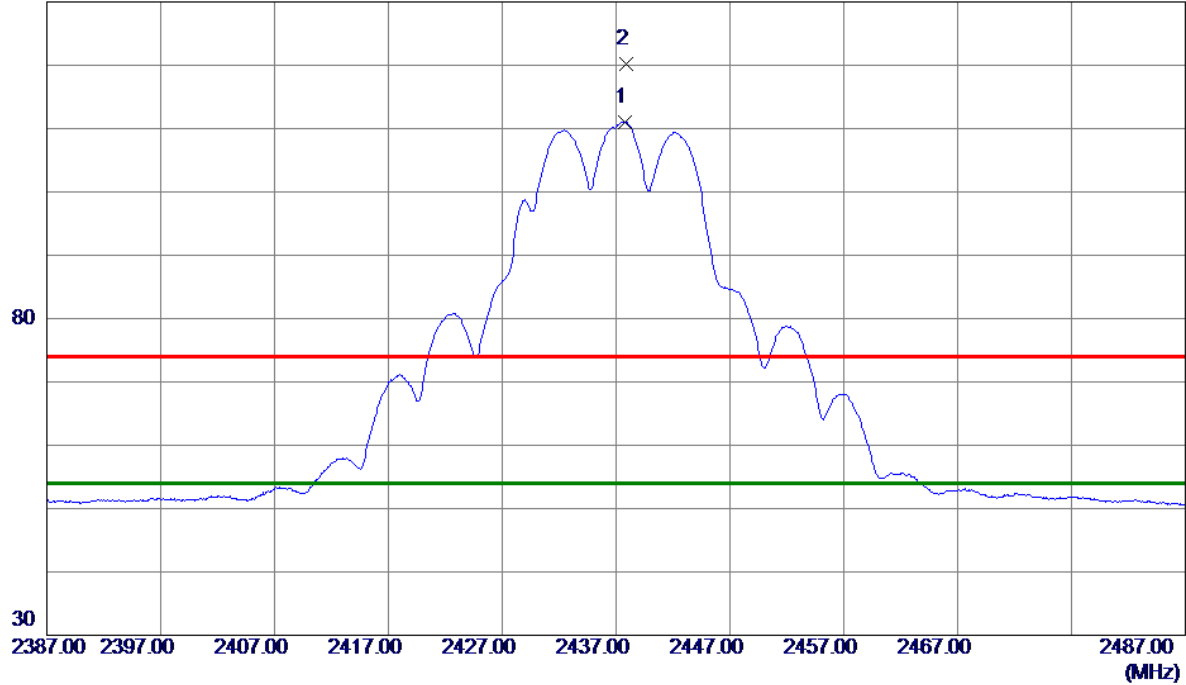
### REMARKS:

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

Test Mode: TX G Mode 2437 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2437.7500	100.31	10.76	111.07	54.00	57.07	AVG	No Limit
2	2437.8500	109.48	10.76	120.24	74.00	46.24	Peak	No Limit

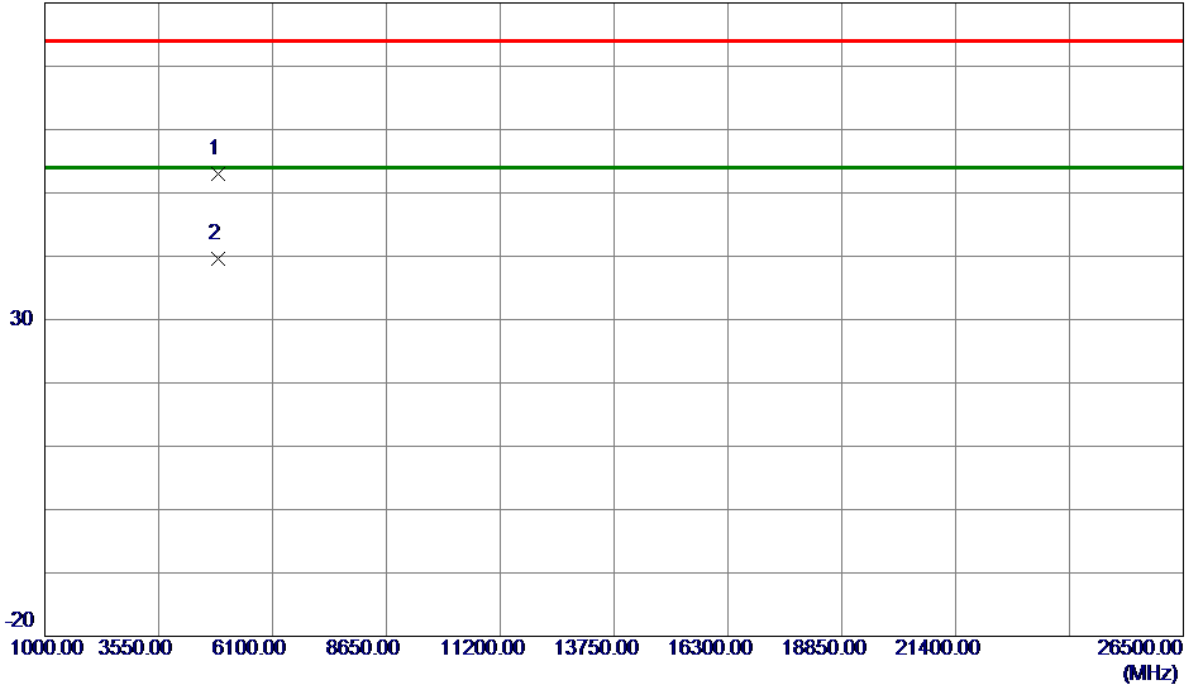
### REMARKS:

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

Test Mode: TX G Mode 2437 MHz

## Vertical

80 dBuV/m



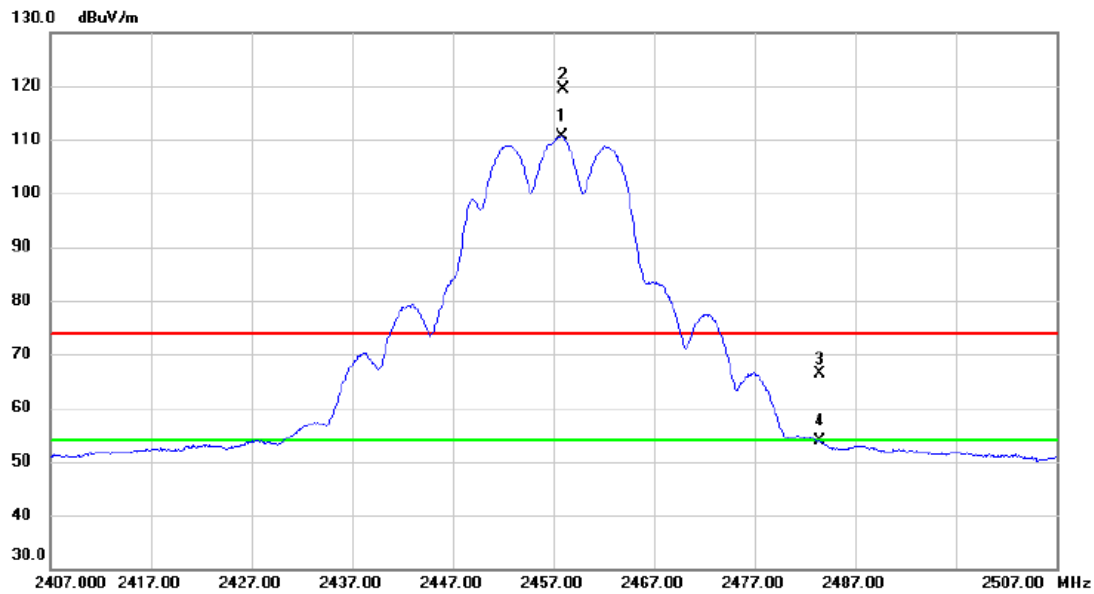
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4874.8180	45.01	8.06	53.07	74.00	-20.93	Peak	
2 *	4875.0000	31.57	8.06	39.63	54.00	-14.37	AVG	

### REMARKS:

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

Test Mode: TX G Mode 2457 MHz

## Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2457.800	99.69	10.83	110.52	54.00	56.52	AVG	No Limit
2	X	2458.000	108.67	10.83	119.50	74.00	45.50	peak	No Limit
3		2483.500	55.46	10.90	66.36	74.00	-7.64	peak	
4		2483.500	42.95	10.90	53.85	54.00	-0.15	AVG	

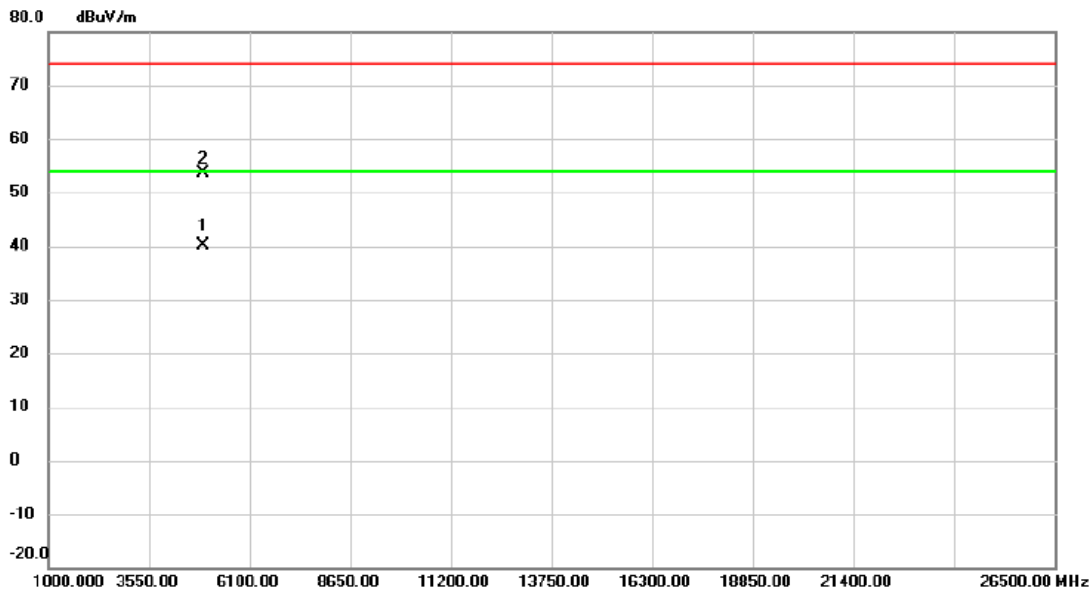
### REMARKS:

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

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

Test Mode: TX G Mode 2457 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4915.130	31.93	8.22	40.15	54.00	-13.85	AVG	
2		4915.145	45.34	8.22	53.56	74.00	-20.44	peak	

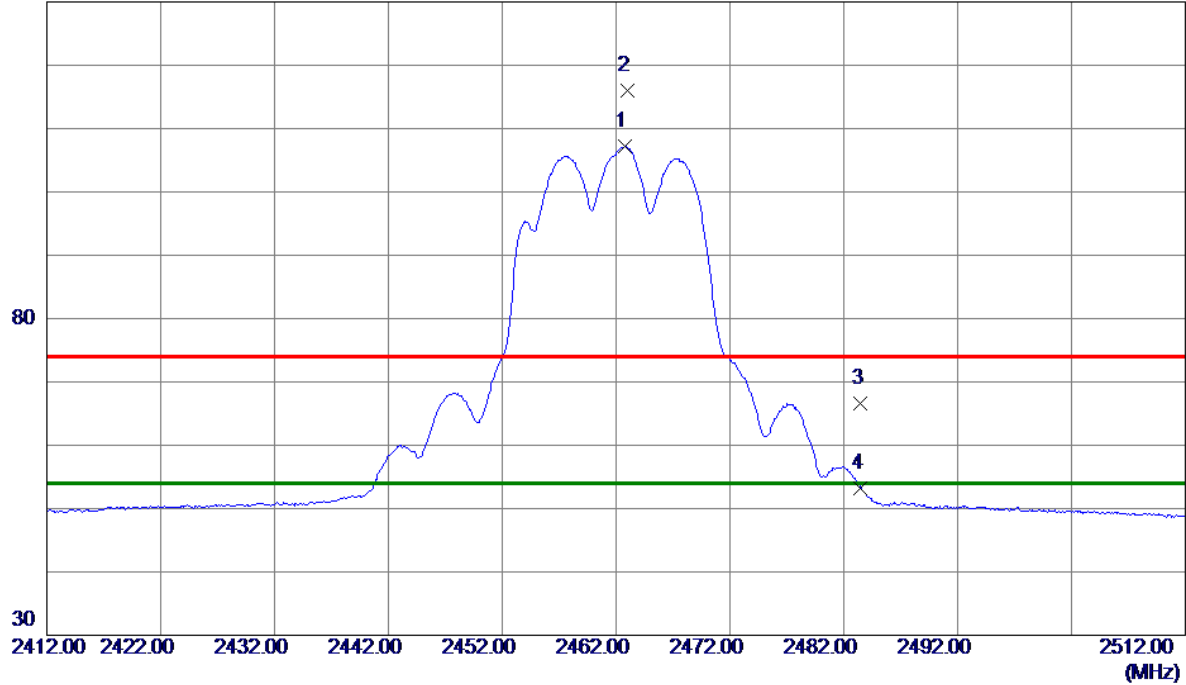
### REMARKS:

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

Test Mode: TX G Mode 2462 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2462.7500	96.35	10.84	107.19	54.00	53.19	AVG	No Limit
2	2463.0000	105.23	10.84	116.07	74.00	42.07	Peak	No Limit
3	2483.5000	55.73	10.90	66.63	74.00	-7.37	Peak	
4	2483.5000	42.22	10.90	53.12	54.00	-0.88	AVG	

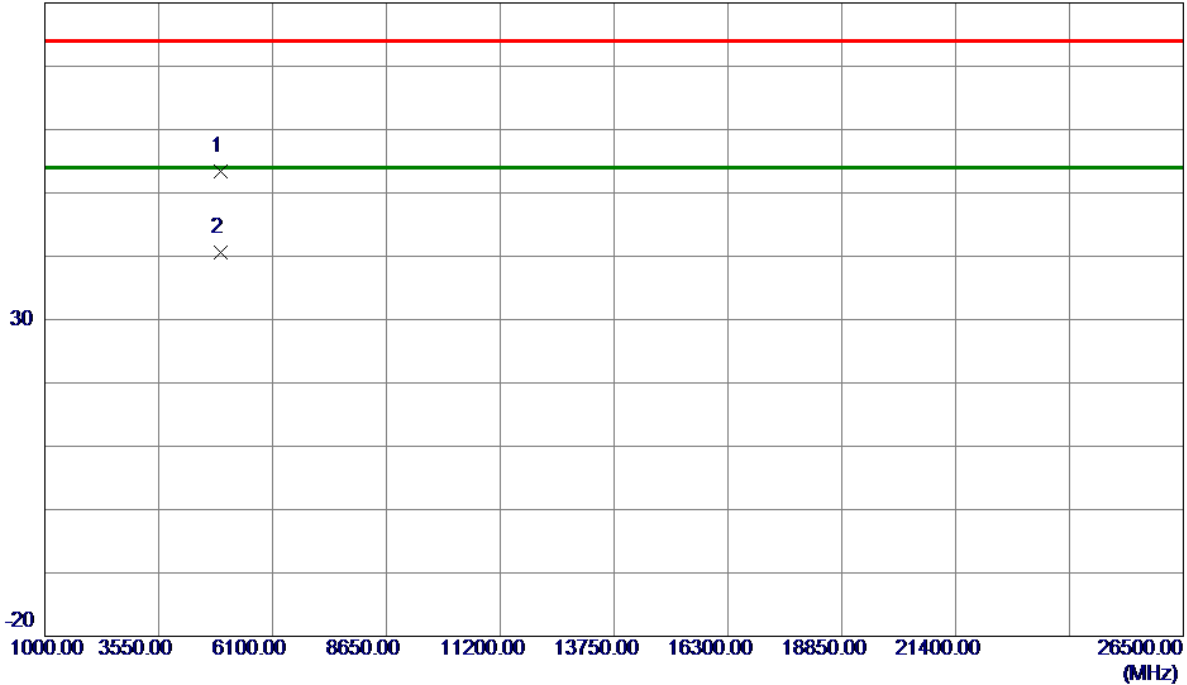
### REMARKS:

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

Test Mode:	TX G Mode 2462 MHz
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## Vertical

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4924.8730	45.11	8.26	53.37	74.00	-20.63	Peak	
2 *	4924.9150	32.40	8.26	40.66	54.00	-13.34	AVG	

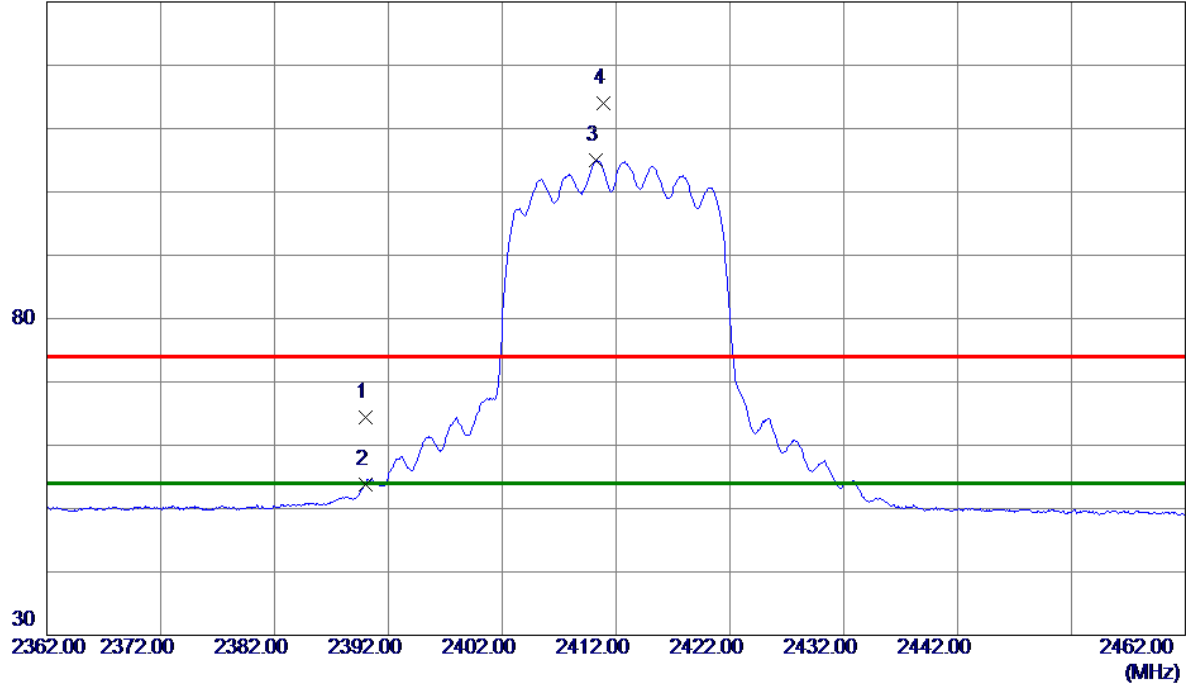
### REMARKS:

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

Test Mode: TX N-20M Mode 2412 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	53.87	10.62	64.49	74.00	-9.51	Peak	
2	2390.0000	43.20	10.62	53.82	54.00	-0.18	AVG	
3 *	2410.2500	94.34	10.68	105.02	54.00	51.02	AVG	No Limit
4	2410.8500	103.37	10.68	114.05	74.00	40.05	Peak	No Limit

### REMARKS:

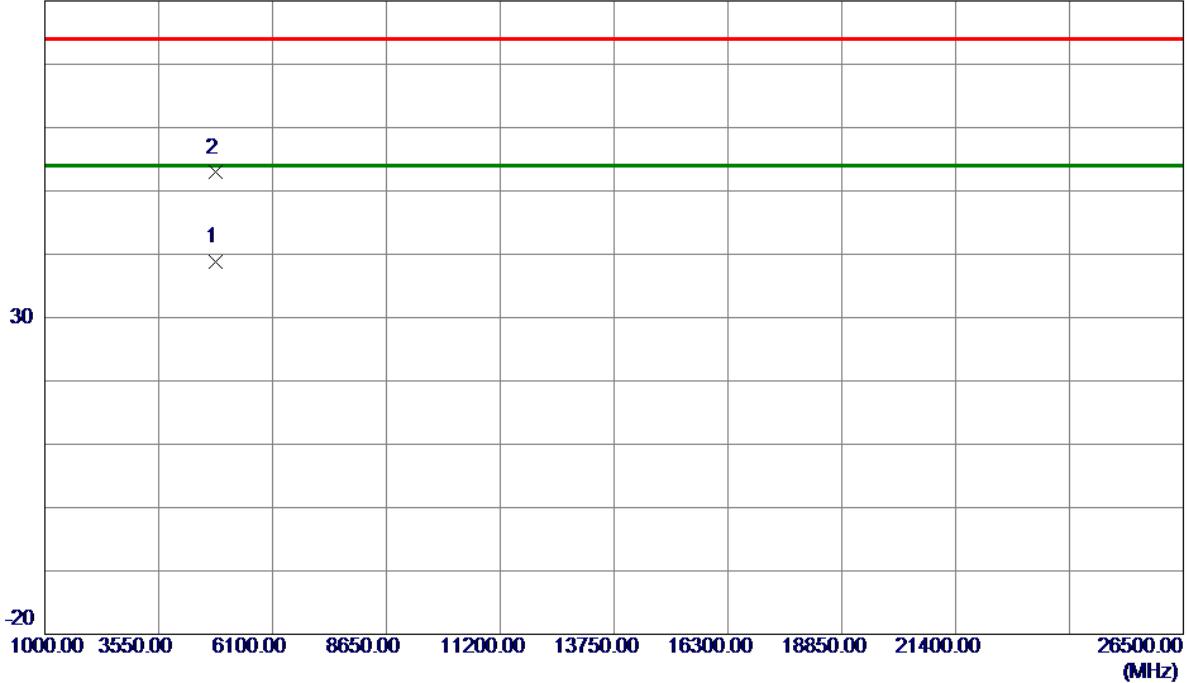
- (1) Measurement Value = Reading Level + Correct Factor.  
(2) Margin Level = Measurement Value - Limit Value.



Test Mode:	TX N-20M Mode 2412 MHz
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## Vertical

80 dBuV/m



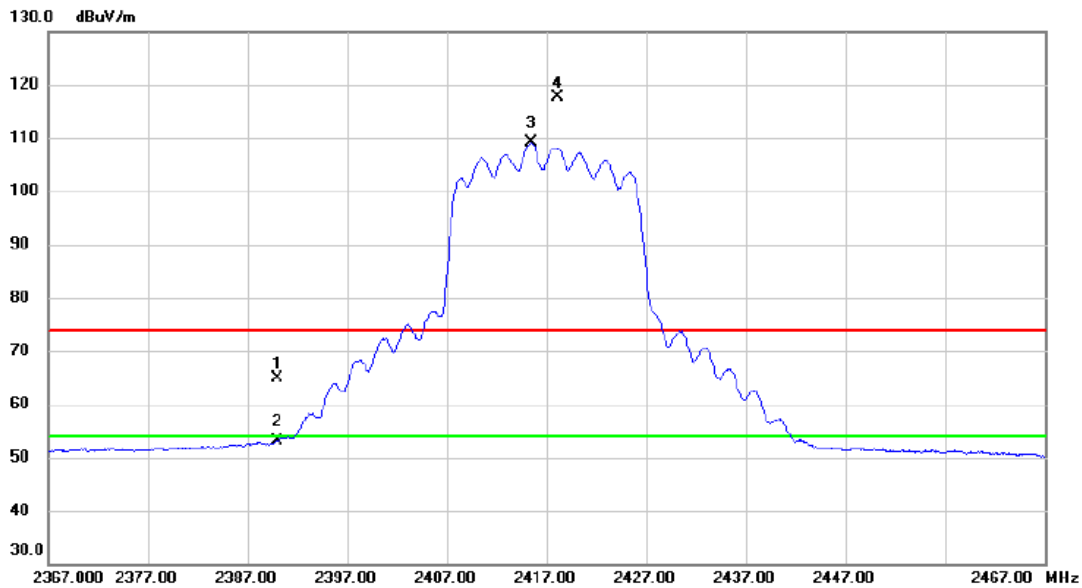
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4821.9169	30.91	7.85	38.76	54.00	-15.24	AVG	
2	4824.3950	45.04	7.86	52.90	74.00	-21.10	Peak	

### REMARKS:

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

Test Mode: TX N-20M Mode 2417 MHz

## Vertical



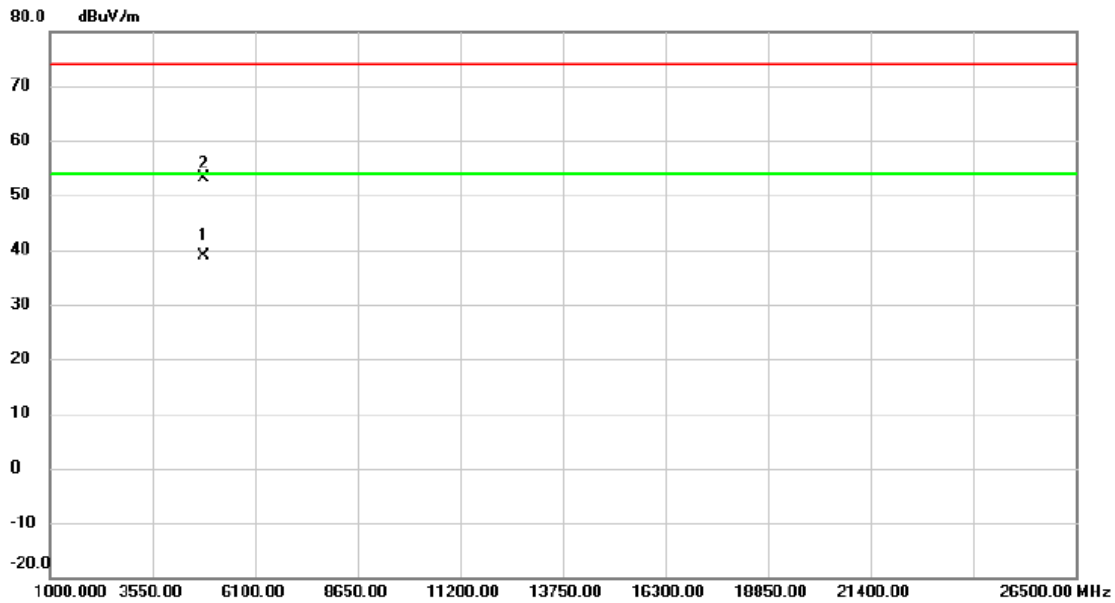
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	54.27	10.63	64.90	74.00	-9.10	peak	
2		2390.000	42.51	10.63	53.14	54.00	-0.86	AVG	
3	*	2415.450	98.42	10.69	109.11	54.00	55.11	AVG	No Limit
4	X	2418.100	106.93	10.71	117.64	74.00	43.64	peak	No Limit

### REMARKS:

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

Test Mode: TX N-20M Mode 2417 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4831.958	30.88	7.89	38.77	54.00	-15.23	AVG	
2		4834.490	45.16	7.90	53.06	74.00	-20.94	peak	

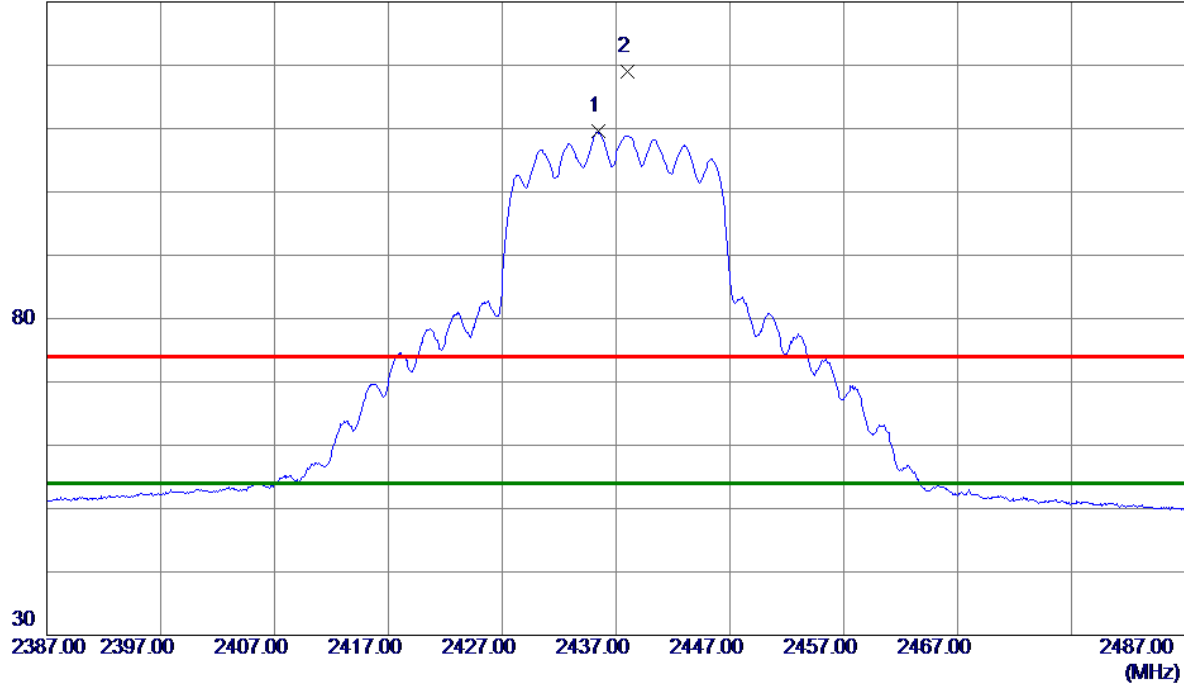
### REMARKS:

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

Test Mode: TX N-20M Mode 2437 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2435.4000	98.83	10.76	109.59	54.00	55.59	AVG	No Limit
2	2438.0000	108.22	10.77	118.99	74.00	44.99	Peak	No Limit

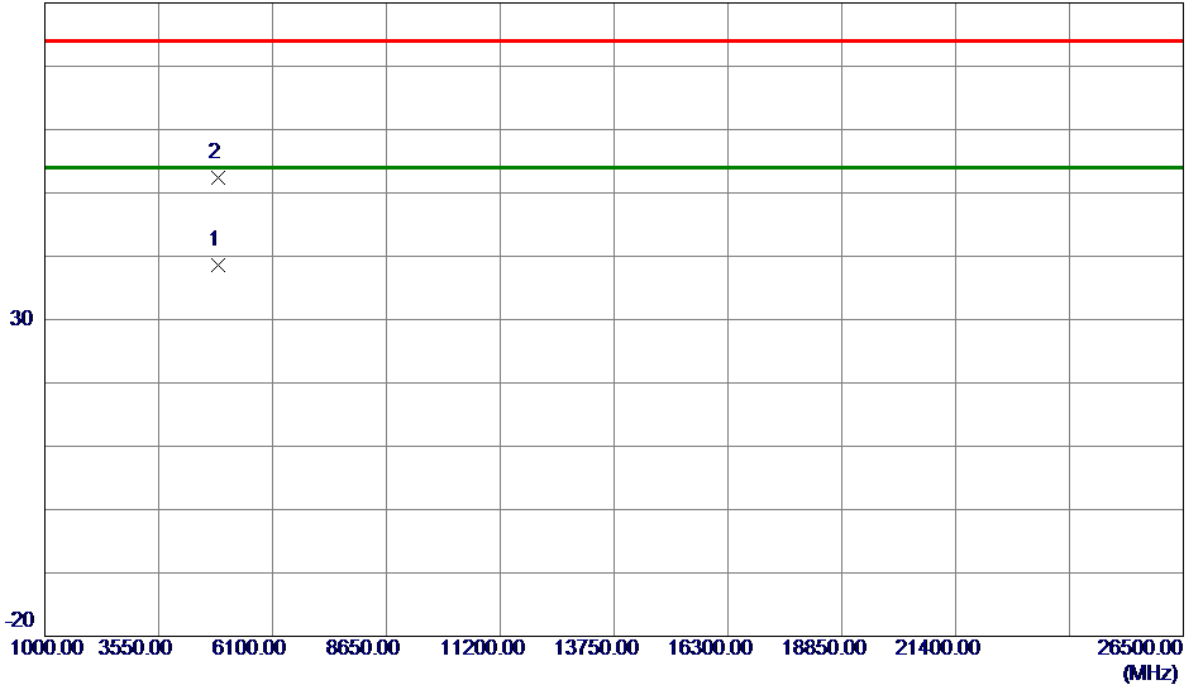
### REMARKS:

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

Test Mode:	TX N-20M Mode 2437 MHz
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## Vertical

80 dBuV/m



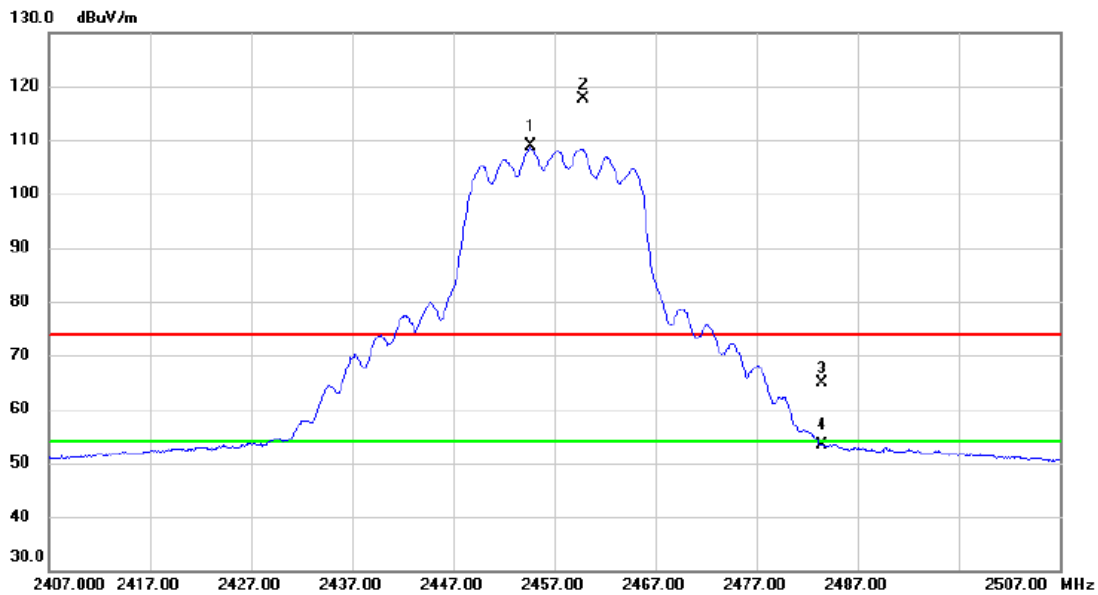
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4874. 2480	30. 52	8. 06	38. 58	54. 00	-15. 42	AVG	
2	4874. 3420	44. 26	8. 06	52. 32	74. 00	-21. 68	Peak	

### REMARKS:

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

Test Mode: TX N-20M Mode 2457 MHz

## Vertical



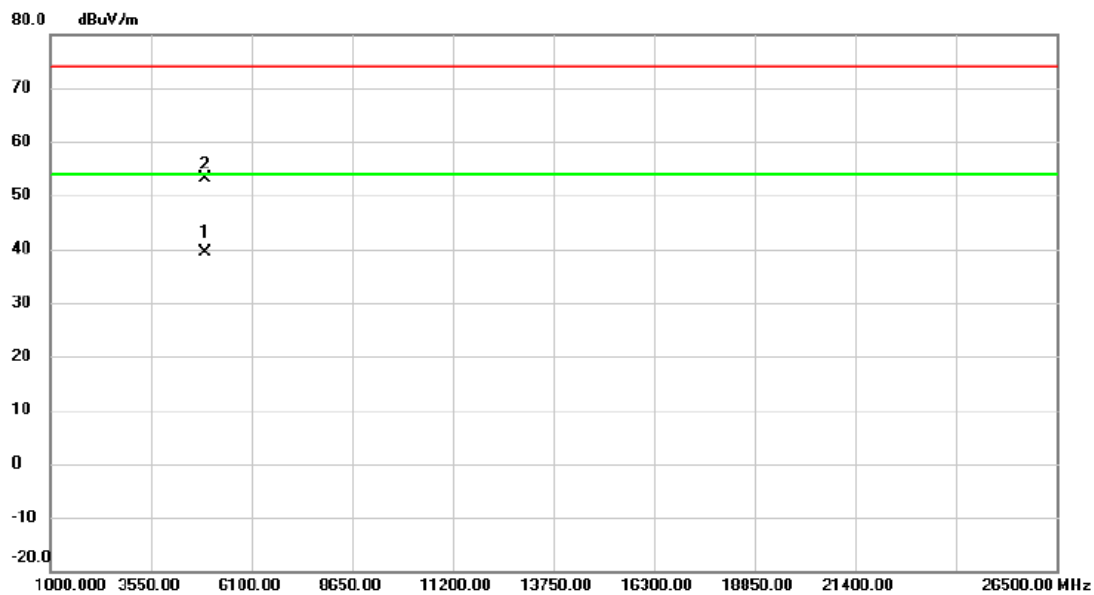
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2454.650	98.04	10.81	108.85	54.00	54.85	AVG	No Limit
2	X	2459.800	106.92	10.83	117.75	74.00	43.75	peak	No Limit
3		2483.500	53.94	10.90	64.84	74.00	-9.16	peak	
4		2483.500	42.44	10.90	53.34	54.00	-0.66	AVG	

### REMARKS:

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

Test Mode: TX N-20M Mode 2457 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4914.413	31.08	8.22	39.30	54.00	-14.70	AVG	
2		4914.610	44.97	8.22	53.19	74.00	-20.81	peak	

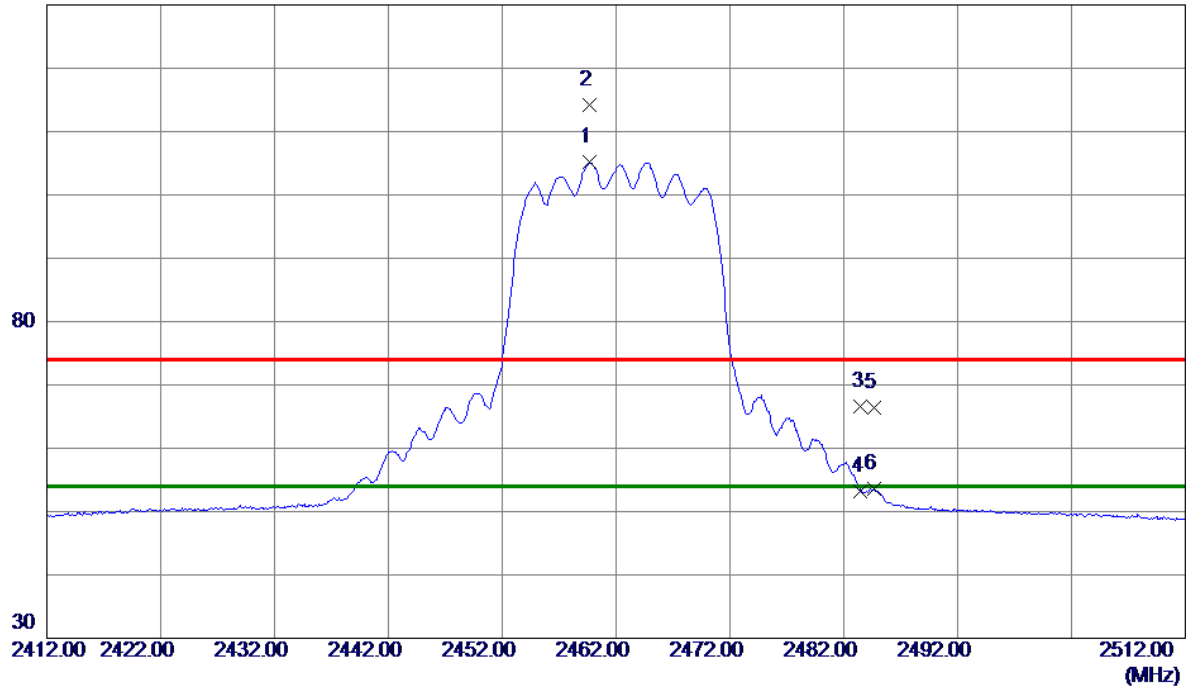
### REMARKS:

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

Test Mode: TX N-20M Mode 2462 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2459.6500	94.33	10.83	105.16	54.00	51.16	AVG	No Limit
2	2459.7000	103.36	10.83	114.19	74.00	40.19	Peak	No Limit
3	2483.5000	55.67	10.90	66.57	74.00	-7.43	Peak	
4	2483.5000	42.34	10.90	53.24	54.00	-0.76	AVG	
5	2484.7000	55.45	10.90	66.35	74.00	-7.65	Peak	
6	2484.7000	42.66	10.90	53.56	54.00	-0.44	AVG	

### REMARKS:

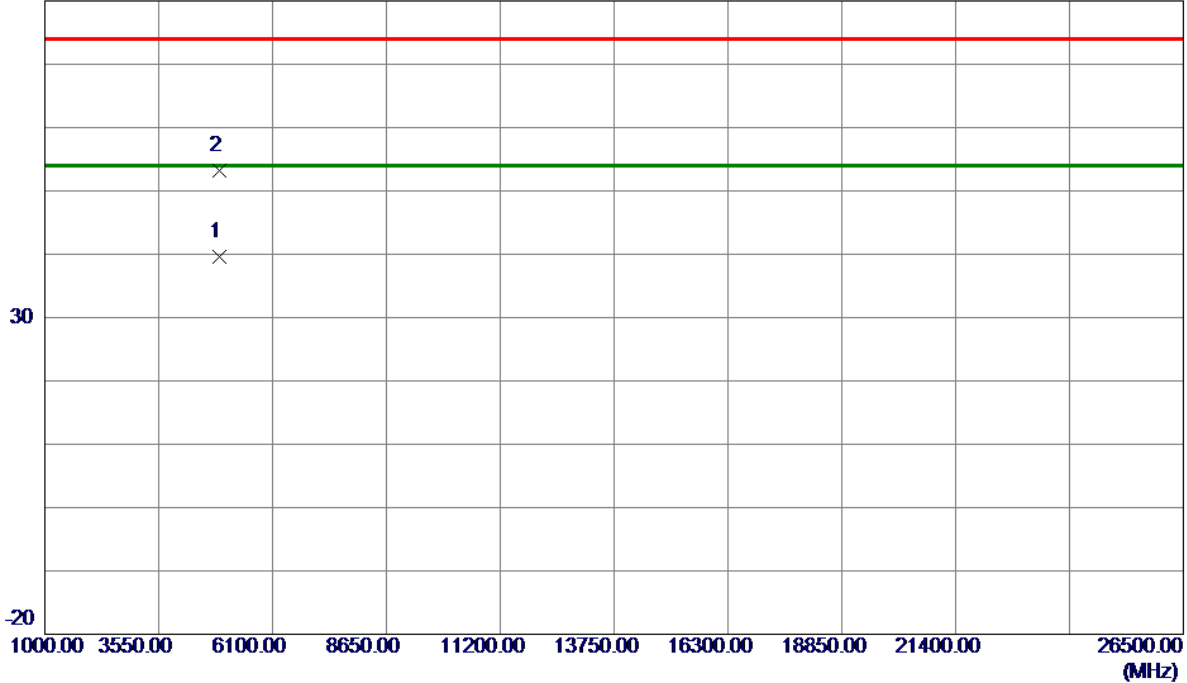
- (1) Measurement Value = Reading Level + Correct Factor.  
(2) Margin Level = Measurement Value - Limit Value.



Test Mode:	TX N-20M Mode 2462 MHz
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## Vertical

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4921.9270	31.44	8.25	39.69	54.00	-14.31	AVG	
2	4922.0520	44.92	8.25	53.17	74.00	-20.83	Peak	

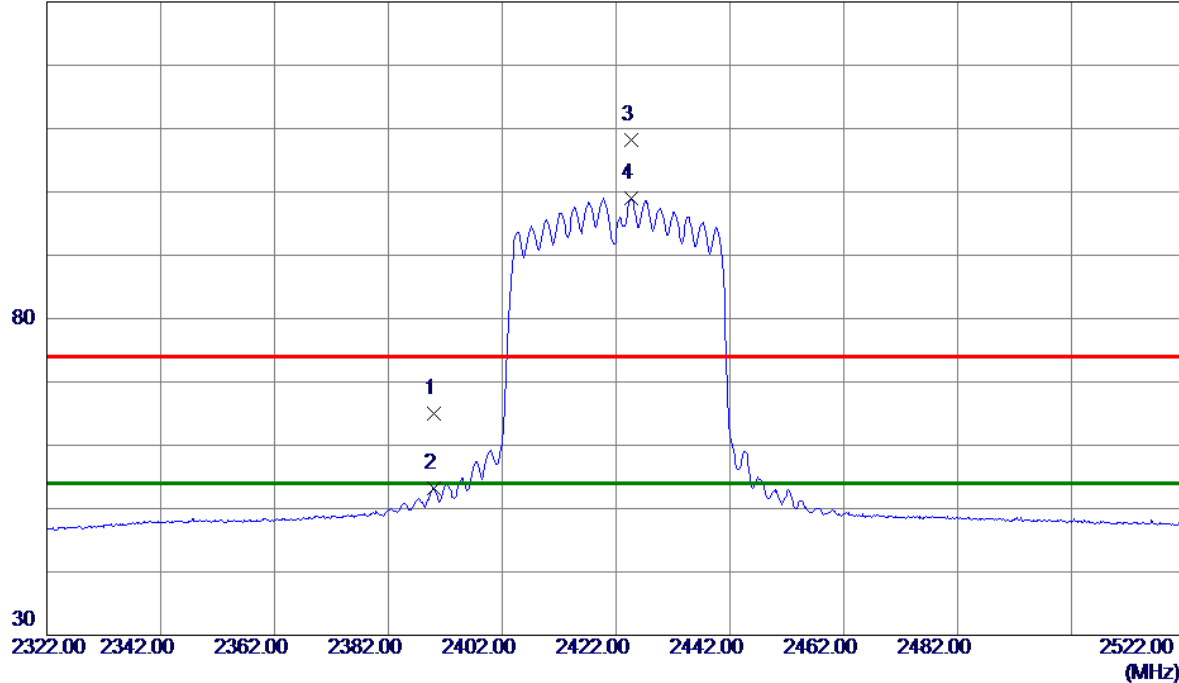
### REMARKS:

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

Test Mode: TX N-40M Mode 2422MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	54.38	10.62	65.00	74.00	-9.00	Peak	
2	2390.0000	42.50	10.62	53.12	54.00	-0.88	AVG	
3	2424.6000	97.39	10.73	108.12	74.00	34.12	Peak	No Limit
4 *	2424.6000	88.20	10.73	98.93	54.00	44.93	AVG	No Limit

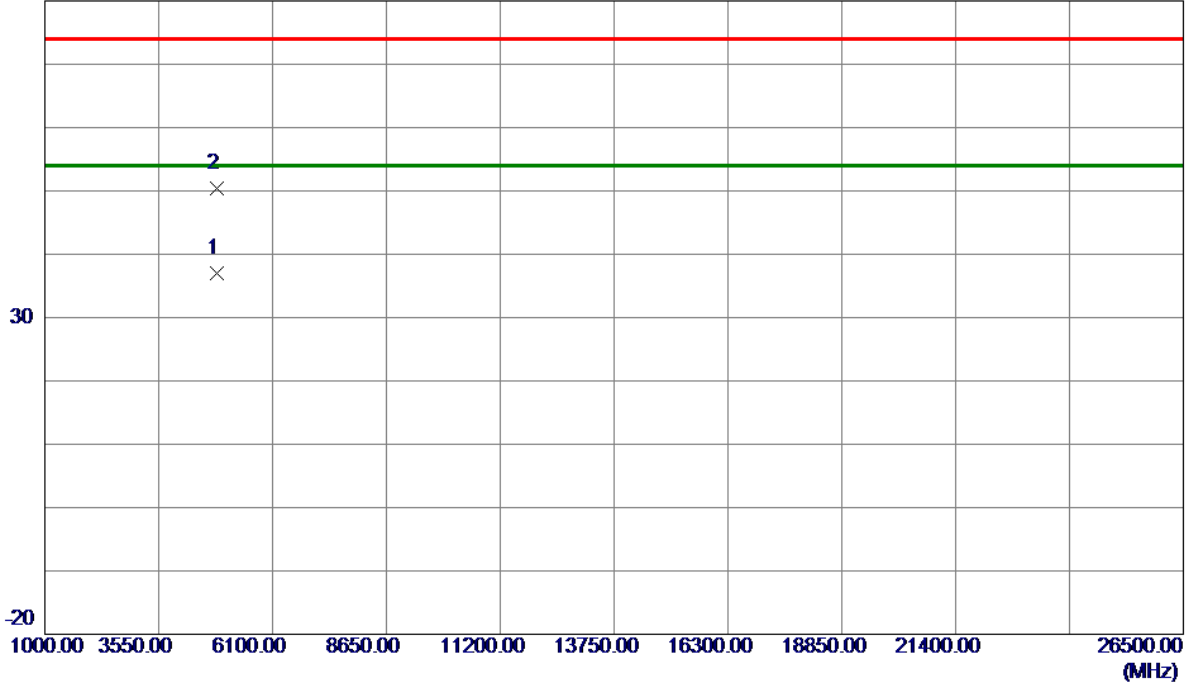
### REMARKS:

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

Test Mode:	TX N-40M Mode 2422MHz
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## Vertical

80 dBuV/m



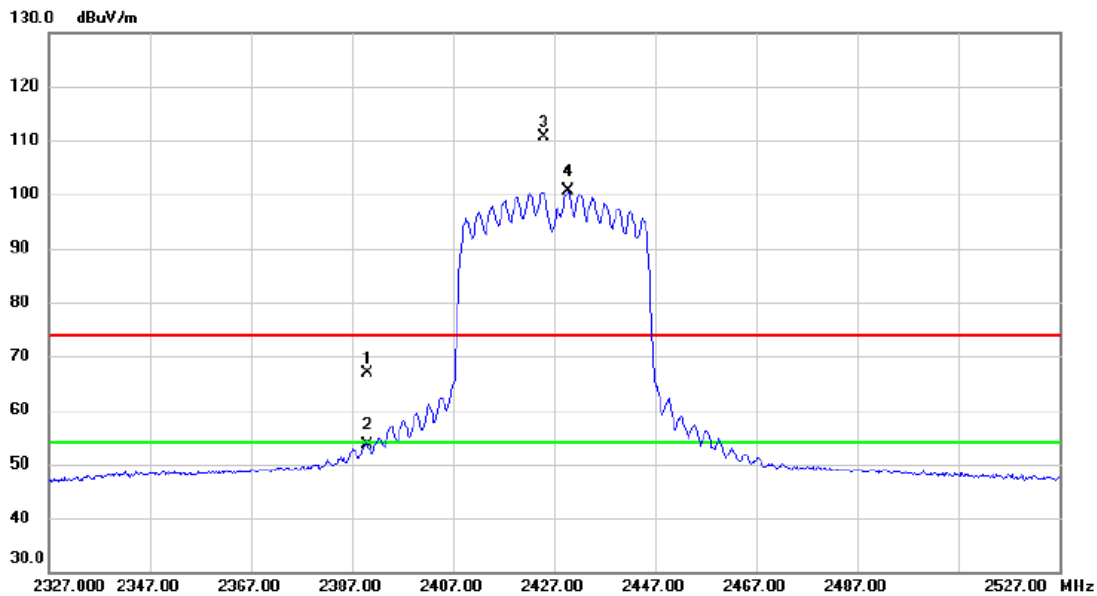
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4844.4300	29.06	7.94	37.00	54.00	-17.00	AVG	
2	4844.6750	42.37	7.94	50.31	74.00	-23.69	Peak	

### REMARKS:

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

Test Mode: TX N-40M Mode 2427MHz

## Vertical



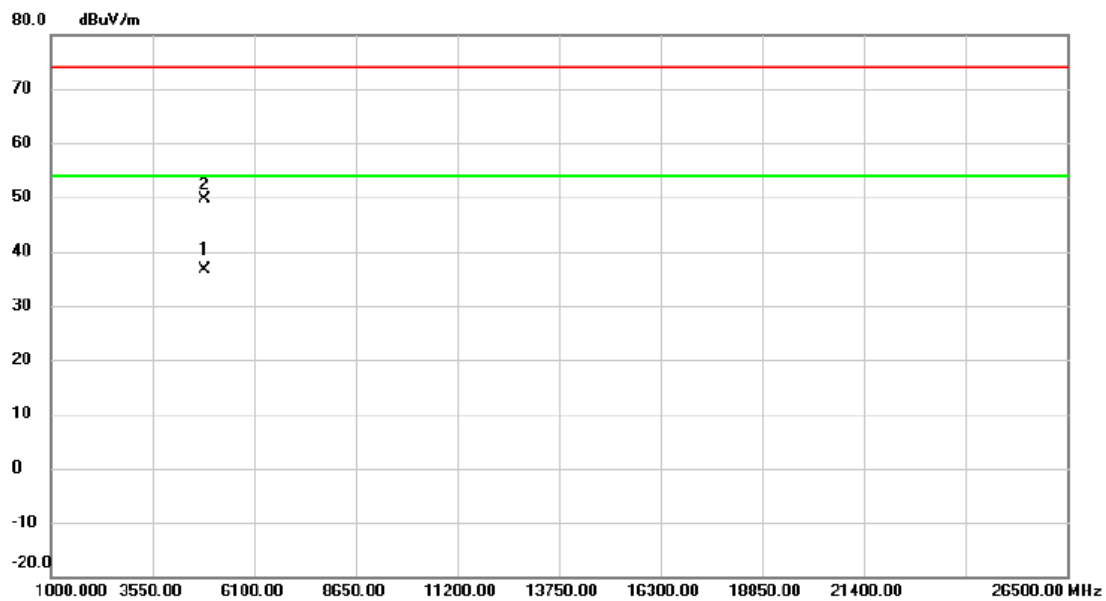
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.000	56.15	10.63	66.78	74.00	-7.22	peak	
2	2390.000	42.99	10.63	53.62	54.00	-0.38	AVG	
3 X	2425.100	99.96	10.73	110.69	74.00	36.69	peak	No Limit
4 *	2429.800	89.77	10.75	100.52	54.00	46.52	AVG	No Limit

### REMARKS:

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

Test Mode: TX N-40M Mode 2427MHz

## Vertical



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4854.333	28.53	7.98	36.51	54.00	-17.49	AVG	
2	4854.495	41.70	7.98	49.68	74.00	-24.32	peak	

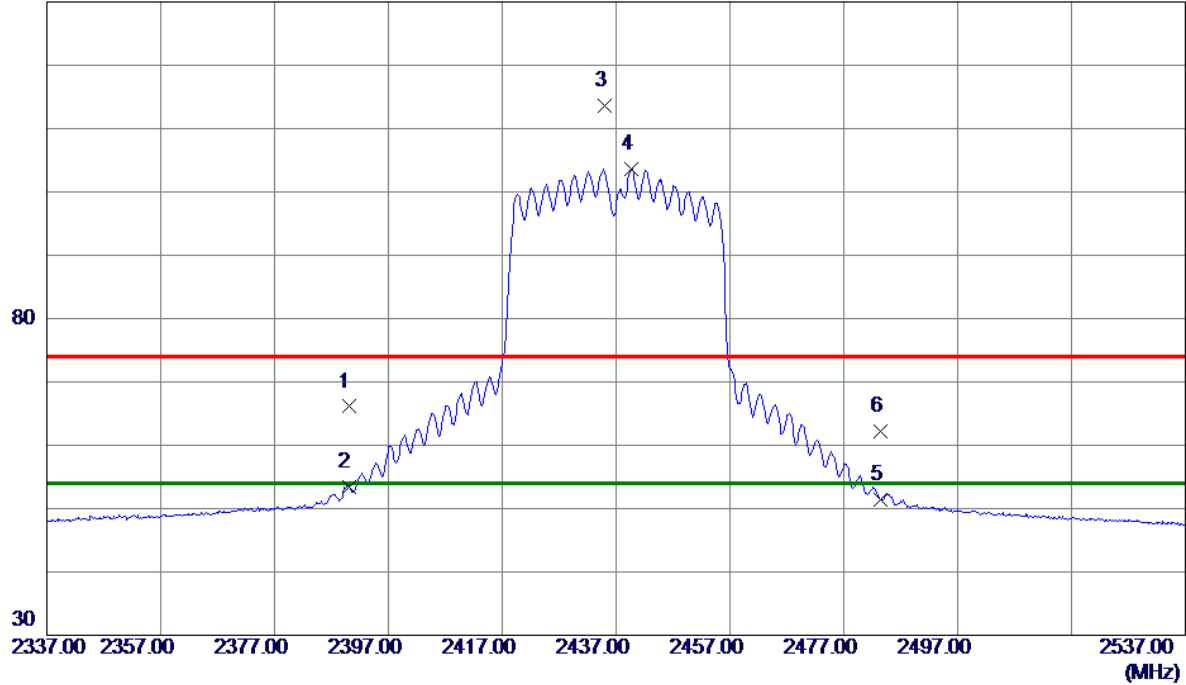
### REMARKS:

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

Test Mode: TX N-40M Mode 2437 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	55.48	10.62	66.10	74.00	-7.90	Peak	
2	2390.0000	42.87	10.62	53.49	74.00	-20.51	Peak	
3 *	2435.1000	102.87	10.76	113.63	74.00	39.63	Peak	No Limit
4	2439.7000	92.78	10.77	103.55	74.00	29.55	Peak	No Limit
5	2483.5000	40.41	10.90	51.31	74.00	-22.69	Peak	
6	2483.5000	51.29	10.90	62.19	74.00	-11.81	Peak	

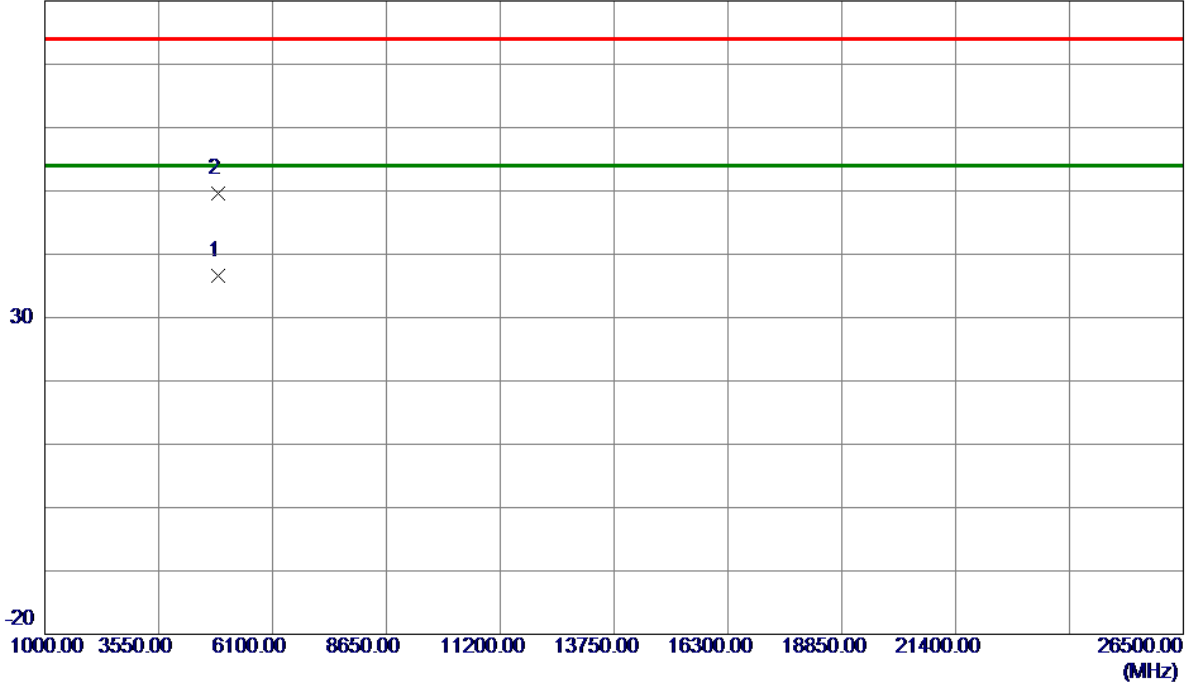
### REMARKS:

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

Test Mode:	TX N-40M Mode 2437 MHz
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## Vertical

80 dBuV/m



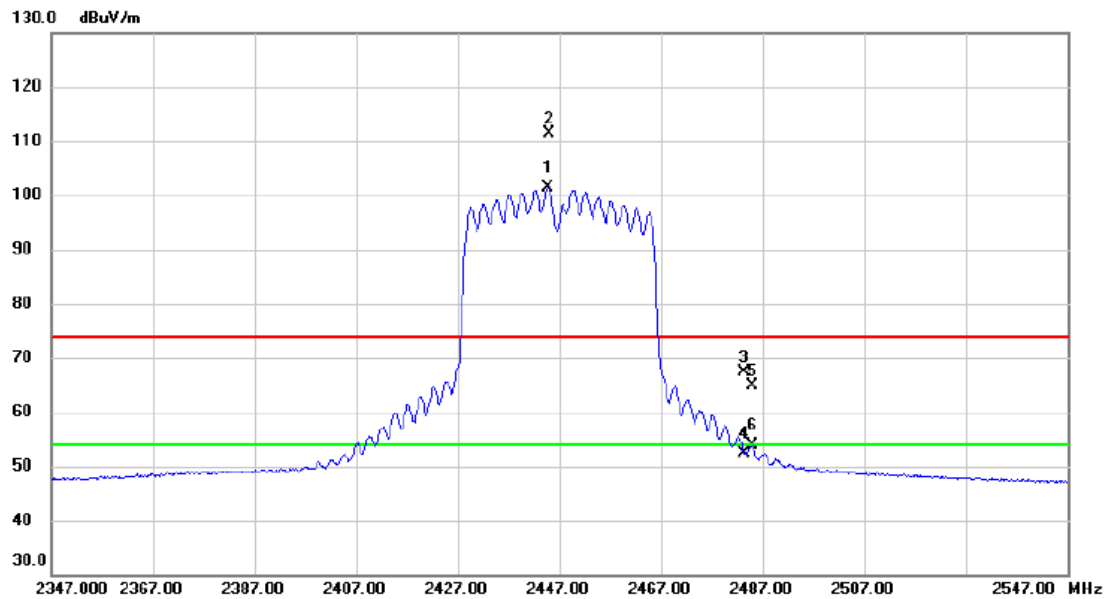
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4874.2970	28.60	8.06	36.66	54.00	-17.34	AVG	
2	4874.4150	41.54	8.06	49.60	74.00	-24.40	Peak	

### REMARKS:

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

Test Mode: TX N-40M Mode 2447 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2444.800	90.54	10.79	101.33	54.00	47.33	AVG	No Limit
2	X	2445.100	100.70	10.79	111.49	74.00	37.49	peak	No Limit
3		2483.500	56.54	10.90	67.44	74.00	-6.56	peak	
4		2483.500	41.40	10.90	52.30	54.00	-1.70	AVG	
5		2485.000	53.97	10.91	64.88	74.00	-9.12	peak	
6		2485.000	42.97	10.91	53.88	54.00	-0.12	AVG	

### REMARKS:

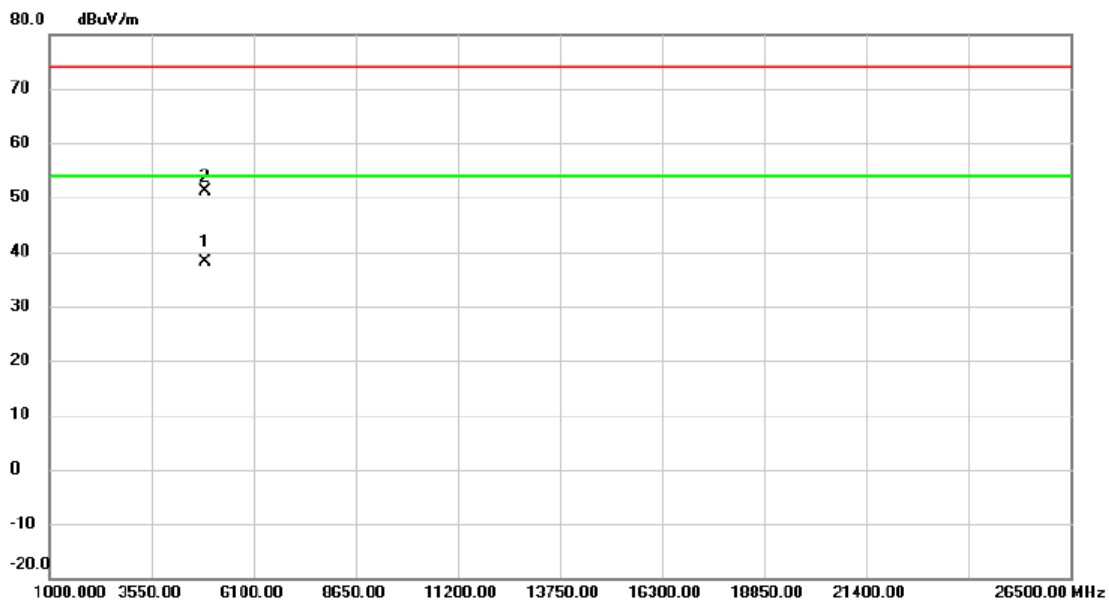
(1) Measurement Value = Reading Level + Correct Factor.

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



Test Mode: TX N-40M Mode 2447 MHz

## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4894.265	30.07	8.13	38.20	54.00	-15.80	AVG	
2		4894.882	43.11	8.13	51.24	74.00	-22.76	peak	

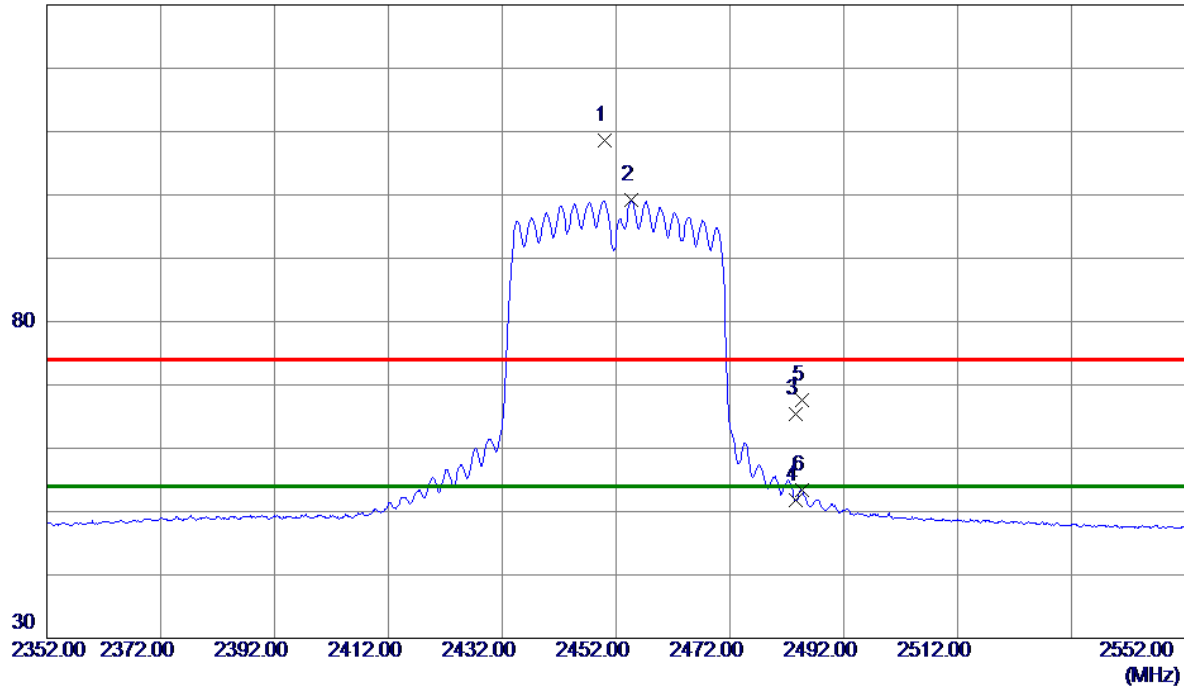
### REMARKS:

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

Test Mode: TX N-40M Mode 2452 MHz

## Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2450.0000	97.86	10.80	108.66	74.00	34.66	Peak	No Limit
2 *	2454.7000	88.35	10.82	99.17	54.00	45.17	AVG	No Limit
3	2483.5000	54.42	10.90	65.32	74.00	-8.68	Peak	
4	2483.5000	40.88	10.90	51.78	54.00	-2.22	AVG	
5	2484.6000	56.76	10.90	67.66	74.00	-6.34	Peak	
6	2484.6000	42.50	10.90	53.40	54.00	-0.60	AVG	

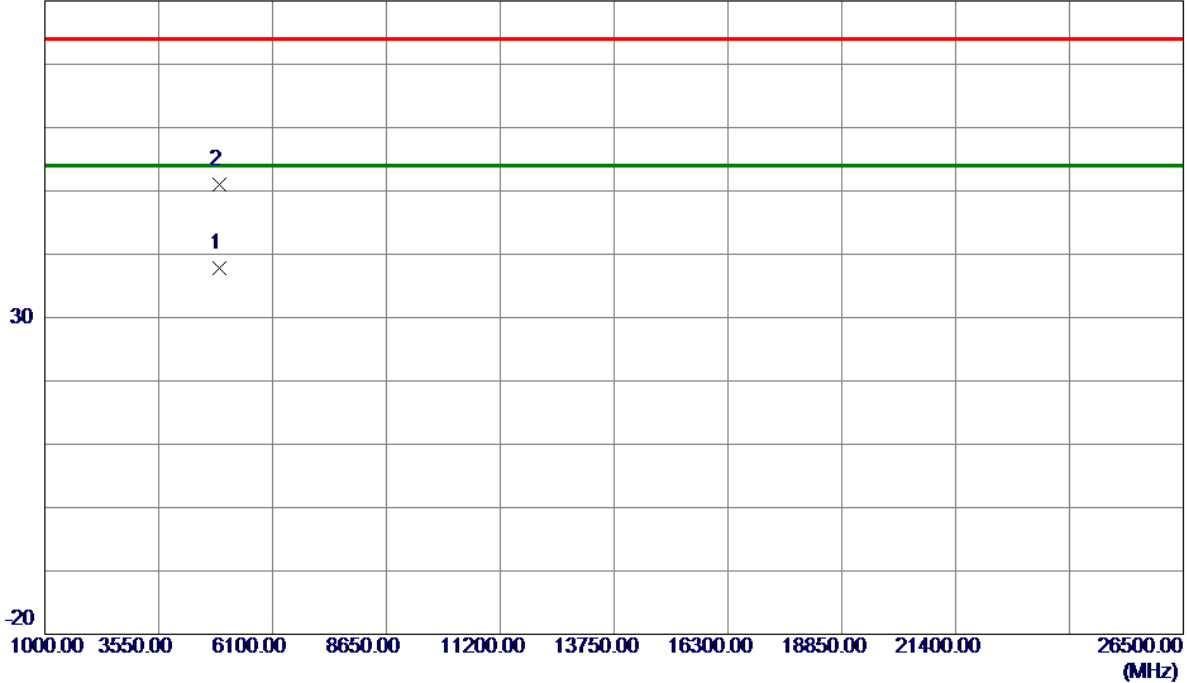
### REMARKS:

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

Test Mode:	TX N-40M Mode 2452 MHz
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## Vertical

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4904.2780	29.60	8.18	37.78	54.00	-16.22	AVG	
2	4904.8900	42.88	8.18	51.06	74.00	-22.94	Peak	

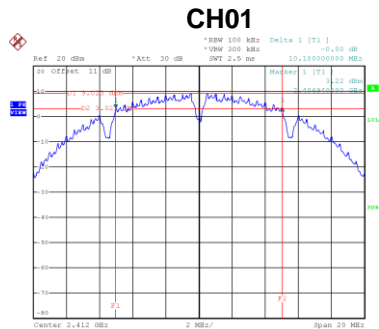
### REMARKS:

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

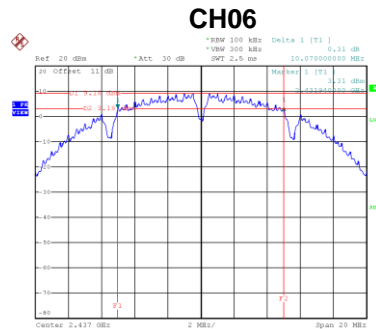
## **APPENDIX E - BANDWIDTH**

Test Mode	TX B Mode
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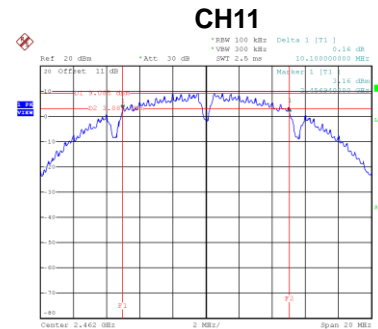
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	10.10	500	Complies
06	2437	10.07	500	Complies
11	2462	10.10	500	Complies



Date: 21.OCT.2020 12:13:18

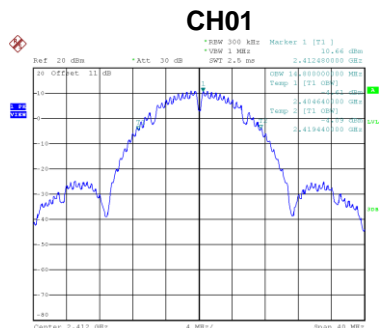


Date: 21.OCT.2020 12:13:15

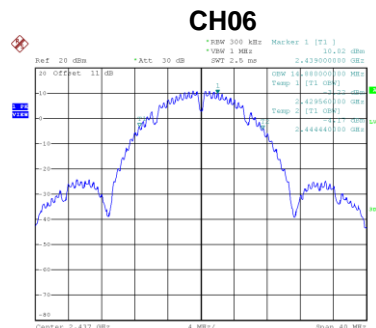


Date: 21.OCT.2020 12:13:10

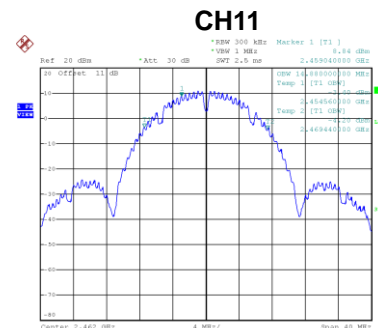
Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	14.80	Complies
06	2437	14.88	Complies
11	2462	14.88	Complies



Date: 21.OCT.2020 12:13:15



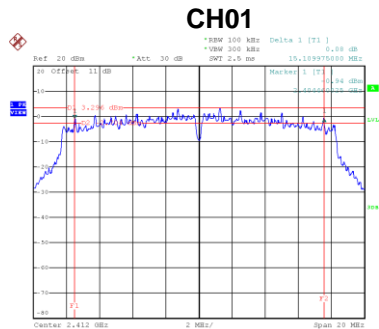
Date: 21.OCT.2020 12:13:10



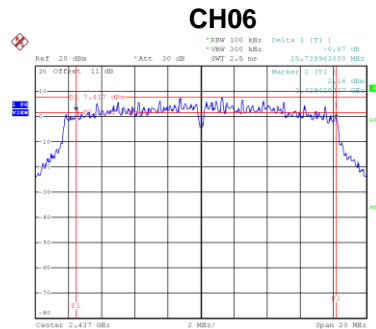
Date: 21.OCT.2020 12:13:13

Test Mode	TX G Mode
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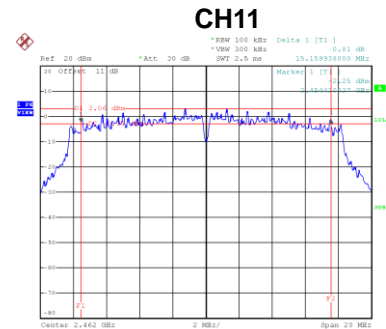
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	15.11	500	Complies
06	2437	15.74	500	Complies
11	2462	15.16	500	Complies



Date: 21.OCT.2020 12:40:17

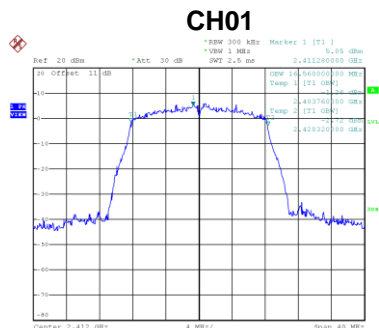


Date: 21.OCT.2020 12:42:03

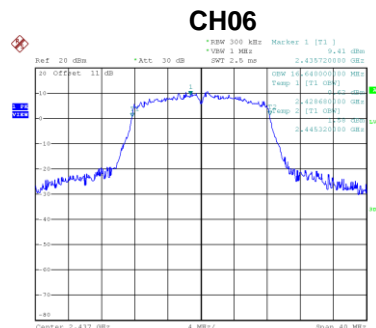


Date: 21.OCT.2020 12:43:15

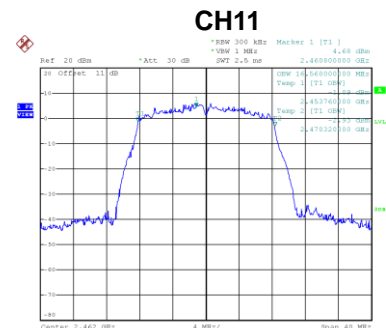
Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	16.56	Complies
06	2437	16.64	Complies
11	2462	16.56	Complies



Date: 21.OCT.2020 12:40:44



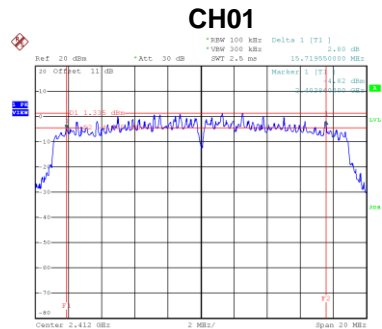
Date: 21.OCT.2020 12:42:10



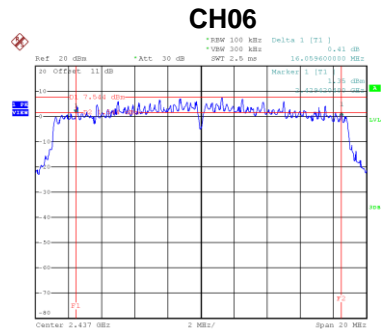
Date: 21.OCT.2020 12:43:21

Test Mode	TX N-20M Mode
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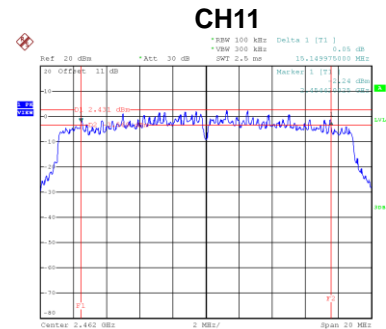
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	15.72	500	Complies
06	2437	16.06	500	Complies
11	2462	15.15	500	Complies



Date: 21.OCT.2020 12:44:39

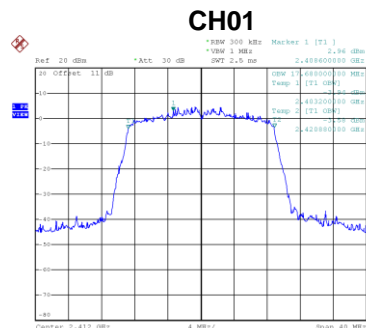


Date: 21.OCT.2020 12:44:40

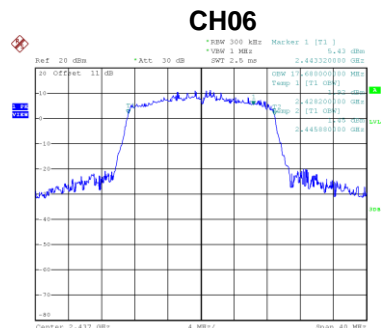


Date: 21.OCT.2020 12:44:43

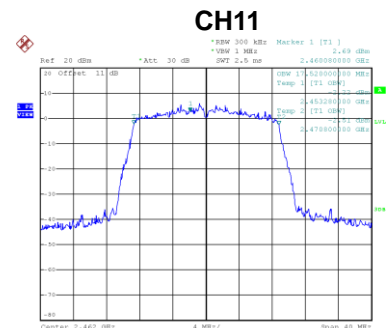
Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
01	2412	17.68	Complies
06	2437	17.68	Complies
11	2462	17.52	Complies



Date: 21.OCT.2020 12:44:45



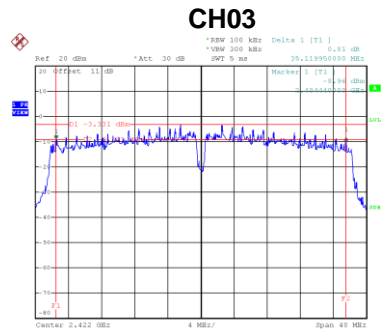
Date: 21.OCT.2020 12:44:47



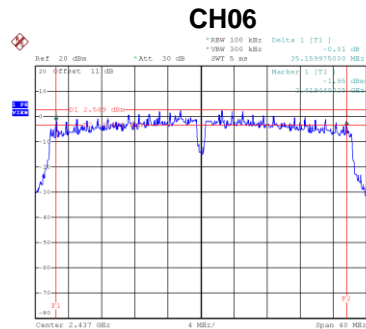
Date: 21.OCT.2020 12:44:49

Test Mode	TX N-40M Mode
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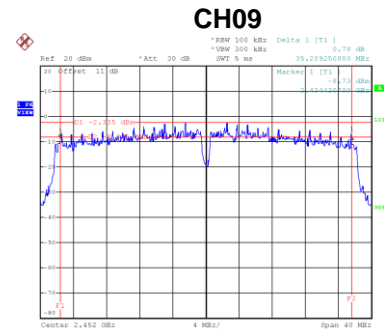
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
03	2422	35.12	500	Complies
06	2437	35.16	500	Complies
09	2452	35.21	500	Complies



Date: 21.OCT.2020 12:47:13

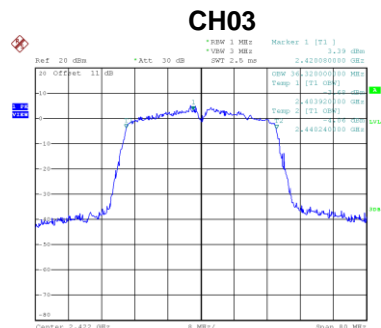


Date: 21.OCT.2020 12:48:19

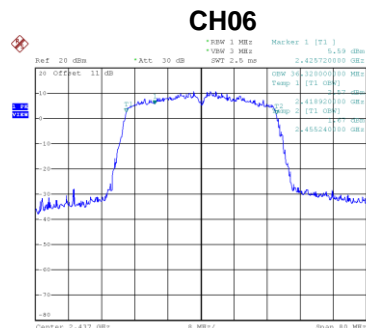


Date: 21.OCT.2020 12:49:53

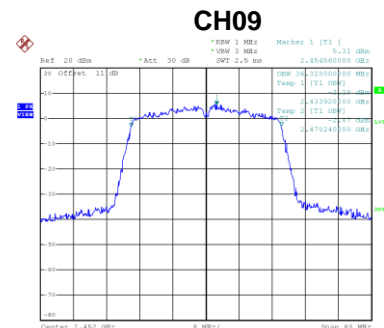
Channel	Frequency (MHz)	99 % Emission Bandwidth (MHz)	Result
03	2422	36.32	Complies
06	2437	36.32	Complies
09	2452	36.32	Complies



Date: 21.OCT.2020 12:47:19



Date: 21.OCT.2020 12:48:56



Date: 21.OCT.2020 12:50:00



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

Test Mode	TX B Mode_Ant. 1
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	18.79	0.00	18.79	30.00	1.0000	Complies
06	2437	18.94	0.00	18.94	30.00	1.0000	Complies
11	2462	19.07	0.00	19.07	30.00	1.0000	Complies

Test Mode	TX B Mode_Ant. 2
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	19.14	0.00	19.14	30.00	1.0000	Complies
06	2437	19.33	0.00	19.33	30.00	1.0000	Complies
11	2462	19.34	0.00	19.34	30.00	1.0000	Complies

Test Mode	TX B Mode_Total
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	21.98	30.00	1.0000	Complies
06	2437	22.15	30.00	1.0000	Complies
11	2462	22.22	30.00	1.0000	Complies

Test Mode	TX G Mode_Ant. 1
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	14.47	0.52	14.99	30.00	1.0000	Complies
06	2437	18.95	0.52	19.47	30.00	1.0000	Complies
11	2462	15.36	0.52	15.88	30.00	1.0000	Complies

Test Mode	TX G Mode_Ant. 2
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	14.72	0.52	15.24	30.00	1.0000	Complies
06	2437	19.12	0.52	19.64	30.00	1.0000	Complies
11	2462	15.57	0.52	16.09	30.00	1.0000	Complies

Test Mode	TX G Mode_Total
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	18.13	30.00	1.0000	Complies
06	2437	22.57	30.00	1.0000	Complies
11	2462	19.00	30.00	1.0000	Complies

Test Mode	TX N-20M Mode_Ant. 1
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	13.45	0.59	14.04	30.00	1.0000	Complies
06	2437	19.08	0.59	19.67	30.00	1.0000	Complies
11	2462	14.63	0.59	15.22	30.00	1.0000	Complies

Test Mode	TX N-20M Mode_Ant. 2
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	13.88	0.59	14.47	30.00	1.0000	Complies
06	2437	19.22	0.59	19.81	30.00	1.0000	Complies
11	2462	14.86	0.59	15.45	30.00	1.0000	Complies

Test Mode	TX N-20M Mode_Total
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	17.27	30.00	1.0000	Complies
06	2437	22.75	30.00	1.0000	Complies
11	2462	18.35	30.00	1.0000	Complies

Test Mode	TX N-40M Mode_Ant. 1
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	10.34	0.51	10.85	30.00	1.0000	Complies
06	2437	16.89	0.51	17.40	30.00	1.0000	Complies
09	2452	11.79	0.51	12.30	30.00	1.0000	Complies

Test Mode	TX N-40M Mode_Ant. 2
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Duty Factor	Avg Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	10.73	0.51	11.24	30.00	1.0000	Complies
06	2437	17.01	0.51	17.52	30.00	1.0000	Complies
09	2452	11.92	0.51	12.43	30.00	1.0000	Complies

Test Mode	TX N-40M Mode_Total
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Channel	Frequency (MHz)	Avg Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	14.06	30.00	1.0000	Complies
06	2437	20.47	30.00	1.0000	Complies
09	2452	15.38	30.00	1.0000	Complies

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