

# FCC Radio Test Report

## FCC ID: 2ABZMEP9

This report concerns (check one):  Original Grant  Class I Change  Class II Change

**Project No.** : 1809C096  
**Equipment** : AC1200 Enterprise Mesh WiFi System  
**Test Model** : EP9  
**Series Model** : N/A  
**Applicant** : SHENZHEN IP-COM NETWORKS CO.,LTD  
**Address** : Room 101, Unit A, First Floor, Tower E3, No. 1001,  
Zhongshanyuan Road, Nanshan District, Shenzhen,  
China. 518052

**Date of Receipt** : Sep. 13, 2018  
**Date of Test** : Sep. 17, 2018 ~ Oct. 16, 2018  
**Issued Date** : Oct. 18, 2018  
**Tested by** : BTL Inc.

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The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1809C096	Original Issue.	Oct. 18, 2018

## 1. CERTIFICATION

Equipment : AC1200 Enterprise Mesh WiFi System  
Brand Name : IP-COM  
Test Model : EP9  
Series Model : N/A  
Applicant : SHENZHEN IP-COM NETWORKS CO.,LTD  
Manufacturer : SHENZHEN IP-COM NETWORKS CO.,LTD  
Address : Room 101, Unit A, First Floor, Tower E3, No. 1001, Zhongshanyuan Road,  
Nanshan District, Shenzhen, China. 518052  
Date of Test : Sep. 17, 2018 ~ Oct. 16, 2018  
Test Sample : Engineering Sample No.: D180907707  
Standard(s) : FCC Part15, Subpart C (15.247) / ANSI C63.10-2013

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

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1809C096) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO-17025 quality assessment standard and technical standard(s).

**Test results included in this report is only for the WLAN 2.4GHz part.**

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15 (15.247) , Subpart C			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	6 dB Bandwidth	PASS	
15.247(b)(3)	Maximum output power	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	
15.247(d)/ 15.205/ 15.209	Transmitter Radiated Emissions	PASS	

Note:

(1) "N/A" denotes test is not applicable in this test report.

## 2.1 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 number for FCC: 854385

BTL's designation number for FCC: CN5020

## 2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor)  $k=1.96$  or  $k=2$ (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %,  $U=2xUc(y)$ .

The BTL measurement uncertainty as below table:

### A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150 kHz ~ 30 MHz	2.32

### B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9 KHz~30 MHz	V	3.79
		9 KHz~30 MHz	H	3.57
		30 MHz~200 MHz	V	3.82
		30 MH~200 MHz	H	3.78
		200 MHz~1,000 MHz	V	4.10
		200 MHz~1,000 MHz	H	4.06
		1 GHz~18 GHz	V	3.12
		1 GHz~18 GHz	H	3.68
		18 GHz~40 GHz	V	4.15
18 GHz~40 GHz	H	4.14		

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



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	AC1200 Enterprise Mesh WiFi System	
Brand Name	IP-COM	
Test Model	EP9	
Series Model	N/A	
Model Difference(s)	N/A	
Product Description	Operation Frequency	2412MHz ~ 2462MHz
	Modulation Technology	802.11b:DSSS 802.11g:OFDM 802.11n:OFDM
	Bit Rate of Transmitter	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n up to 300 Mbps
	Output Power (Max.) Non-Beamforming	802.11b: 28.11 dBm 802.11g: 28.26 dBm 802.11n(20 MHz): 26.40 dBm 802.11n(40 MHz): 26.17 dBm
	Output Power (Max.) Beamforming	802.11n(20 MHz):26.23 dBm 802.11n(40 MHz):26.09 dBm
Power Source	DC Voltage supplied from AC/DC adapter. Model: BN036-A12012U	
Power Rating	I/P:100-240V~ 50/60Hz 0.4A    O/P:12V --- 1.0A	

Note:

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

CH01 - CH11 for 802.11b, 802.11g, 802.11n(20 MHz) CH03 - CH09 for 802.11n(40 MHz)							
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. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	N/A	4.5
2	N/A	N/A	PCB	N/A	4.5

Note:

- (1) This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so Directional gain =  $G_{ANT} + 10\log(N)$  dBi, that is Directional gain =  $4.5 + 10\log(2)$  dBi = 7.51; So, the output power limit is  $30 - 7.51 + 6 = 28.49$ , the power density limit is  $8 - 7.51 + 6 = 6.49$ .
- (2) Beamforming Gain: 3 dBi, Directional gain =  $3 + 4.5 = 7.50$ . So, the output power limit is  $30 - 7.50 + 6 = 28.50$ , the power density limit is  $8 - 7.50 + 6 = 6.50$ .

4. The worst case for 1TX/2TX as follow:

Operating Mode	TX Mode	1TX	2TX
		802.11b	V (ANT 2)
802.11g		V (ANT 2)	V (ANT 1+ ANT 2)
802.11n(20 MHz)		-	V (ANT 1+ ANT 2)
802.11n(40 MHz)		-	V (ANT 1+ ANT 2)

### 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

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 Mode

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Test	
Final Test Mode:	Description
Mode 5	TX Mode

For Radiated 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

For Band Edge 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

6 dB Spectrum Bandwidth	
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

Maximum Output Power	
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

Power Spectral Density	
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: DBPSK (1 Mbps)  
 802.11g mode: OFDM (6 Mbps)  
 802.11n HT20 mode : BPSK (13 Mbps)  
 802.11n HT40 mode : BPSK (27 Mbps)  
 For radiated emission tests, the highest output powers were set for final test.
- (3) For radiated 30 MHz to 1000 MHz test, the 802.11b is found to be the worst case and recorded.

### 3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN

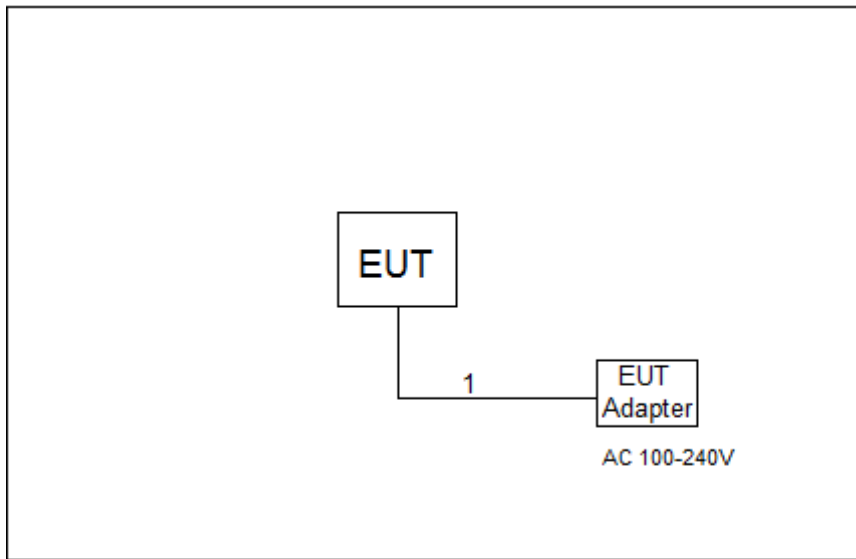
#### Non-Beamforming

Test software version	MP-v3.4		
Frequency (MHz)	2412	2437	2462
802.11b	37	43	44
802.11g	28	29	30
802.11n (20 MHz)	24/23	24/24	24/25
Frequency (MHz)	2422	2437	2452
802.11n (40 MHz)	24/23	25/23	25/23

#### Beamforming

Test software version	MP-v3.4		
Frequency (MHz)	2412	2437	2462
802.11n (20 MHz)	24/23	24/24	24/25
Frequency (MHz)	2422	2437	2452
802.11n (40 MHz)	24/23	25/23	25/23

**3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**



**3.5 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.2m	DC Cable

## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150 kHz-30 MHz)

Frequency of Emission (MHz)	Conducted 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 limit of " \* " decreases with the logarithm of the frequency
- (2) The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)  
 Margin Level = Measurement Value - Limit Value

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

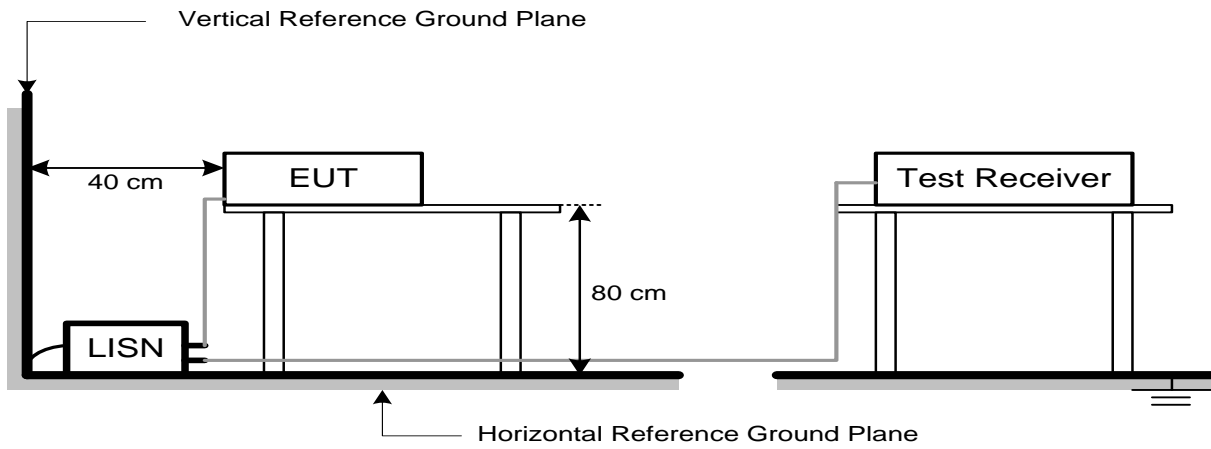
#### 4.1.2 TEST PROCEDURE

- 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.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.4 TEST SETUP



#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was placed on the test table and programmed in normal function.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: 25°C    Relative Humidity: 52%    Test Voltage: AC 120V/60Hz

#### 4.1.7 TEST RESULTS

Please refer to the Appendix A.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 RADIATED EMISSION LIMITS

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
960~1000	500	3

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

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

#### 4.2.2 TEST PROCEDURE

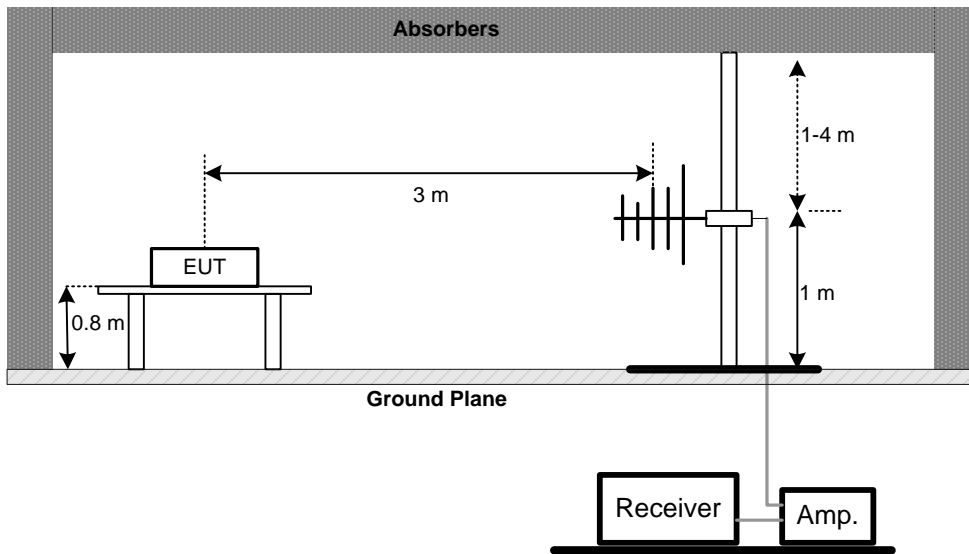
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The measuring distance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

#### 4.2.3 DEVIATION FROM TEST STANDARD

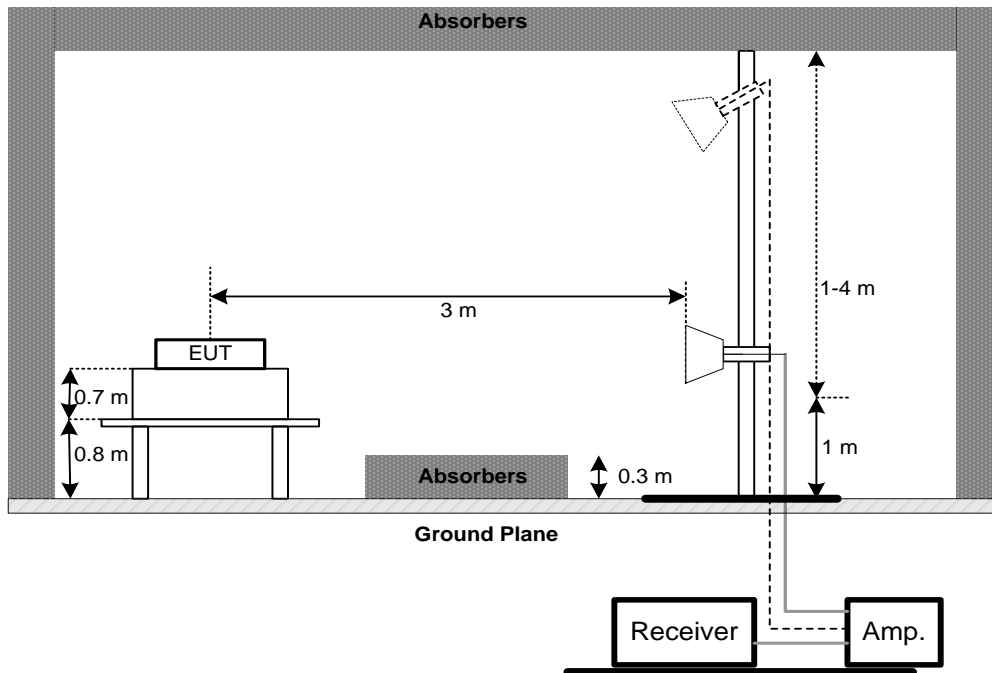
No deviation

#### 4.2.4 TEST SETUP

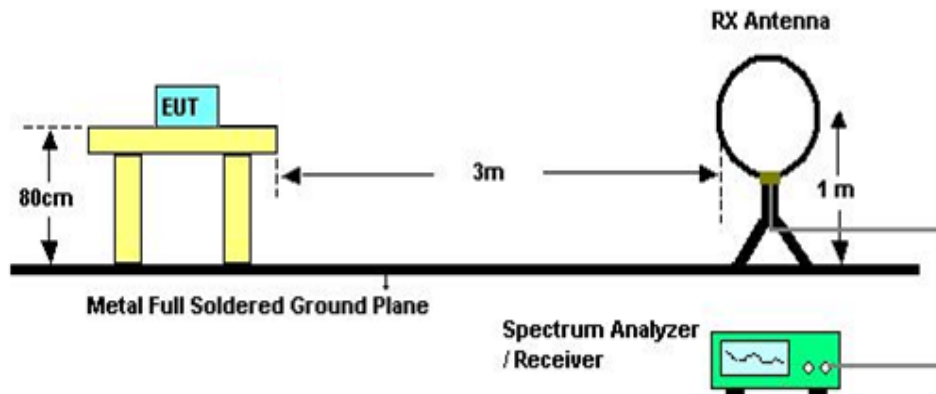
(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For Radiated Emissions 9 kHz-30 MHz



#### 4.2.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 4.2.6 EUT TEST CONDITIONS

Temperature: 25°C    Relative Humidity: 60%    Test Voltage: AC 120V/60Hz

#### 4.2.7 TEST RESULTS (9 kHz TO 30 MHz)

Please refer to the Appendix B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 4.2.8 TEST RESULTS (30 MHz TO 1000 MHz)

Please refer to the Appendix C.

#### 4.2.9 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 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	2400-2483.5	PASS

#### 5.1.1 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 = 2.5 ms.

#### 5.1.2 DEVIATION FROM STANDARD

No deviation.

#### 5.1.3 TEST SETUP



#### 5.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 5.1.5 EUT TEST CONDITIONS

Temperature: 25°C    Relative Humidity: 52%    Test Voltage: AC 120V/60Hz

#### 5.1.6 TEST RESULTS

Please refer to the Appendix E.

## 6. MAXIMUM OUTPUT POWER TEST

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Maximum Output Power	1 Watt or 30 dBm	2400-2483.5	PASS

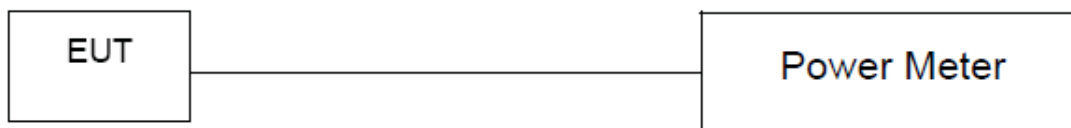
#### 6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- b. The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 v04 DTS Meas Guidance.

#### 6.1.2 DEVIATION FROM STANDARD

No deviation.

#### 6.1.3 TEST SETUP



#### 6.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 6.1.5 EUT TEST CONDITIONS

Temperature: 25°C    Relative Humidity: 52%    Test Voltage: AC 120V/60Hz

#### 6.1.6 TEST RESULTS

Please refer to the Appendix F.

## 7. ANTENNA CONDUCTED SPURIOUS EMISSION

### 7.1 APPLIED PROCEDURES / 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 conducted power limits. If the transmitter complies with the conducted 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. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

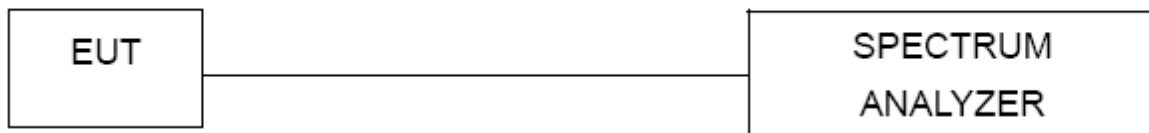
#### 7.1.1 TEST PROCEDURE

- 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.
- c. Offset=antenna gain+cable loss

#### 7.1.2 DEVIATION FROM STANDARD

No deviation.

#### 7.1.3 TEST SETUP



#### 7.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 7.1.5 EUT TEST CONDITIONS

Temperature: 25°C    Relative Humidity: 52%    Test Voltage: AC 120V/60Hz

#### 7.1.6 TEST RESULTS

Please refer to the Appendix G.

## 8. POWER SPECTRAL DENSITY TEST

### 8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)	2400-2483.5	PASS

#### 8.1.1 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.

#### 8.1.2 DEVIATION FROM STANDARD

No deviation.

#### 8.1.3 TEST SETUP



#### 8.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 8.1.5 EUT TEST CONDITIONS

Temperature: 25°C    Relative Humidity: 52%    Test Voltage: AC 120V/60Hz

#### 8.1.6 TEST RESULTS

Please refer to the Appendix H.



## 9. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019
2	LISN	EMCO	3816/2	52765	Mar. 11, 2019
3	50Ω Terminator	SHX	TF2-3G-A	8122901	Mar. 11, 2019
4	TWO-LINE V-NETWORK	R&S	ENV216	101447	Mar. 11, 2019
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Mar. 23, 2019

Radiated Emission Measurement-9 kHz TO 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EM	EM-6876-1	230	Feb. 07, 2019
2	Cable	N/A	RG 213/U	C-102	Jun. 01, 2019
3	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emission Measurement-30 MHz TO 1000 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 11, 2019
2	Amplifier	HP	8447D	2944A09673	Aug. 11, 2019
3	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 25, 2019
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

Radiated Emission Measurement - Above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 11, 2019
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2019
3	Amplifier	Agilent	8449B	3008A02274	Mar. 11, 2019
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 11, 2019
5	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	mitron	B10-01-01-12M	18072744	Jul. 30, 2019
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

6 dB Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Maximum output power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	ANRITSU	ML2495A	1128009	Mar. 11, 2019
2	Pulse Power Sensor	ANRITSU	MA 2411B	1027500	Mar. 11, 2019

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

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 Measurement Photos**



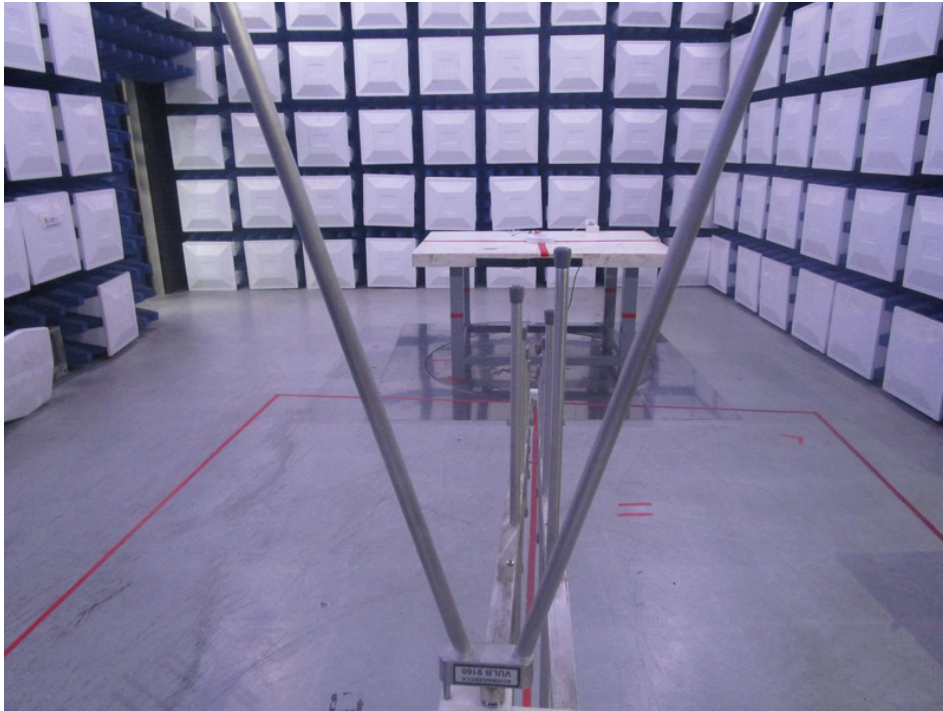
### Radiated Measurement Photos

9 kHz to 30 MHz



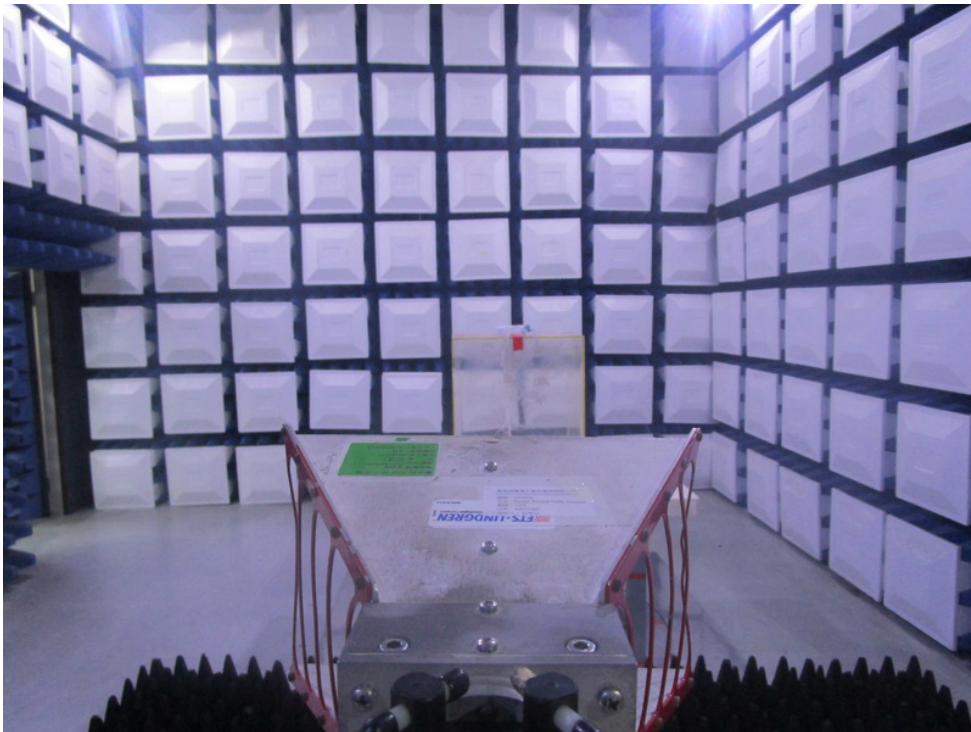
**Radiated Measurement Photos**

**30 MHz to 1000 MHz**



**Radiated Measurement Photos**

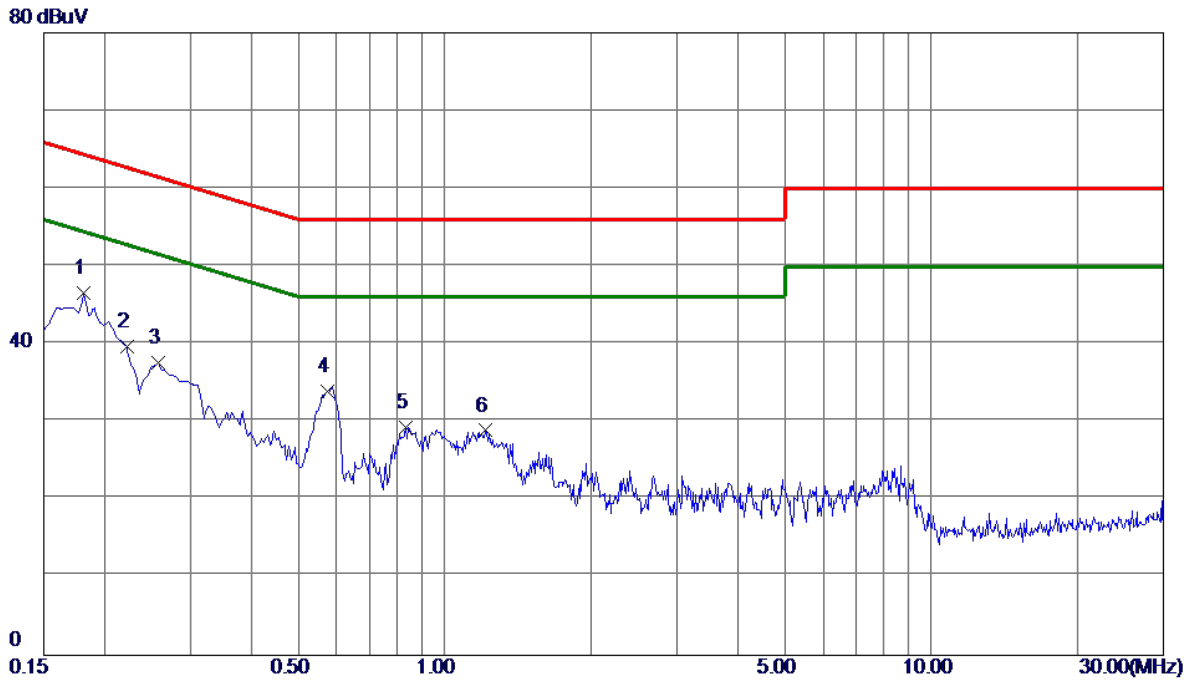
**Above 1000 MHz**



## APPENDIX A - CONDUCTED EMISSION

Test Mode: TX Mode

**Line**

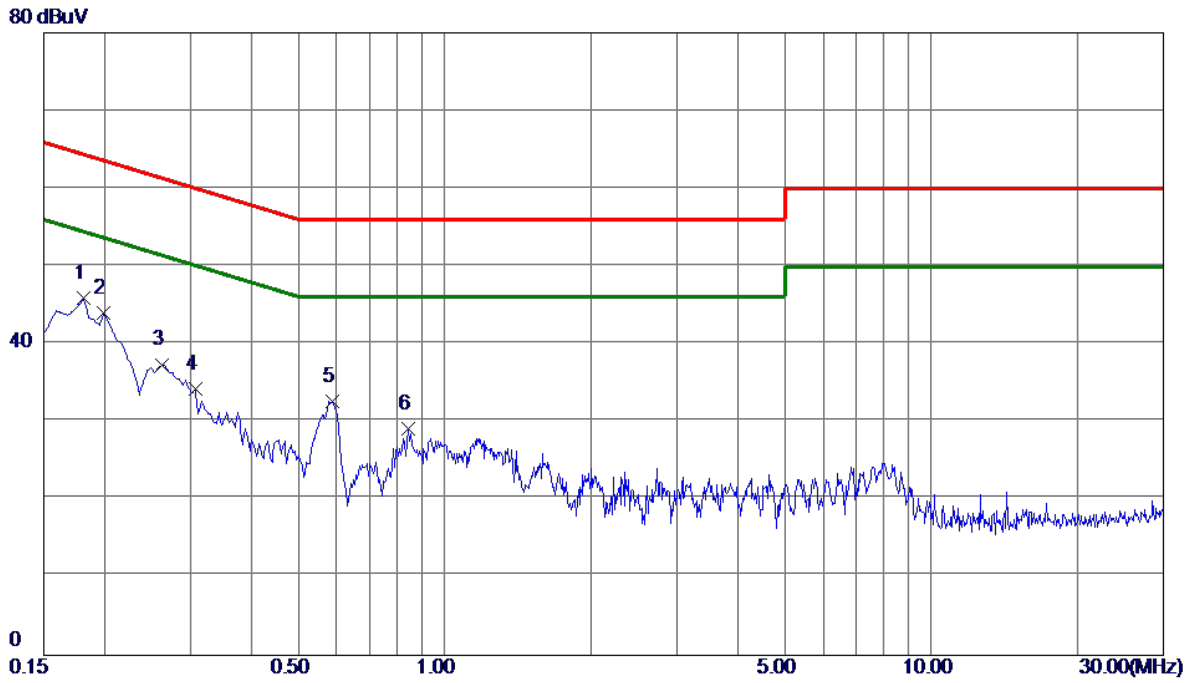


No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1815	36.70	9.82	46.52	64.42	-17.90	Peak	
2	0.2220	29.81	9.82	39.63	62.74	-23.11	Peak	
3	0.2580	27.72	9.82	37.54	61.50	-23.96	Peak	
4	0.5730	24.16	9.82	33.98	56.00	-22.02	Peak	
5	0.8340	19.43	9.91	29.34	56.00	-26.66	Peak	
6	1.2120	18.95	9.93	28.88	56.00	-27.12	Peak	



Test Mode: TX Mode

**Neutral**

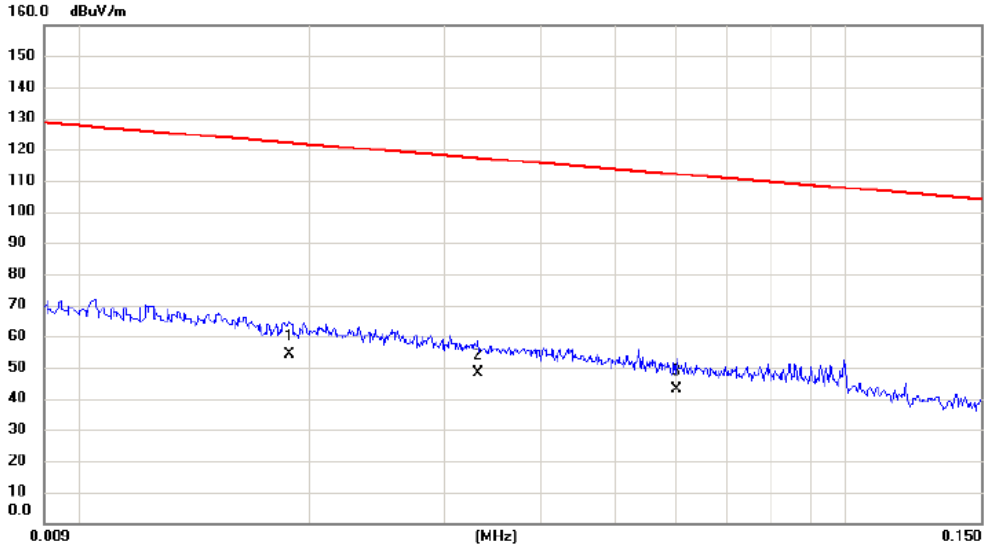


No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1815	35.96	9.91	45.87	64.42	-18.55	Peak	
2	0.1995	34.15	9.91	44.06	63.63	-19.57	Peak	
3	0.2625	27.44	9.92	37.36	61.35	-23.99	Peak	
4	0.3075	24.30	9.93	34.23	60.04	-25.81	Peak	
5	0.5865	22.74	9.97	32.71	56.00	-23.29	Peak	
6	0.8430	19.02	10.09	29.11	56.00	-26.89	Peak	

## APPENDIX B - RADIATED EMISSION (9 KHZ TO 30 MHZ)

Test Mode: TX Mode

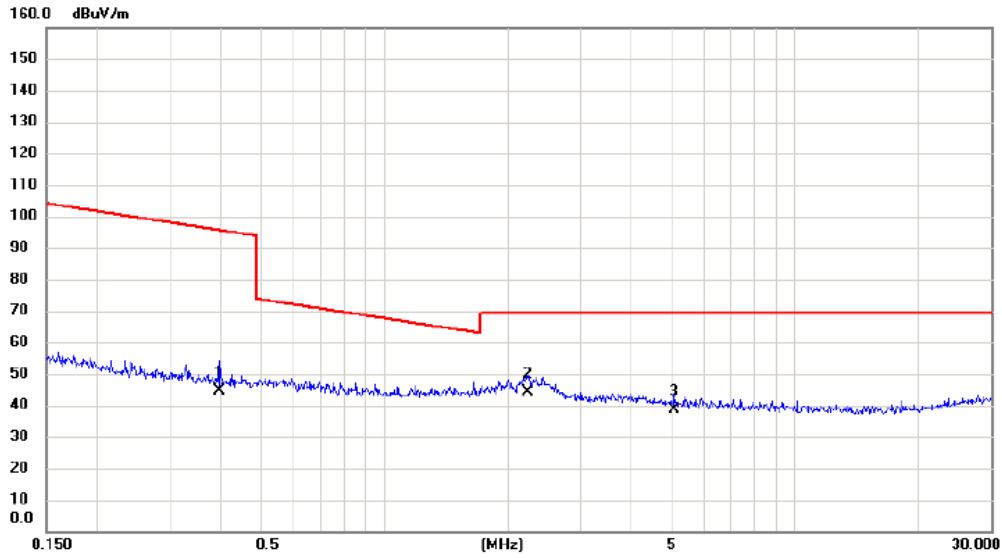
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	0.0188	33.90	20.19	54.09	122.12	-68.03	AVG	
2		0.0331	28.60	19.80	48.40	117.21	-68.81	AVG	
3		0.0601	23.70	19.33	43.03	112.03	-69.00	AVG	

Test Mode: TX Mode

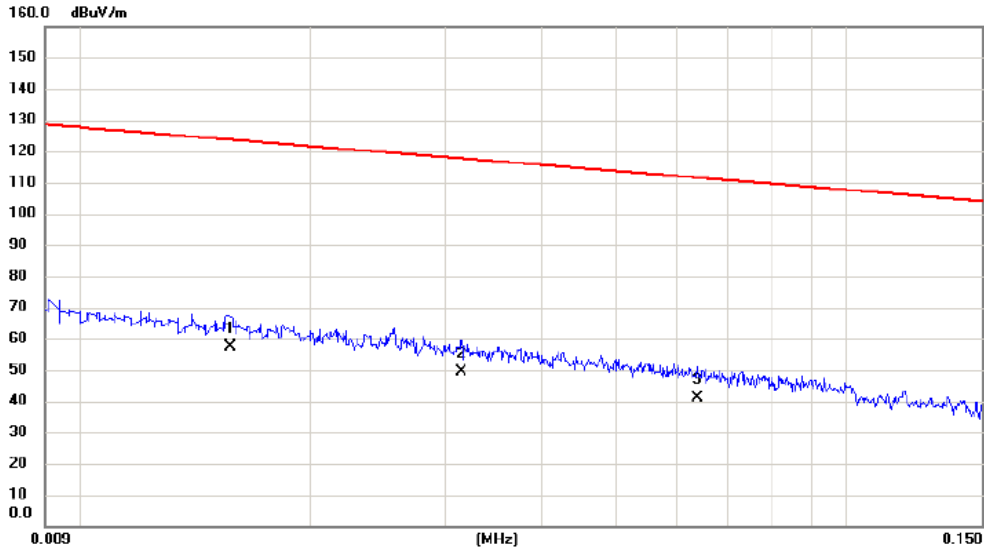
Ant 0°



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	0.3976	27.50	17.00	44.50	95.62	-51.12	AVG	
2 *	2.2367	27.30	16.97	44.27	69.54	-25.27	QP	
3	5.0580	23.60	15.16	38.76	69.54	-30.78	QP	

Test Mode: TX Mode

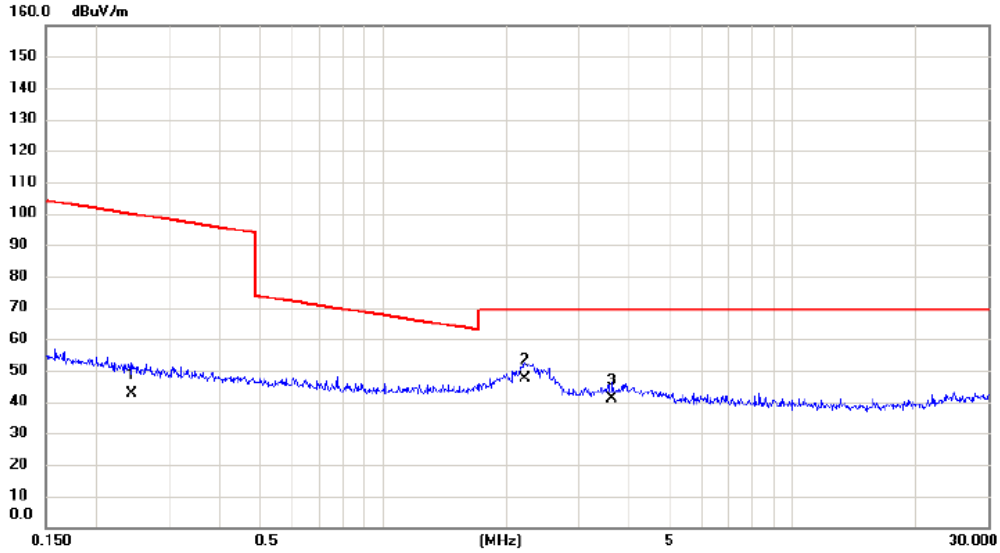
Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	0.0157	36.80	20.62	57.42	123.69	-66.27	AVG	
2		0.0314	29.50	19.83	49.33	117.67	-68.34	AVG	
3		0.0640	21.60	19.25	40.85	111.48	-70.63	AVG	

Test Mode: TX Mode

Ant 90°



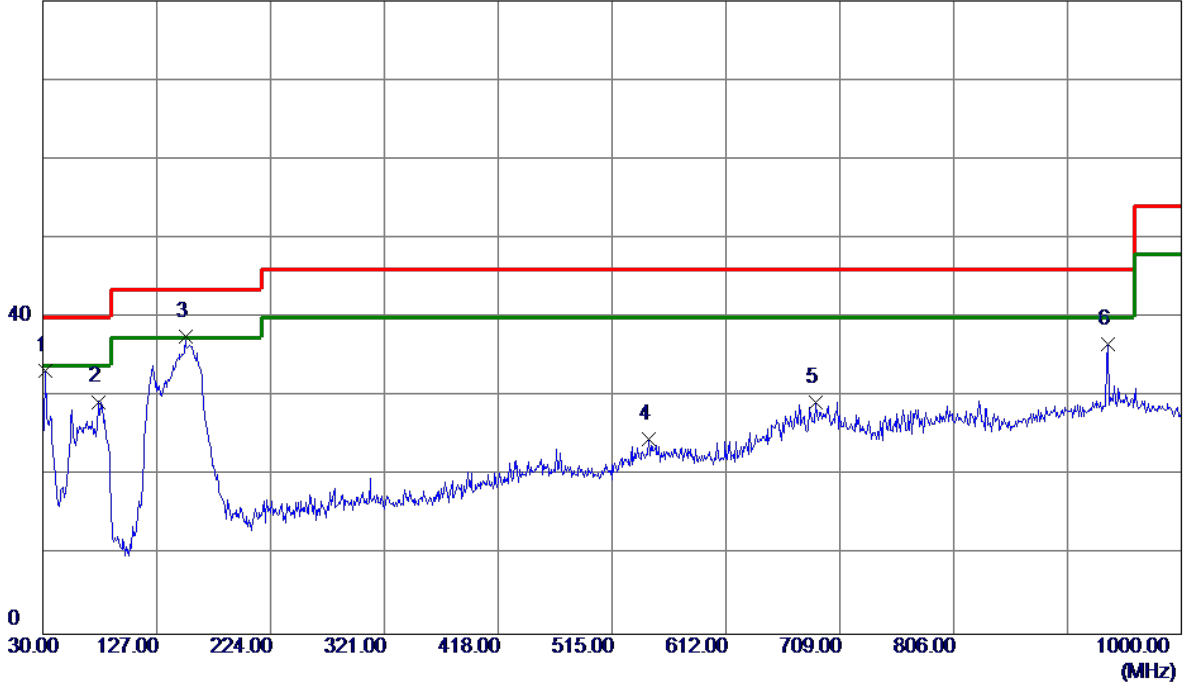
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	0.2430	25.60	17.07	42.67	99.89	-57.22	AVG	
2 *	2.2250	30.51	16.97	47.48	69.54	-22.06	QP	
3	3.6225	25.10	16.04	41.14	69.54	-28.40	QP	

## APPENDIX C - RADIATED EMISSION (30 MHZ TO 1000 MHZ)

Test Mode: TX B Mode Channel 01

**Vertical**

80 dBuV/m



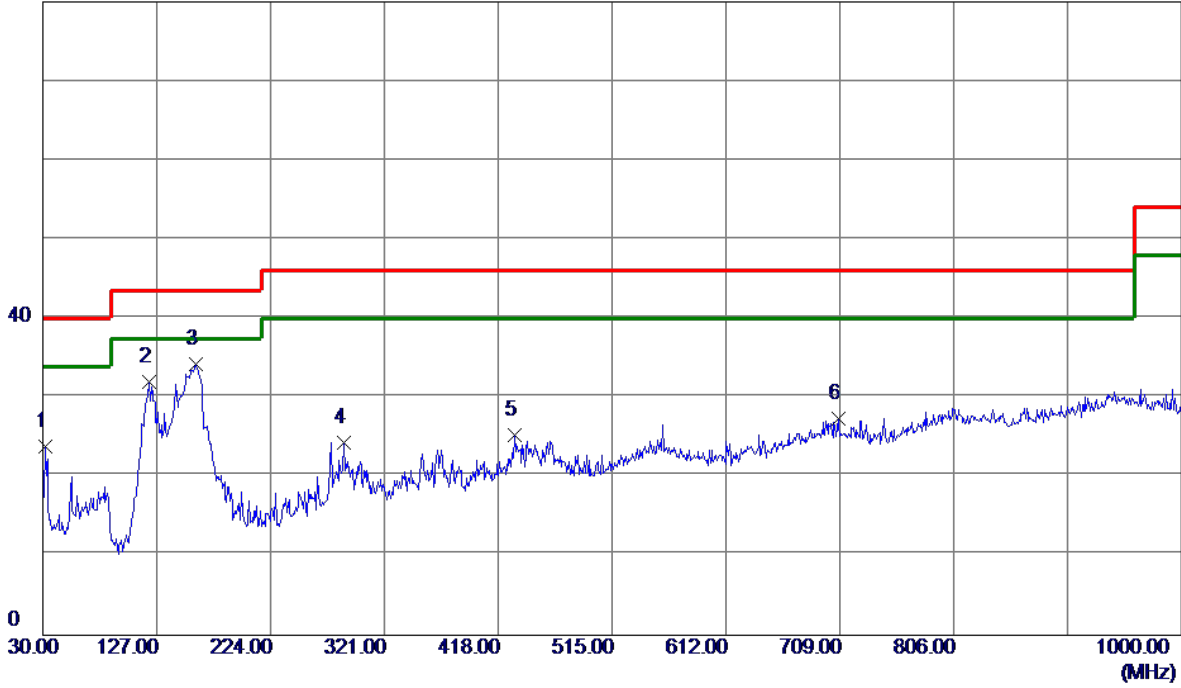
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	32.4250	48.20	-14.99	33.21	40.00	-6.79	Peak	
2	77.5300	47.86	-18.50	29.36	40.00	-10.64	Peak	
3 *	151.7350	48.94	-11.34	37.60	43.50	-5.90	Peak	
4	546.5250	30.29	-5.68	24.61	46.00	-21.39	Peak	
5	688.1450	32.64	-3.32	29.32	46.00	-16.68	Peak	
6	936.9500	35.79	0.89	36.68	46.00	-9.32	Peak	



Test Mode: TX B Mode Channel 01

Horizontal

80 dBuV/m

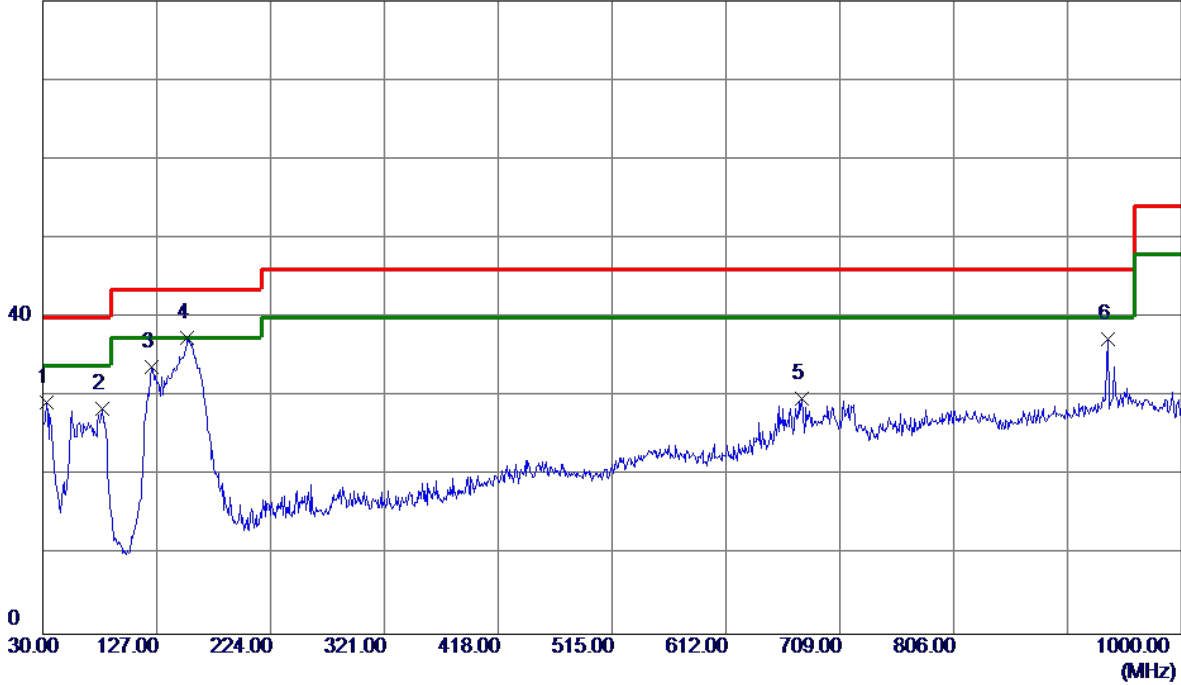


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	32.4250	38.90	-14.99	23.91	40.00	-16.09	Peak	
2	120.6950	46.54	-14.60	31.94	43.50	-11.56	Peak	
3 *	159.9800	44.89	-10.60	34.29	43.50	-9.21	Peak	
4	286.5650	35.48	-11.09	24.39	46.00	-21.61	Peak	
5	432.0650	33.37	-8.11	25.26	46.00	-20.74	Peak	
6	707.5450	30.37	-2.94	27.43	46.00	-18.57	Peak	

Test Mode: TX B Mode Channel 06

**Vertical**

80 dBuV/m

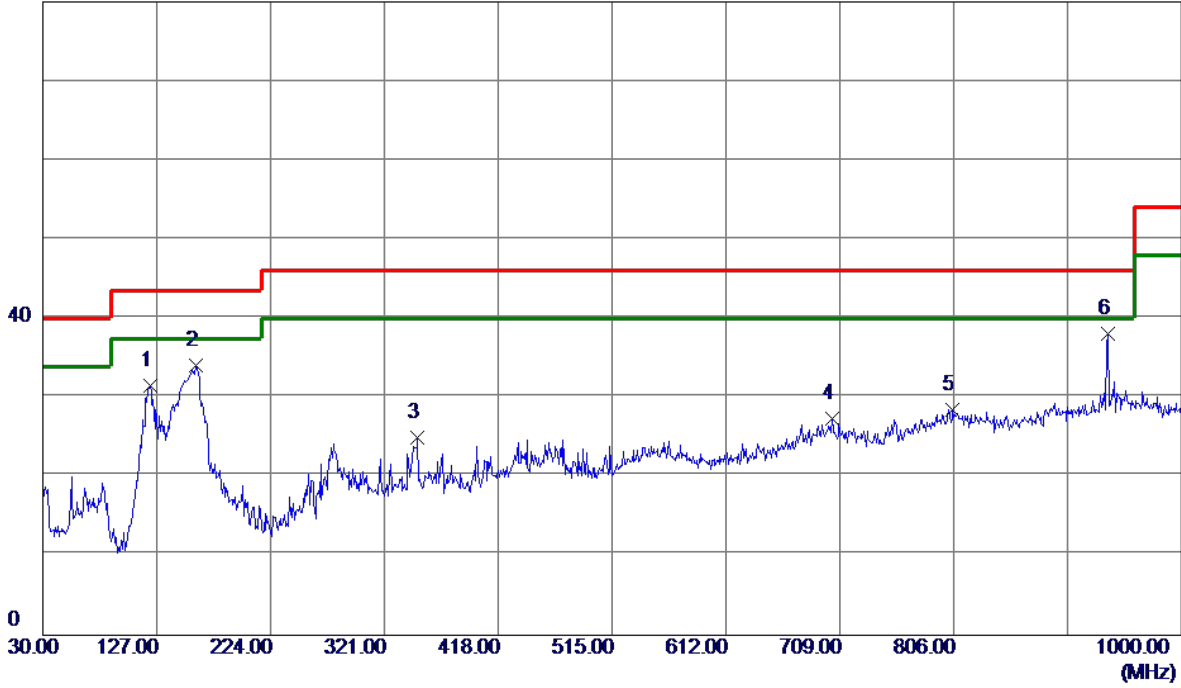


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	32.9100	44.24	-14.94	29.30	40.00	-10.70	Peak	
2	80.4400	47.15	-18.62	28.53	40.00	-11.47	Peak	
3	123.1200	48.06	-14.28	33.78	43.50	-9.72	Peak	
4 *	153.1900	48.67	-11.21	37.46	43.50	-6.04	Peak	
5	676.5050	33.60	-3.89	29.71	46.00	-16.29	Peak	
6	936.9500	36.36	0.89	37.25	46.00	-8.75	Peak	

Test Mode: TX B Mode Channel 06

Horizontal

80 dBuV/m

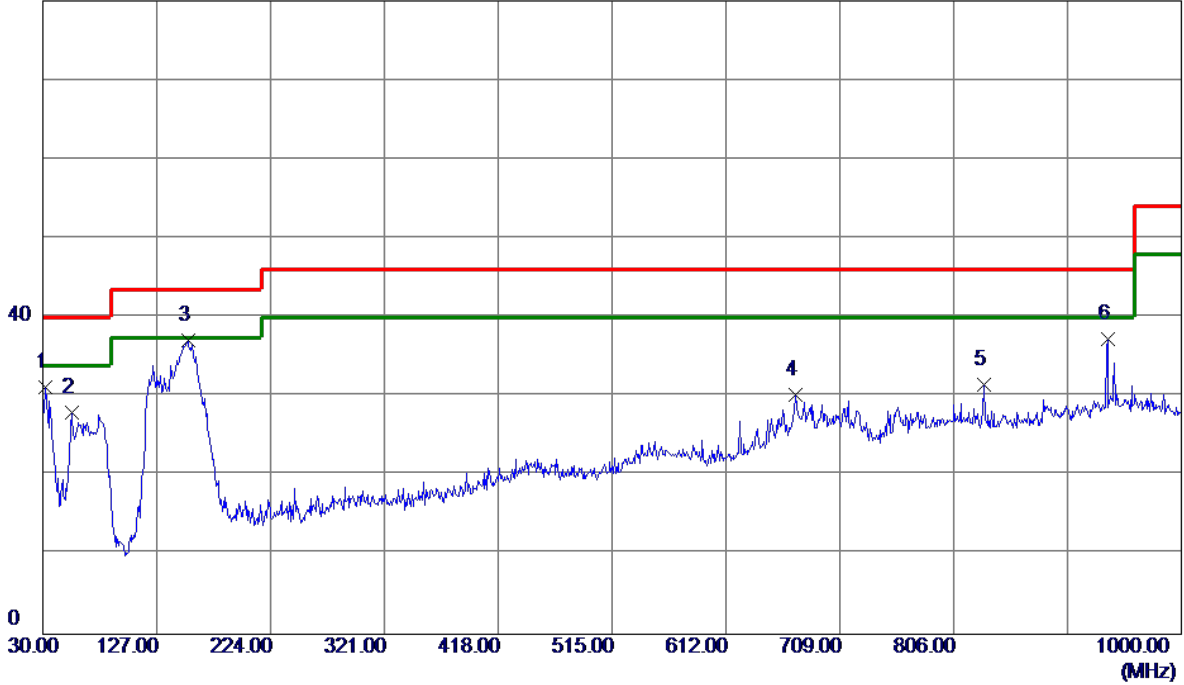


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	121.6650	45.96	-14.47	31.49	43.50	-12.01	Peak	
2	160.4650	44.76	-10.63	34.13	43.50	-9.37	Peak	
3	349.1300	36.02	-11.06	24.96	46.00	-21.04	Peak	
4	702.6950	30.18	-2.82	27.36	46.00	-18.64	Peak	
5	805.0300	29.59	-1.12	28.47	46.00	-17.53	Peak	
6 *	936.9500	37.21	0.89	38.10	46.00	-7.90	Peak	

Test Mode: TX B Mode Channel 11

**Vertical**

80 dBuV/m

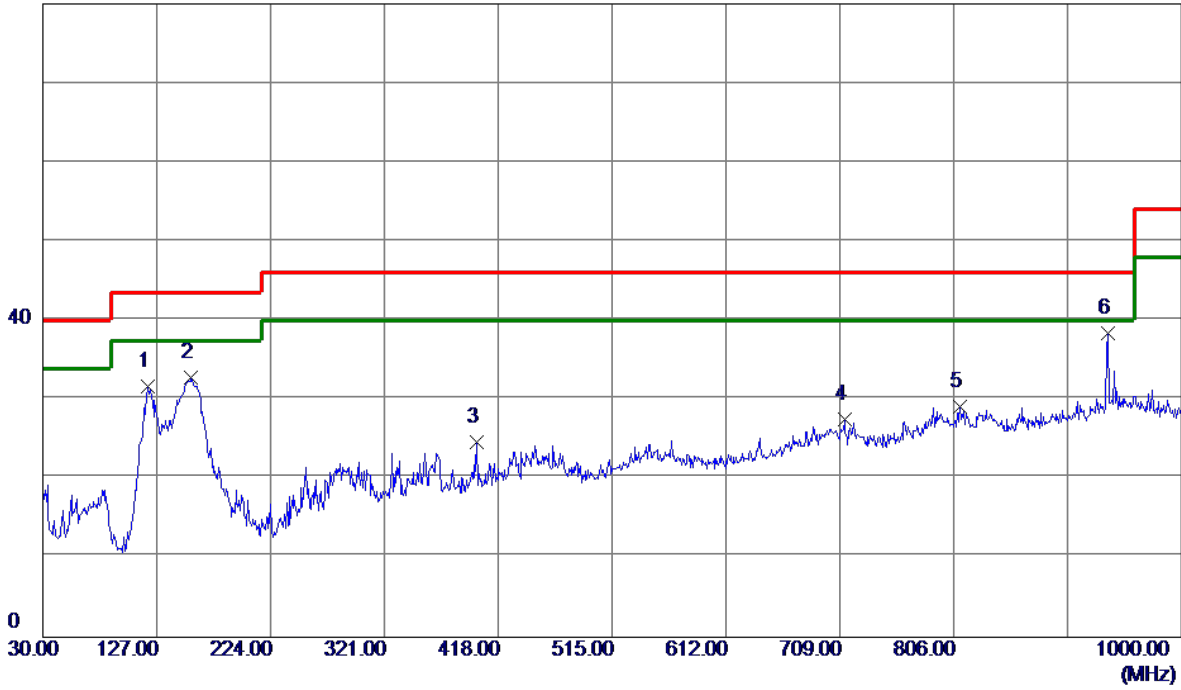


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	32.4250	46.21	-14.99	31.22	40.00	-8.78	Peak	
2	54.7350	42.91	-14.98	27.93	40.00	-12.07	Peak	
3 *	153.6750	48.23	-11.17	37.06	43.50	-6.44	Peak	
4	671.6550	34.34	-4.12	30.22	46.00	-15.78	Peak	
5	832.1900	33.05	-1.54	31.51	46.00	-14.49	Peak	
6	936.9500	36.32	0.89	37.21	46.00	-8.79	Peak	

Test Mode: TX B Mode Channel 11

**Horizontal**

80 dBuV/m



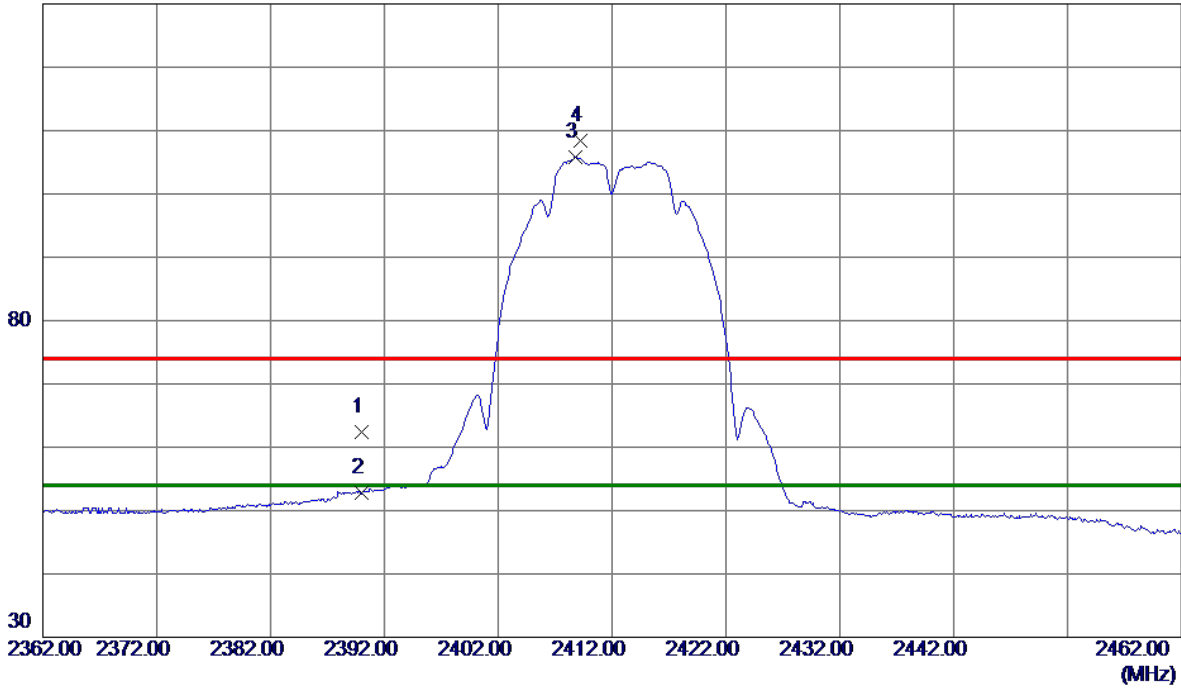
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	119.2400	46.48	-14.81	31.67	43.50	-11.83	Peak	
2	156.5850	43.65	-10.90	32.75	43.50	-10.75	Peak	
3	400.0550	34.03	-9.38	24.65	46.00	-21.35	Peak	
4	712.8800	30.64	-3.08	27.56	46.00	-18.44	Peak	
5	811.8200	30.29	-1.22	29.07	46.00	-16.93	Peak	
6 *	936.9500	37.45	0.89	38.34	46.00	-7.66	Peak	

## APPENDIX D - RADIATED EMISSION (ABOVE 1000 MHZ)

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

**Vertical**

130 dBuV/m

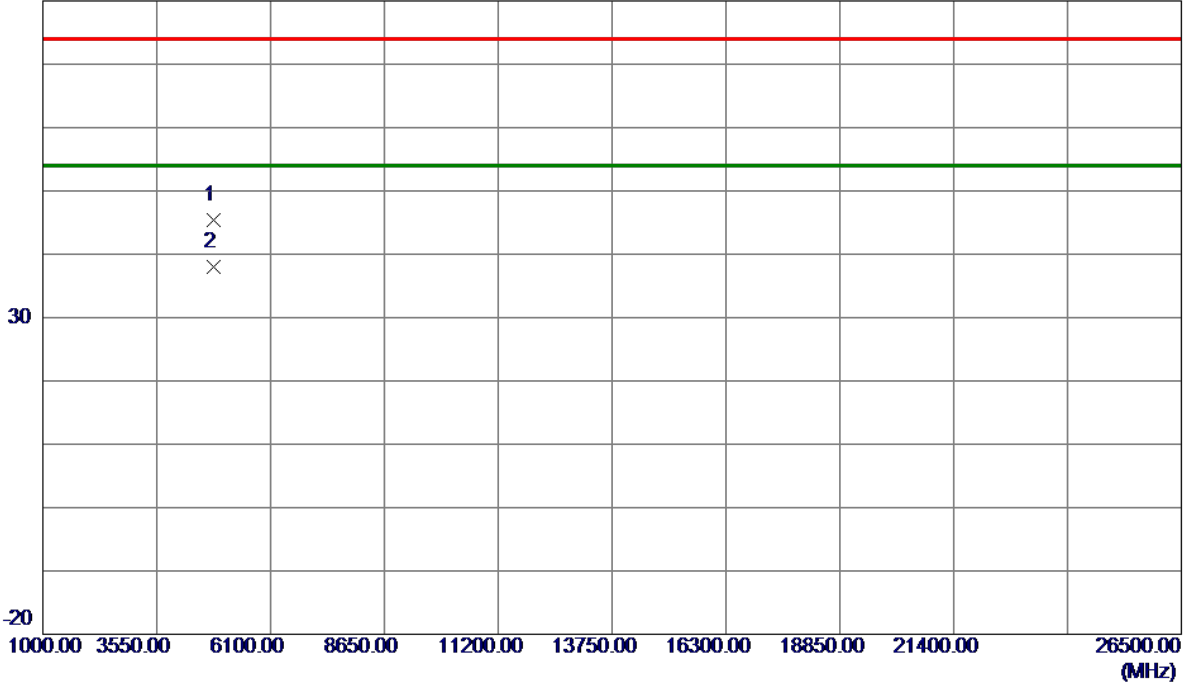


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	55.85	6.62	62.47	74.00	-11.53	Peak	
2	2390.0000	46.15	6.62	52.77	54.00	-1.23	AVG	
3 *	2408.7500	99.20	6.62	105.82	54.00	51.82	AVG	No Limit
4	2409.2000	101.74	6.62	108.36	74.00	34.36	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

**Vertical**

80 dBuV/m

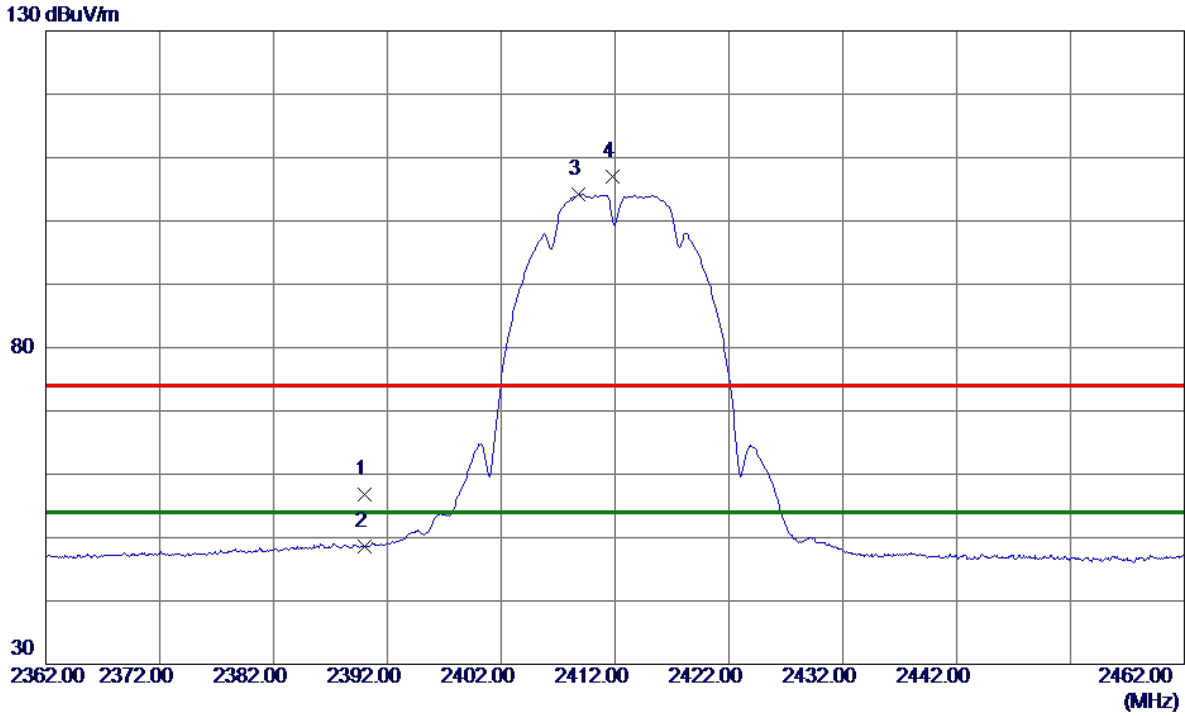


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4823.9260	41.84	3.57	45.41	74.00	-28.59	Peak	
2 *	4823.9570	34.40	3.57	37.97	54.00	-16.03	AVG	



Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

### Horizontal

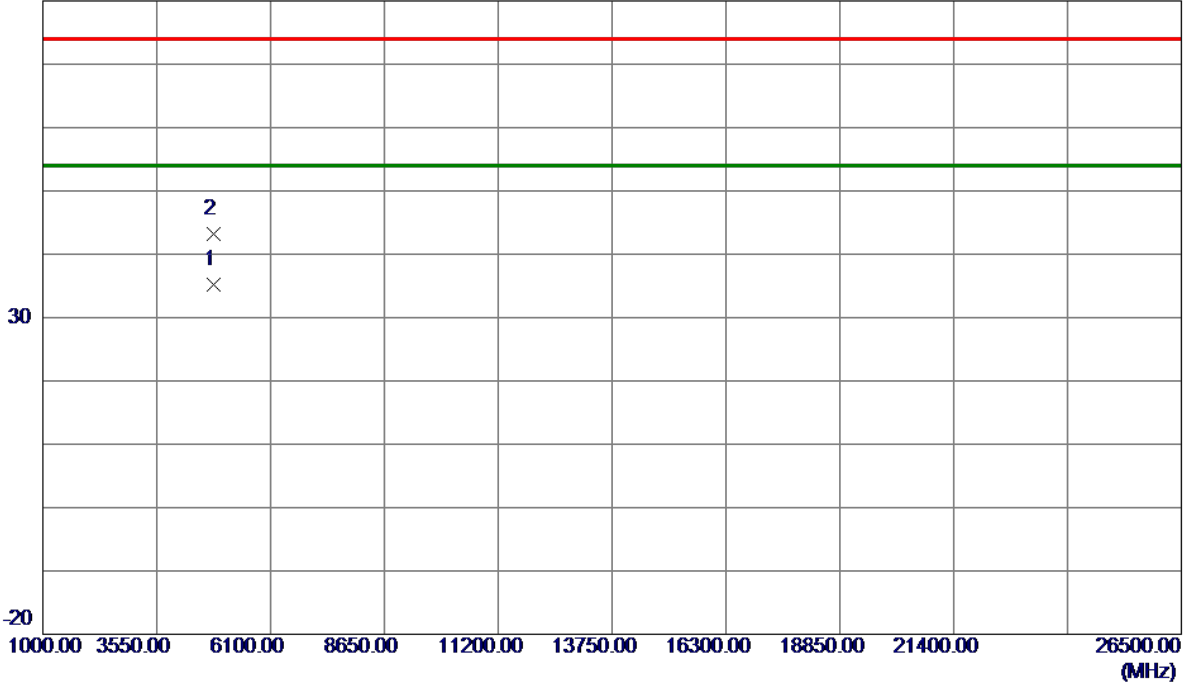


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	50.19	6.62	56.81	74.00	-17.19	Peak	
2	2390.0000	41.97	6.62	48.59	54.00	-5.41	AVG	
3 *	2408.7500	97.60	6.62	104.22	54.00	50.22	AVG	No Limit
4	2411.8000	100.28	6.62	106.90	74.00	32.90	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

**Horizontal**

80 dBuV/m

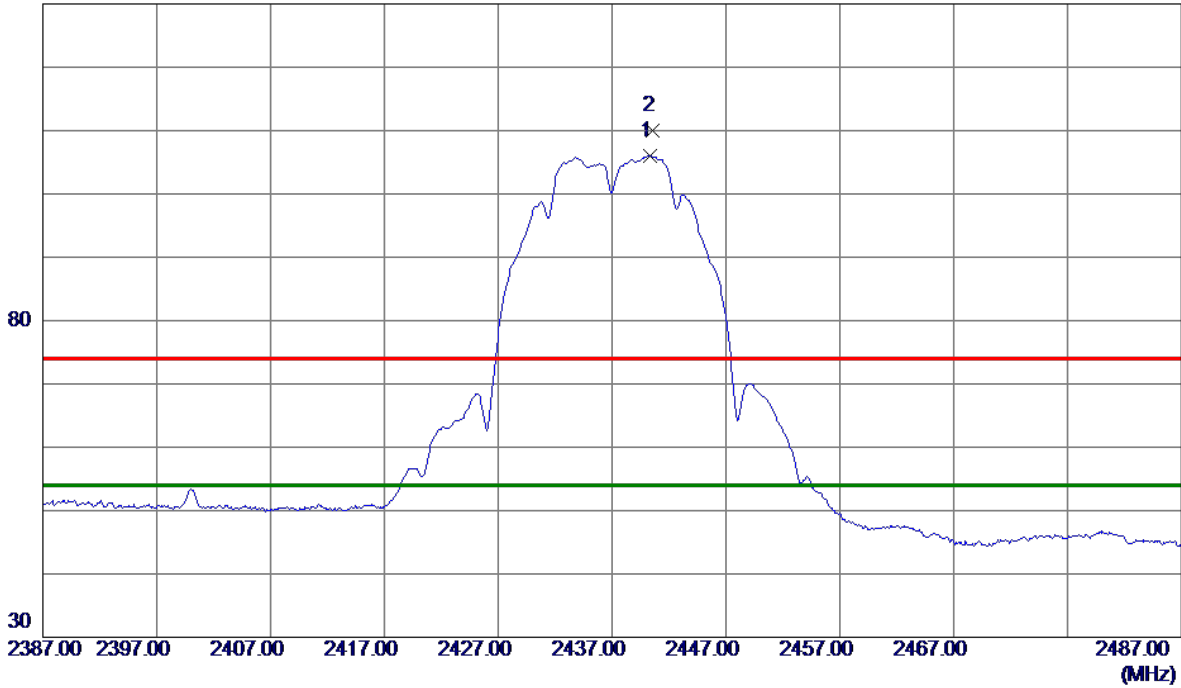


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4823.9169	31.62	3.57	35.19	54.00	-18.81	AVG	
2	4823.9900	39.60	3.57	43.17	74.00	-30.83	Peak	

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

**Vertical**

130 dBuV/m

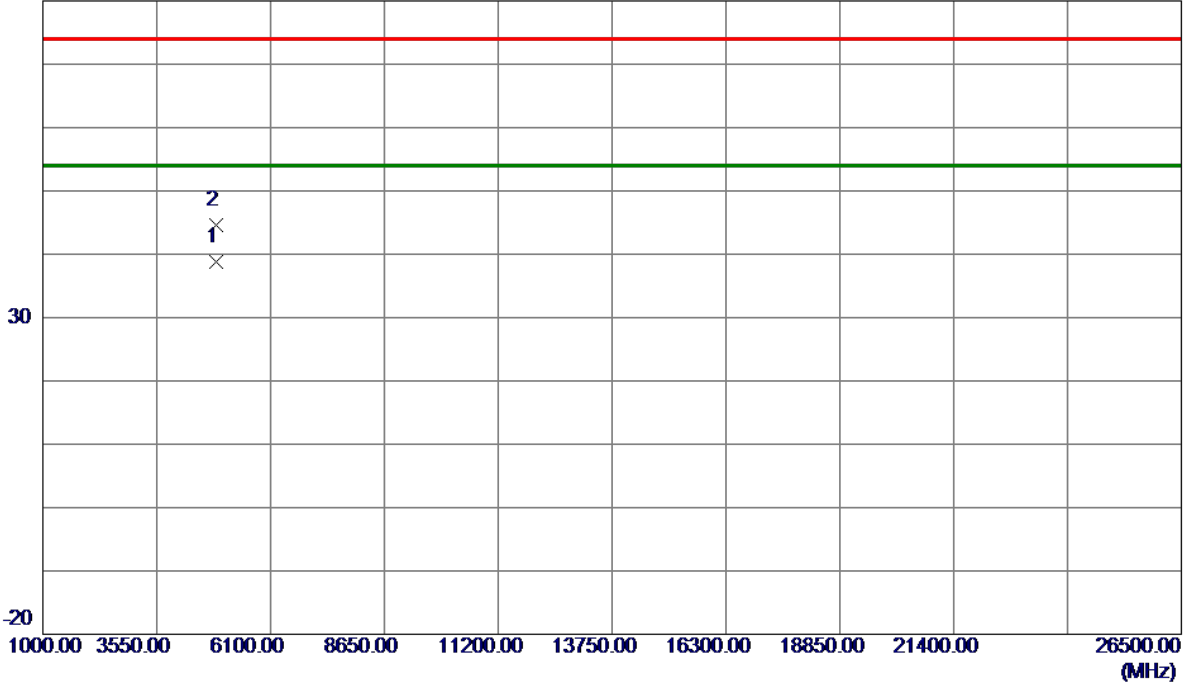


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2440.3000	99.39	6.61	106.00	54.00	52.00	AVG	No Limit
2	2440.5500	103.39	6.61	110.00	74.00	36.00	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

**Vertical**

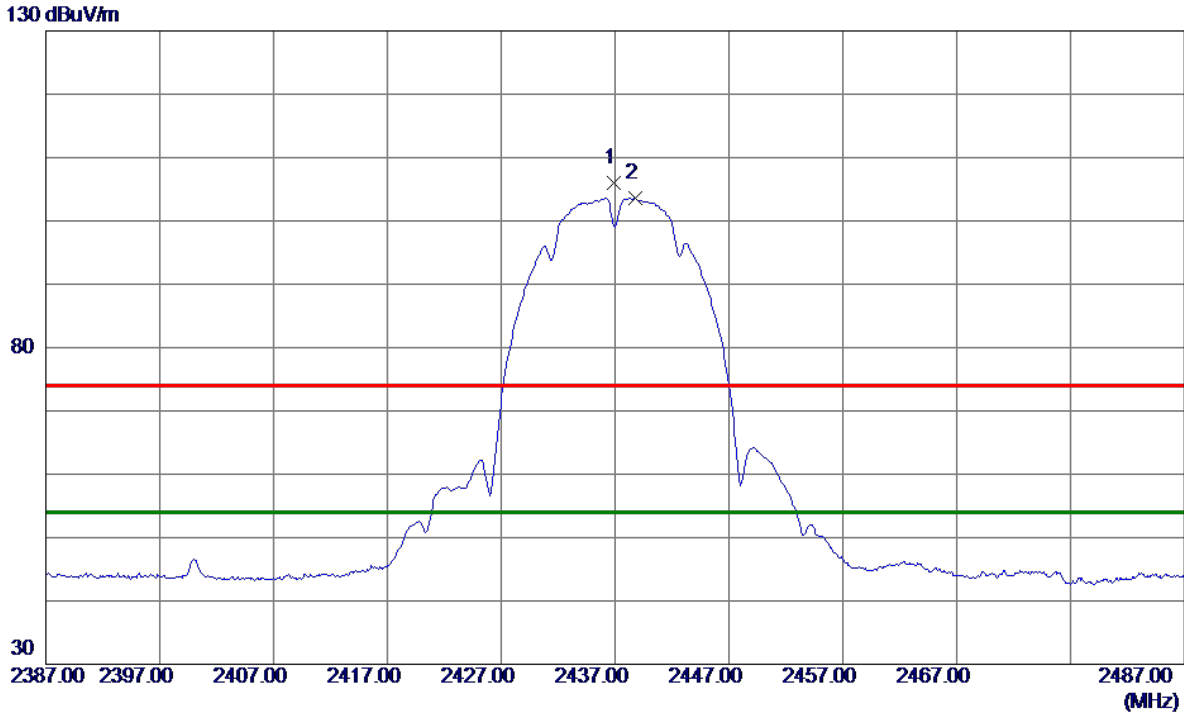
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4873.9560	35.10	3.68	38.78	54.00	-15.22	AVG	
2	4873.9960	40.86	3.68	44.54	74.00	-29.46	Peak	

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

### Horizontal

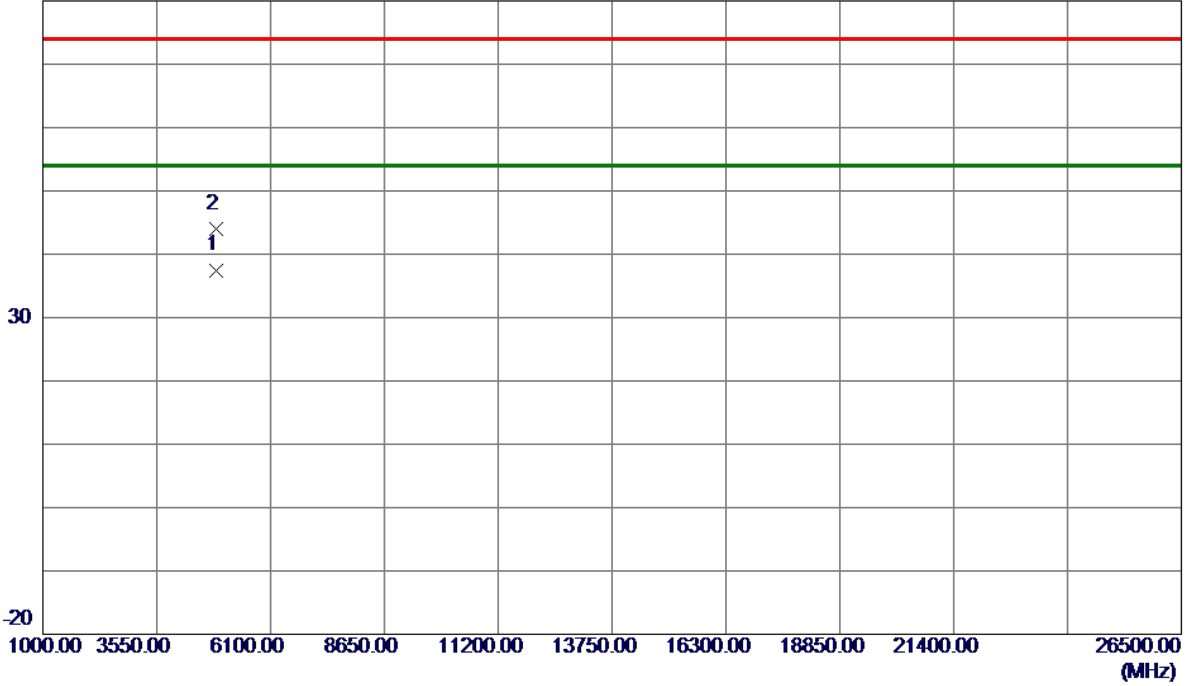


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2436.9000	99.49	6.61	106.10	74.00	32.10	Peak	No Limit
2 *	2438.7500	96.96	6.61	103.57	54.00	49.57	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

**Horizontal**

80 dBuV/m

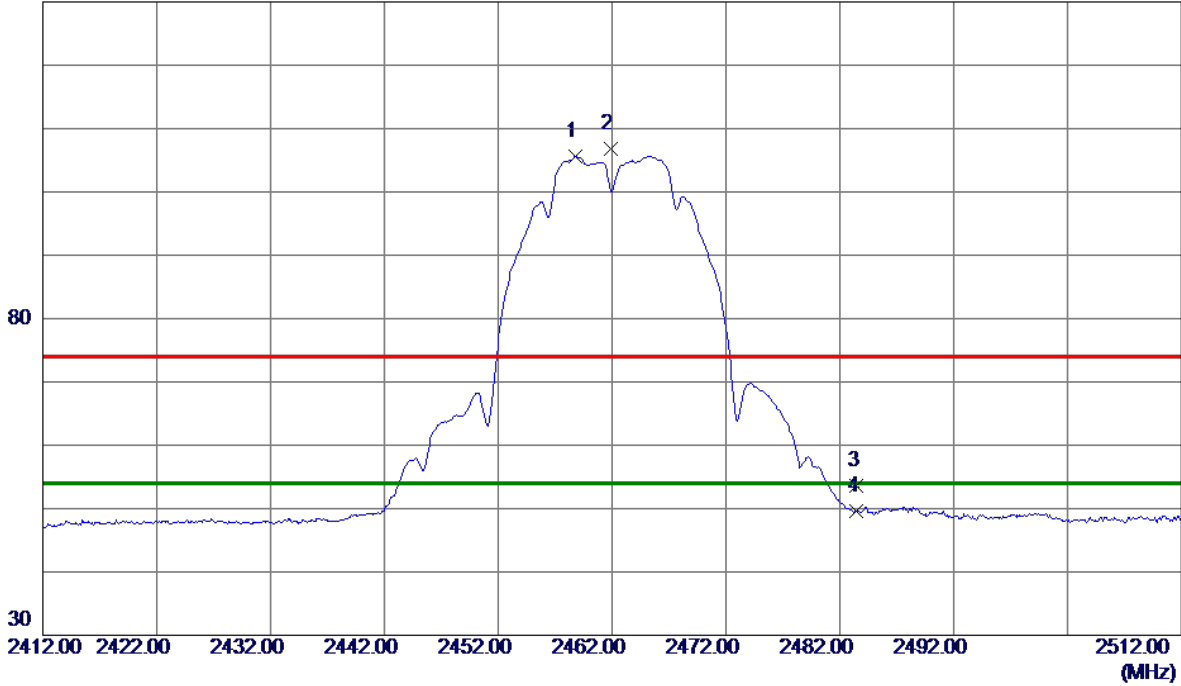


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4873.9790	33.82	3.68	37.50	54.00	-16.50	AVG	
2	4874.0890	40.27	3.68	43.95	74.00	-30.05	Peak	

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

**Vertical**

130 dBuV/m

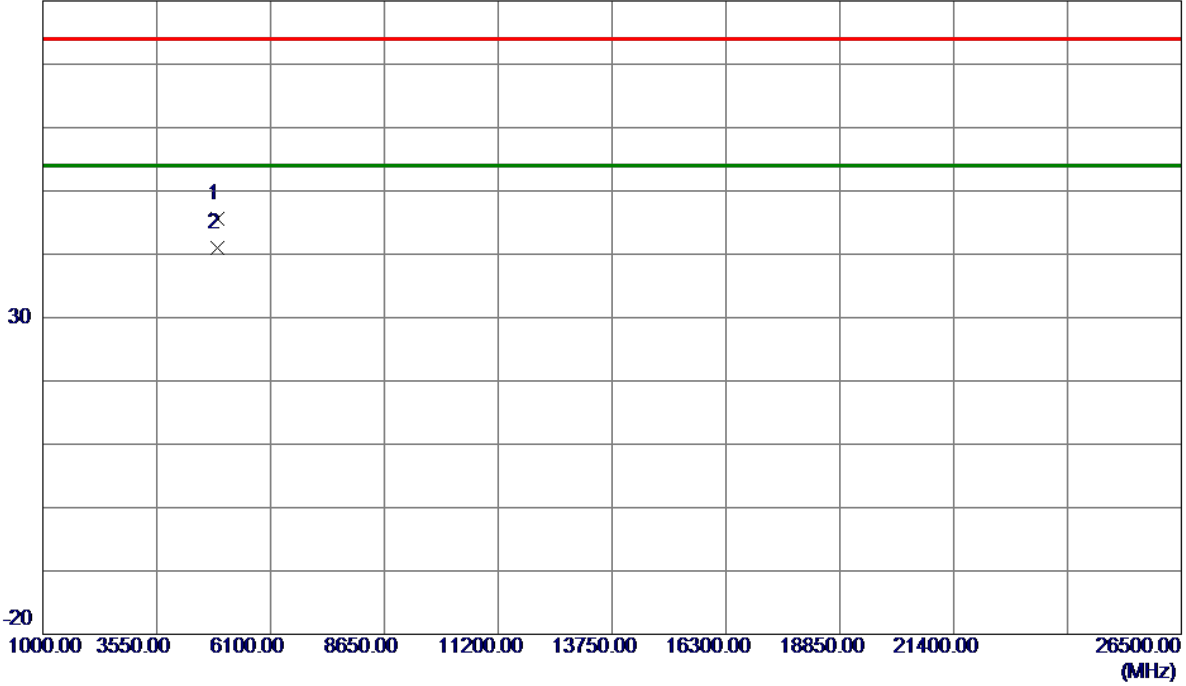


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2458.8000	99.03	6.61	105.64	54.00	51.64	AVG	No Limit
2	2461.9000	100.22	6.61	106.83	74.00	32.83	Peak	No Limit
3	2483.5000	46.91	6.61	53.52	74.00	-20.48	Peak	
4	2483.5000	43.02	6.61	49.63	54.00	-4.37	AVG	

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

**Vertical**

80 dBuV/m

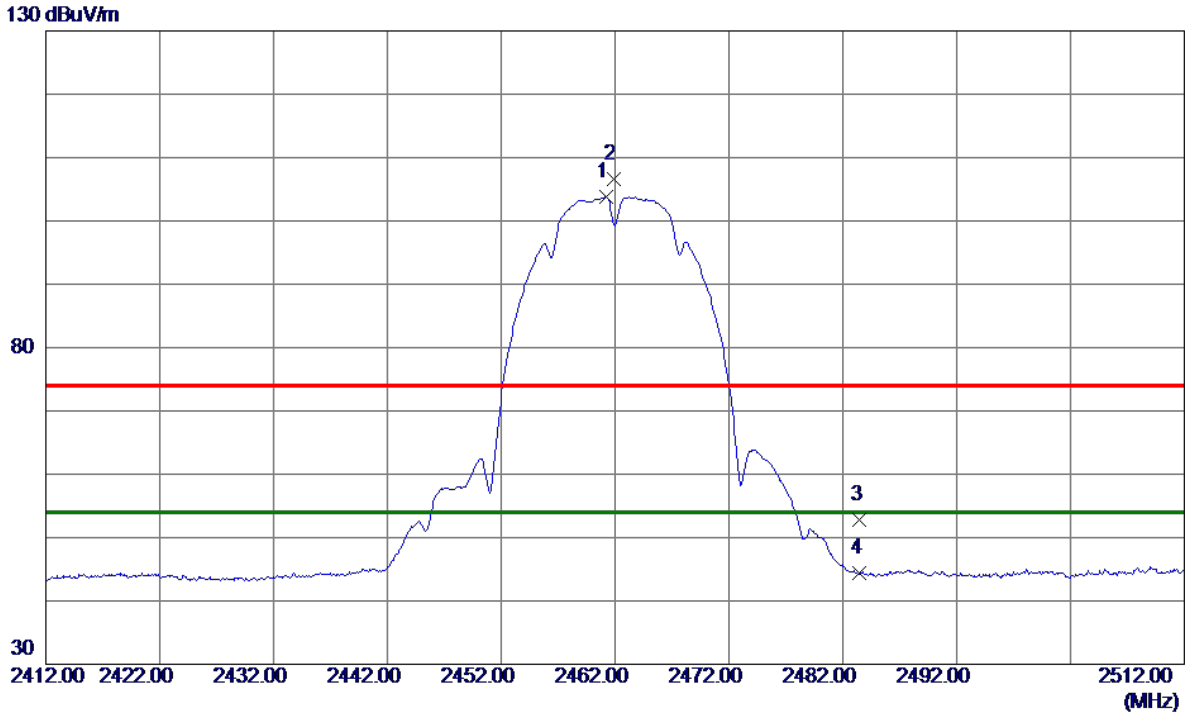


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4923.9500	41.72	3.79	45.51	74.00	-28.49	Peak	
2 *	4923.9610	37.24	3.79	41.03	54.00	-12.97	AVG	



Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

### Horizontal

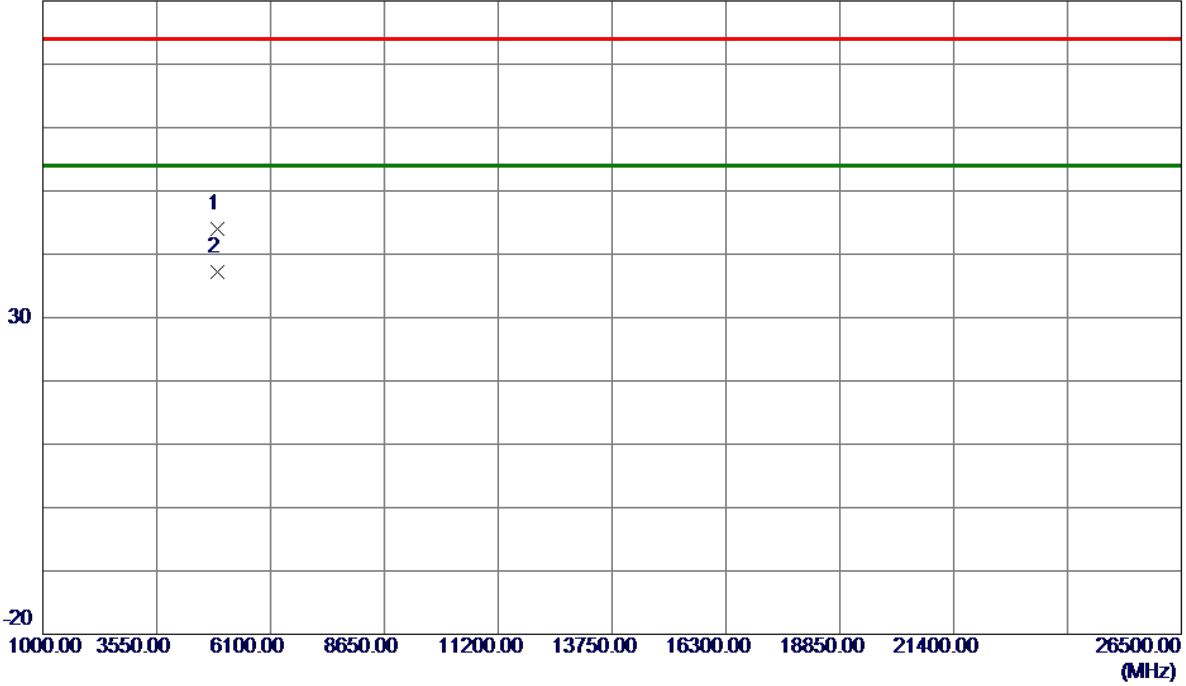


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2461.2000	97.17	6.61	103.78	54.00	49.78	AVG	No Limit
2	2461.9000	99.95	6.61	106.56	74.00	32.56	Peak	No Limit
3	2483.5000	46.22	6.61	52.83	74.00	-21.17	Peak	
4	2483.5000	37.77	6.61	44.38	54.00	-9.62	AVG	

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

**Horizontal**

80 dBuV/m

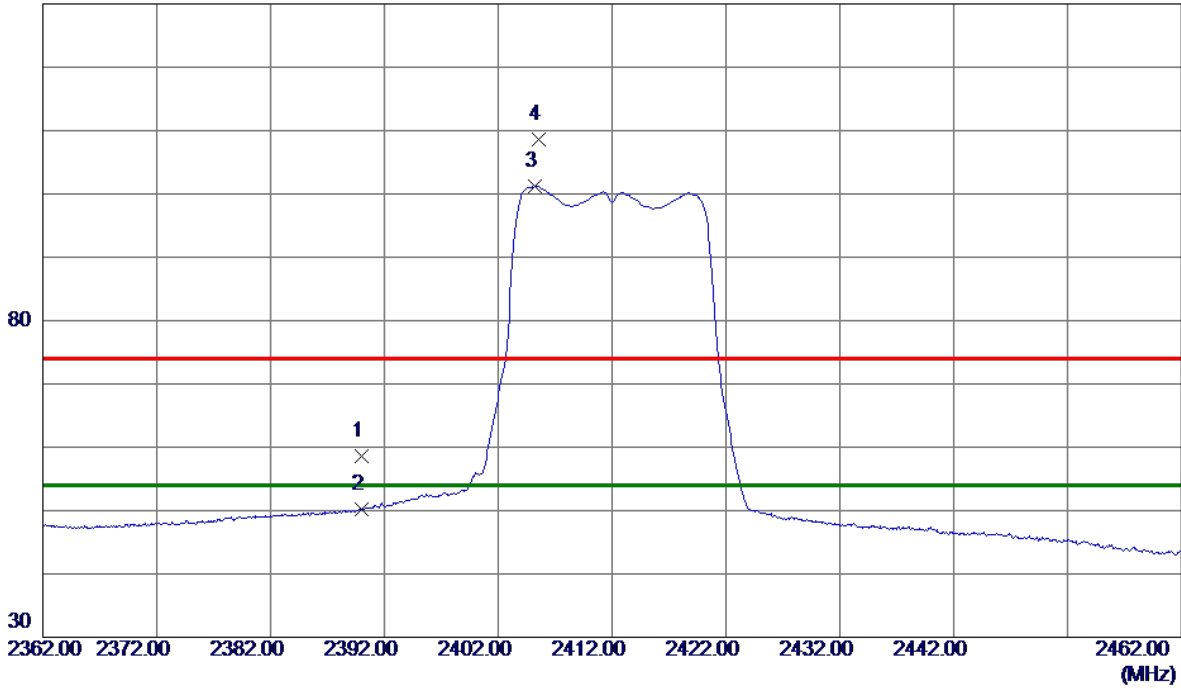


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4923.8000	40.30	3.79	44.09	74.00	-29.91	Peak	
2 *	4924.0000	33.33	3.79	37.12	54.00	-16.88	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

**Vertical**

130 dBuV/m

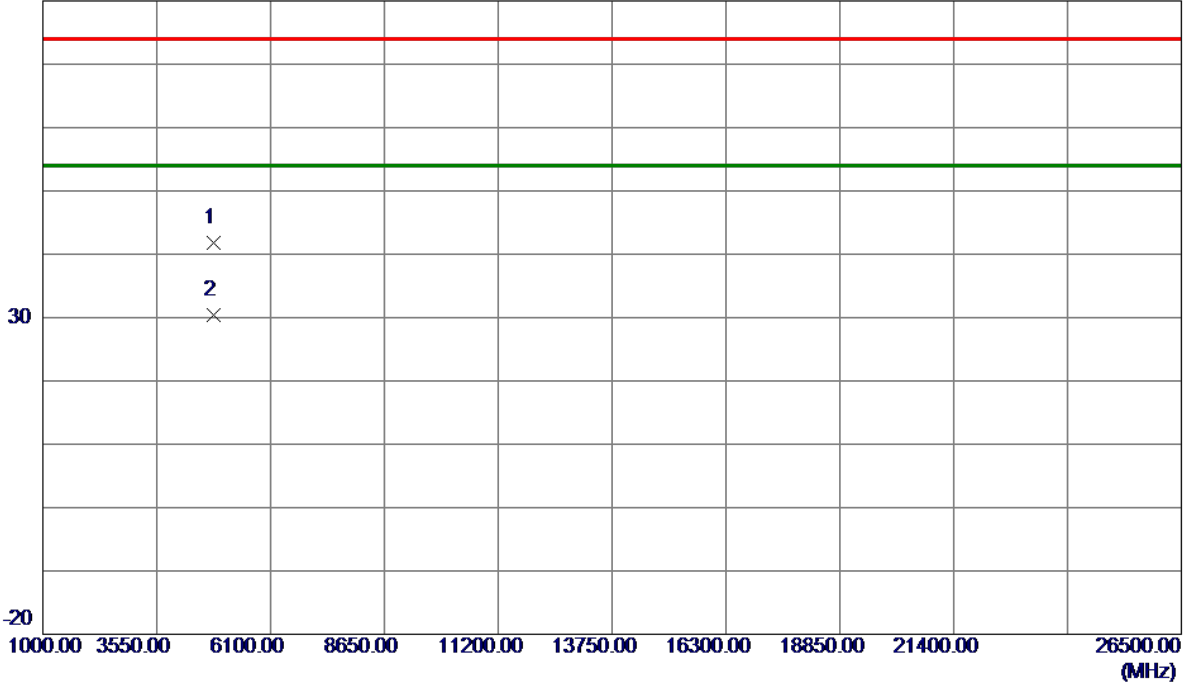


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	52.00	6.62	58.62	74.00	-15.38	Peak	
2	2390.0000	43.52	6.62	50.14	54.00	-3.86	AVG	
3 *	2405.2500	94.53	6.62	101.15	54.00	47.15	AVG	No Limit
4	2405.6000	102.04	6.62	108.66	74.00	34.66	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

**Vertical**

80 dBuV/m

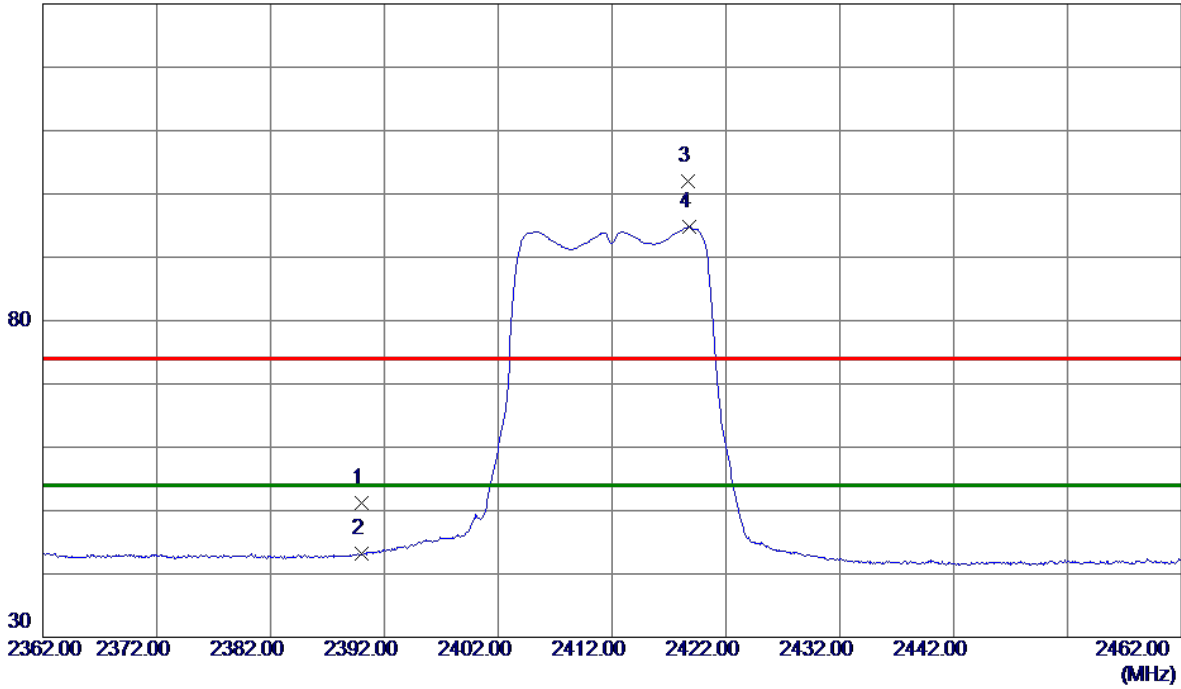


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4822.8640	38.24	3.57	41.81	74.00	-32.19	Peak	
2 *	4824.2590	26.75	3.57	30.32	54.00	-23.68	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

### Horizontal

130 dBuV/m

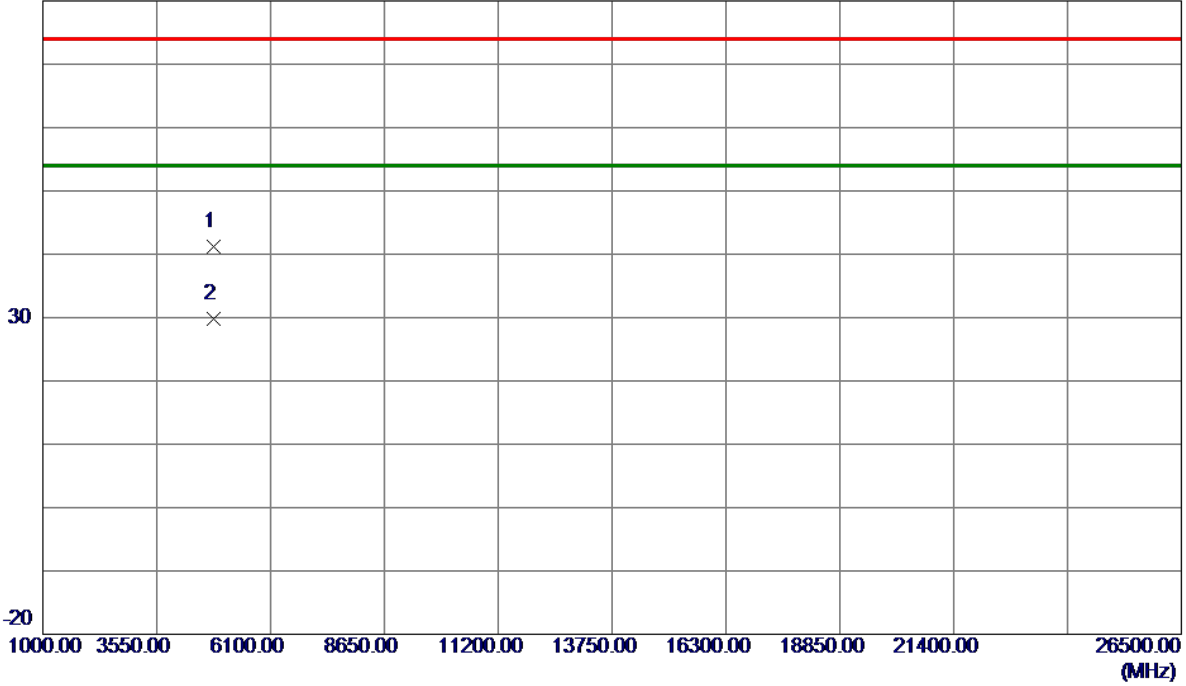


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	44.61	6.62	51.23	74.00	-22.77	Peak	
2	2390.0000	36.53	6.62	43.15	54.00	-10.85	AVG	
3	2418.7000	95.47	6.62	102.09	74.00	28.09	Peak	No Limit
4 *	2418.7500	88.17	6.62	94.79	54.00	40.79	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

### Horizontal

80 dBuV/m

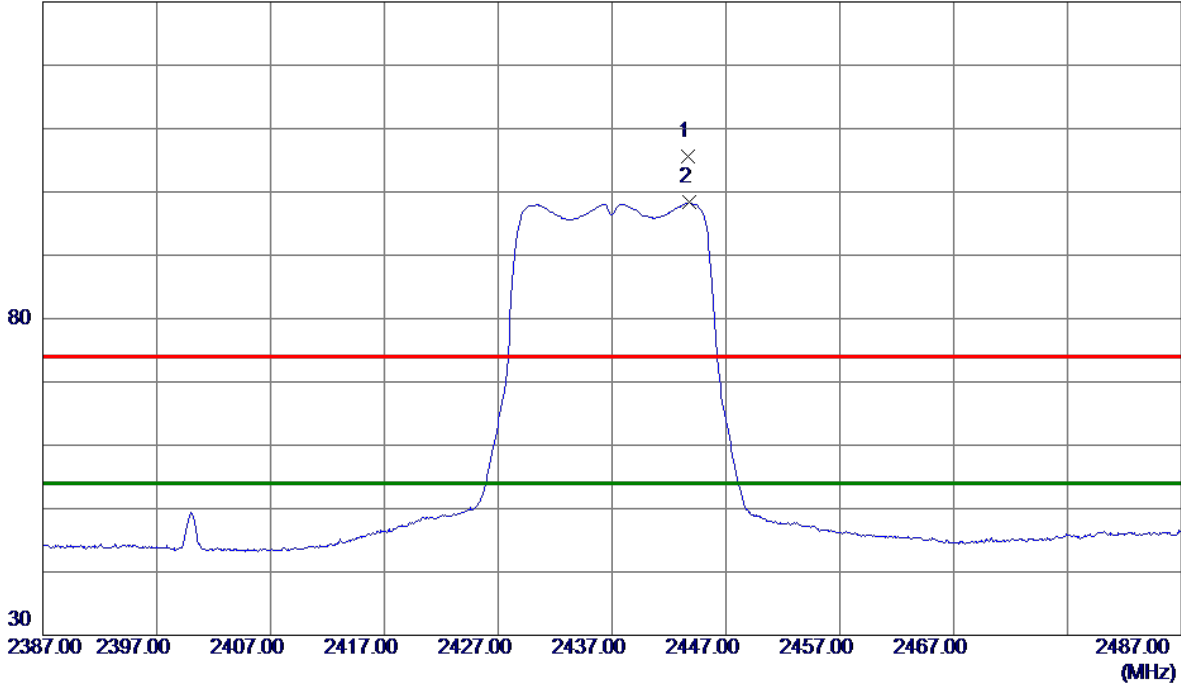


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4822.9490	37.67	3.57	41.24	74.00	-32.76	Peak	
2 *	4824.5920	26.31	3.57	29.88	54.00	-24.12	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

**Vertical**

130 dBuV/m

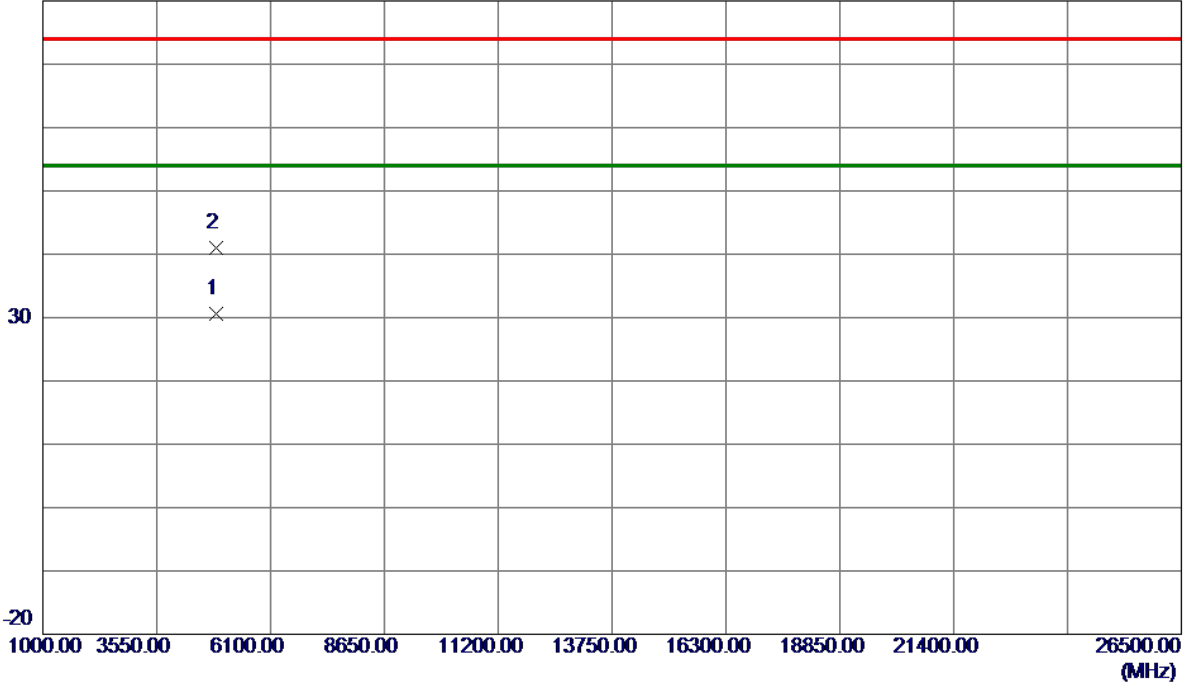


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2443.7000	98.97	6.61	105.58	74.00	31.58	Peak	No Limit
2 *	2443.7500	91.71	6.61	98.32	54.00	44.32	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

**Vertical**

80 dBuV/m

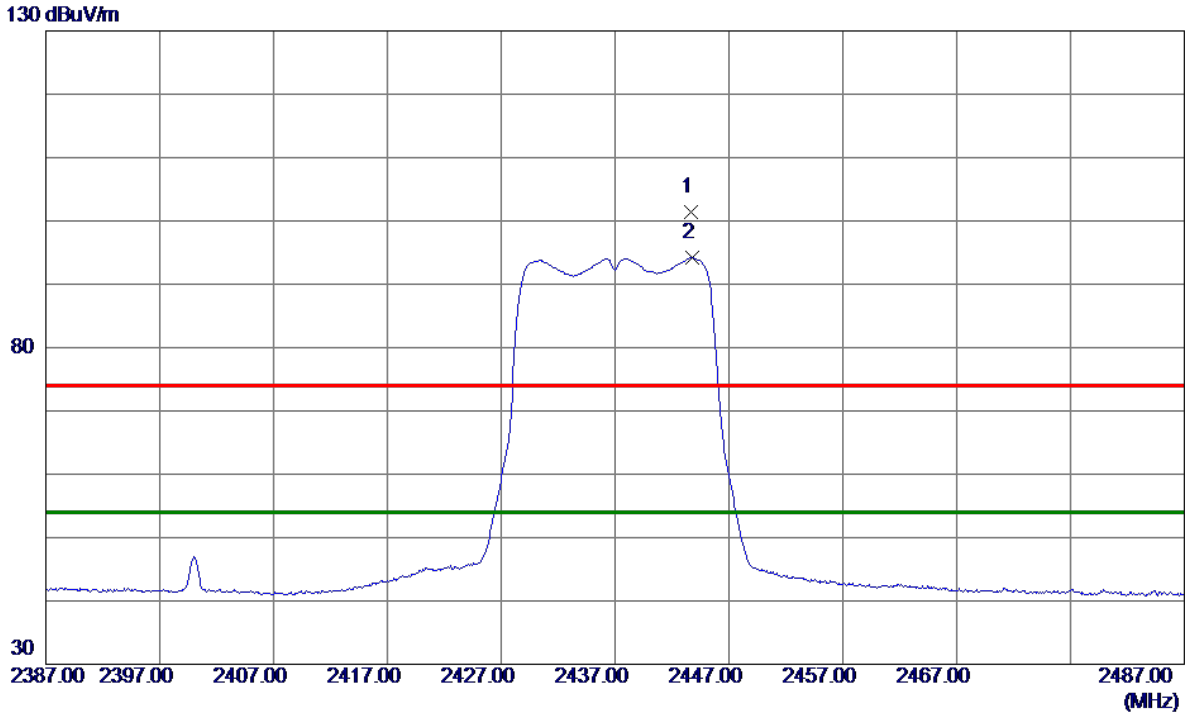


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4871.5350	26.98	3.68	30.66	54.00	-23.34	AVG	
2	4872.3350	37.25	3.68	40.93	74.00	-33.07	Peak	



Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

### Horizontal

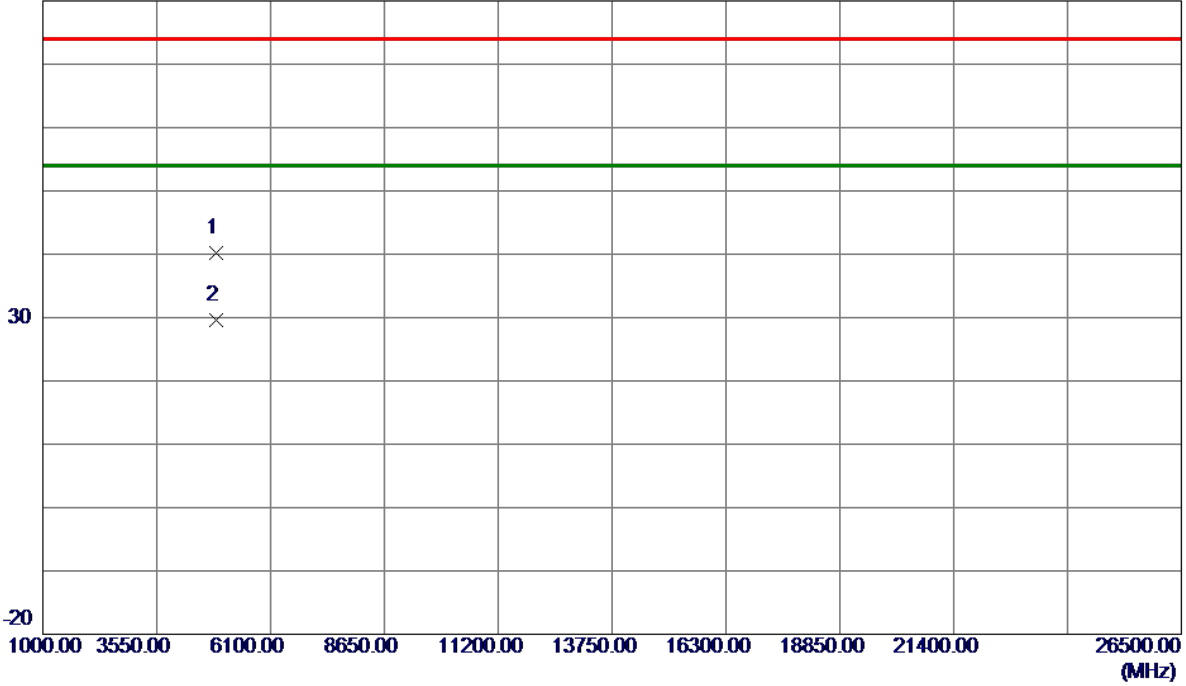


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2443.7000	94.83	6.61	101.44	74.00	27.44	Peak	No Limit
2 *	2443.7500	87.56	6.61	94.17	54.00	40.17	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

**Horizontal**

80 dBuV/m

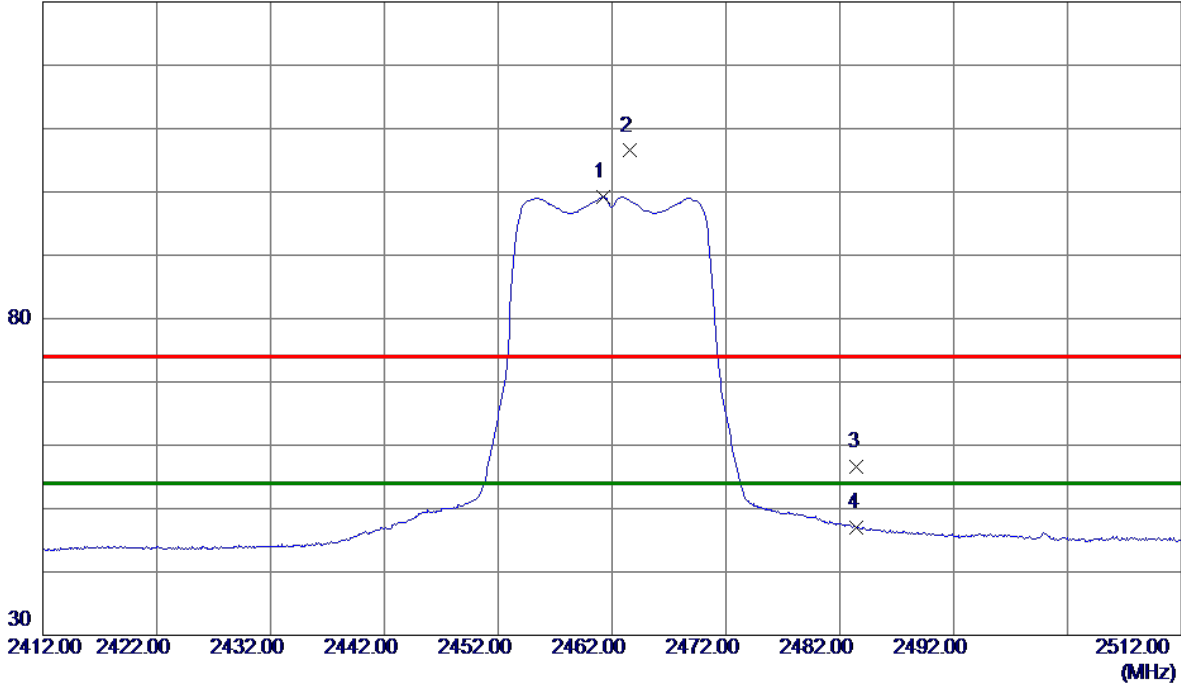


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4872.1130	36.54	3.68	40.22	74.00	-33.78	Peak	
2 *	4872.3150	25.87	3.68	29.55	54.00	-24.45	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

**Vertical**

130 dBuV/m

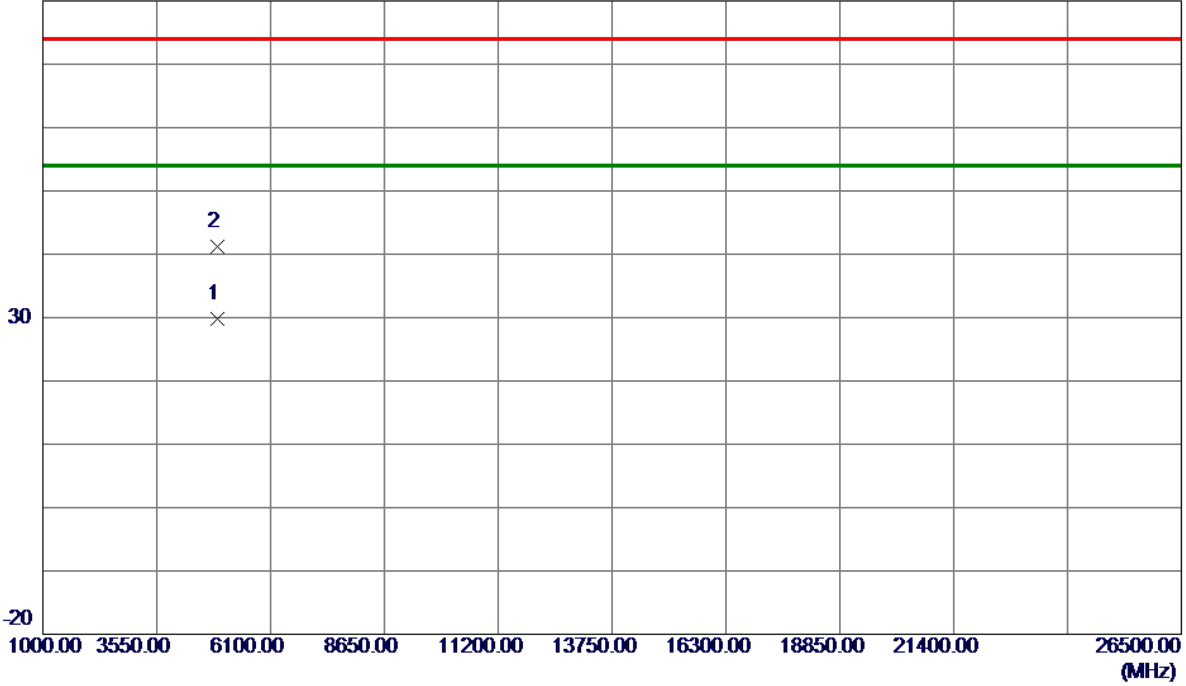


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2461.2000	92.57	6.61	99.18	54.00	45.18	AVG	No Limit
2	2463.5500	99.89	6.61	106.50	74.00	32.50	Peak	No Limit
3	2483.5000	49.99	6.61	56.60	74.00	-17.40	Peak	
4	2483.5000	40.32	6.61	46.93	54.00	-7.07	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

**Vertical**

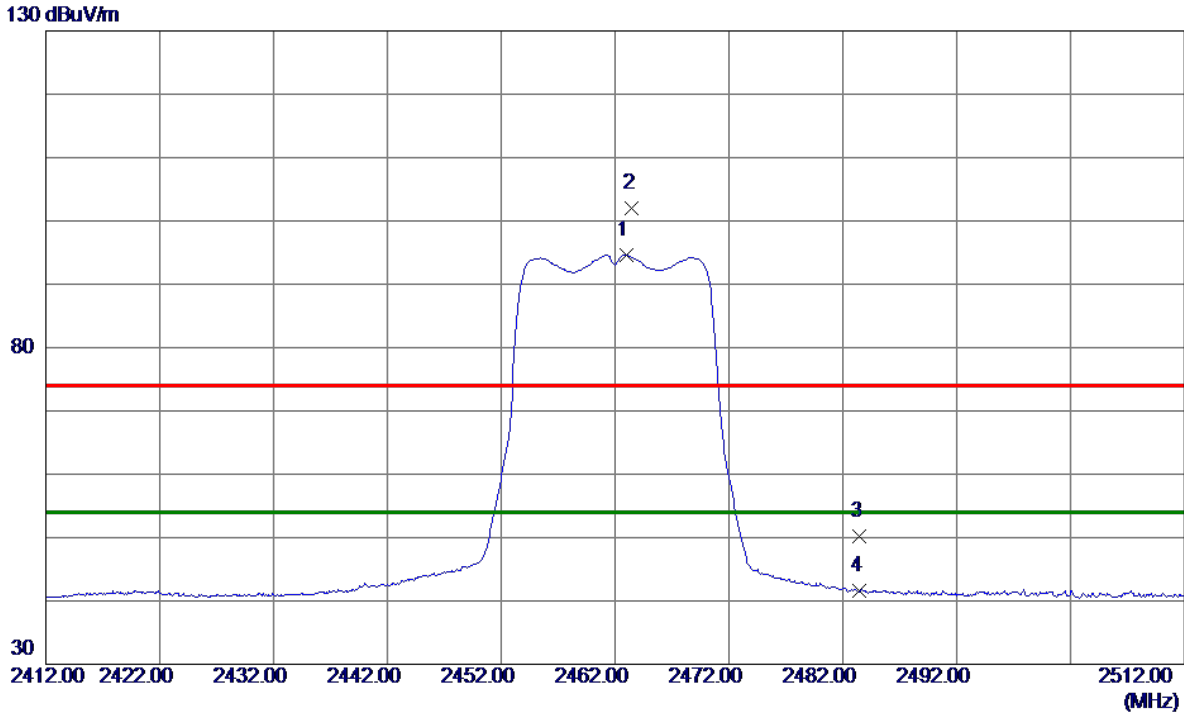
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4922.3100	26.05	3.79	29.84	54.00	-24.16	AVG	
2	4923.2430	37.34	3.79	41.13	74.00	-32.87	Peak	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

**Horizontal**

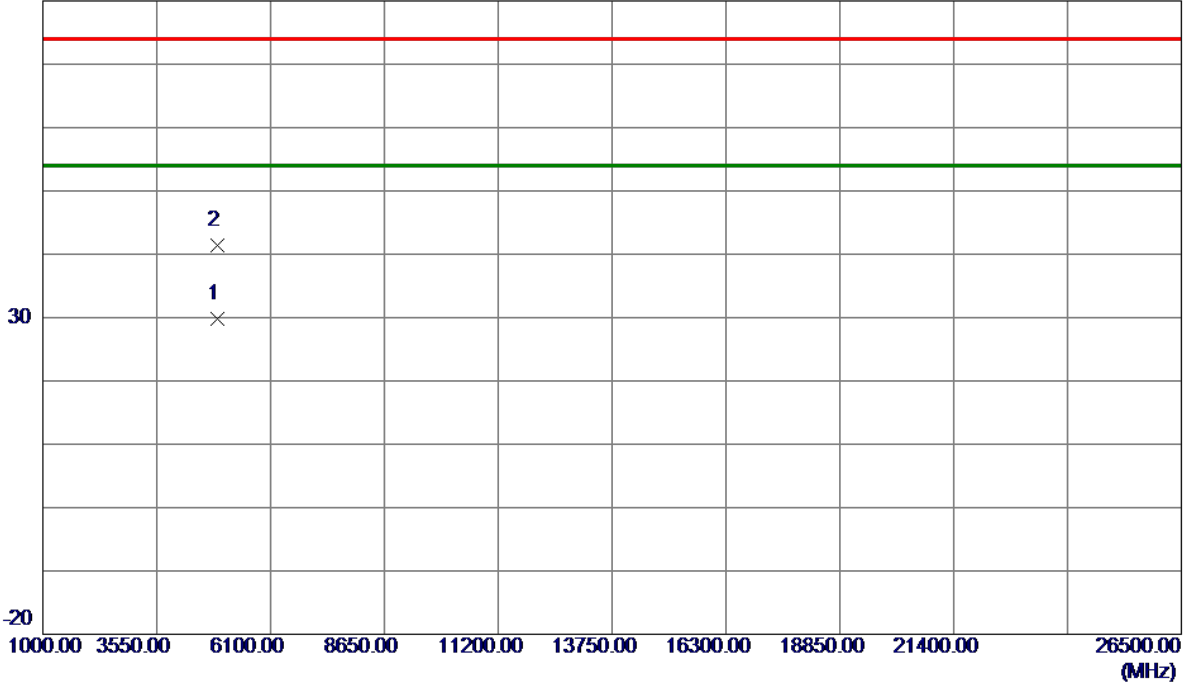


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2462.9500	88.00	6.61	94.61	54.00	40.61	AVG	No Limit
2	2463.5000	95.32	6.61	101.93	74.00	27.93	Peak	No Limit
3	2483.5000	43.54	6.61	50.15	74.00	-23.85	Peak	
4	2483.5000	34.99	6.61	41.60	54.00	-12.40	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

**Horizontal**

80 dBuV/m

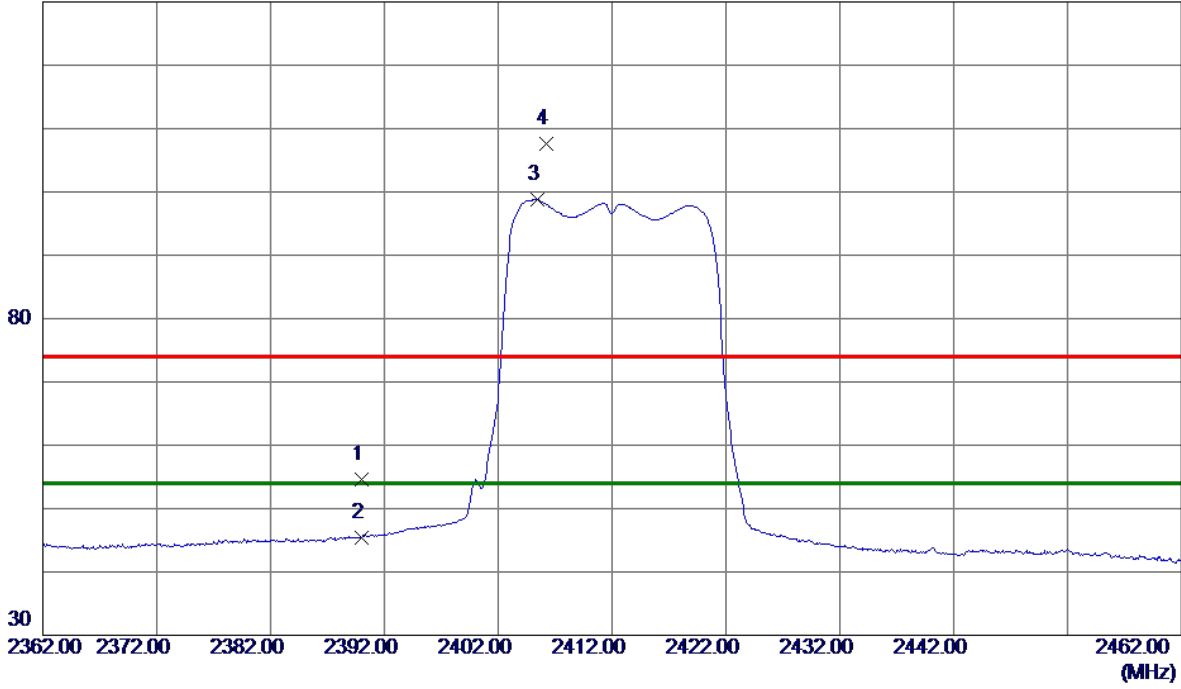


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4921.5600	26.07	3.79	29.86	54.00	-24.14	AVG	
2	4923.3180	37.61	3.79	41.40	74.00	-32.60	Peak	

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2412 MHz

**Vertical**

130 dBuV/m

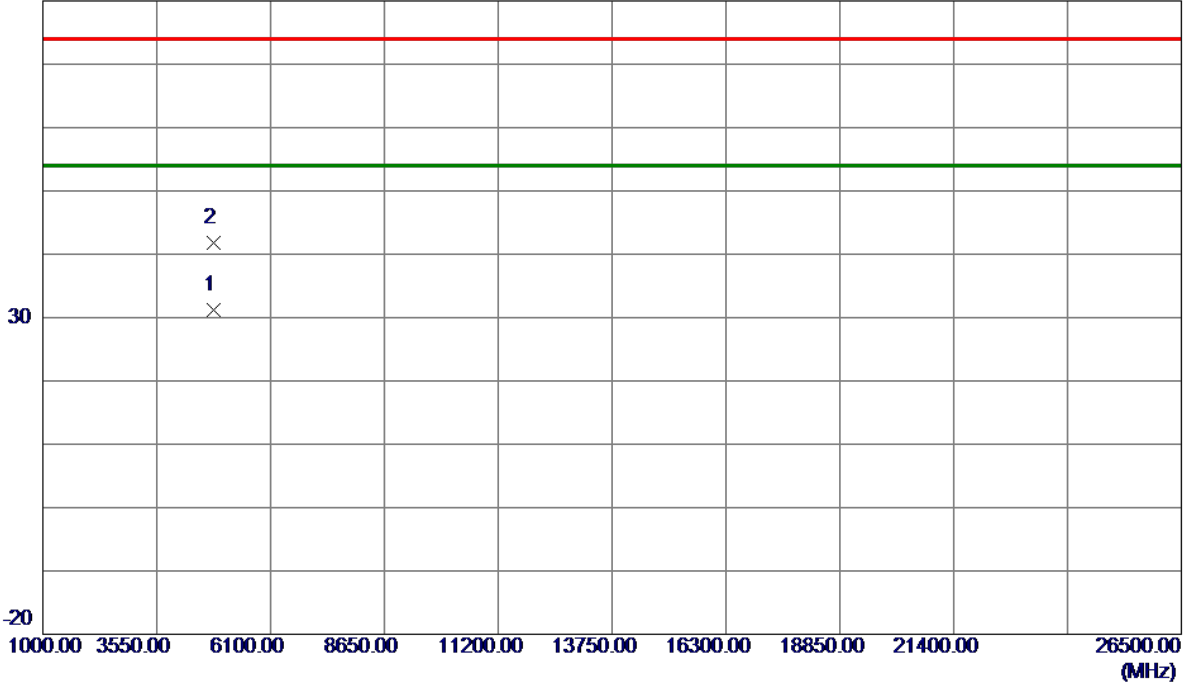


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	48.03	6.62	54.65	74.00	-19.35	Peak	
2	2390.0000	38.83	6.62	45.45	54.00	-8.55	AVG	
3 *	2405.4000	92.13	6.62	98.75	54.00	44.75	AVG	No Limit
4	2406.2300	100.89	6.62	107.51	74.00	33.51	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2412 MHz

**Vertical**

80 dBuV/m



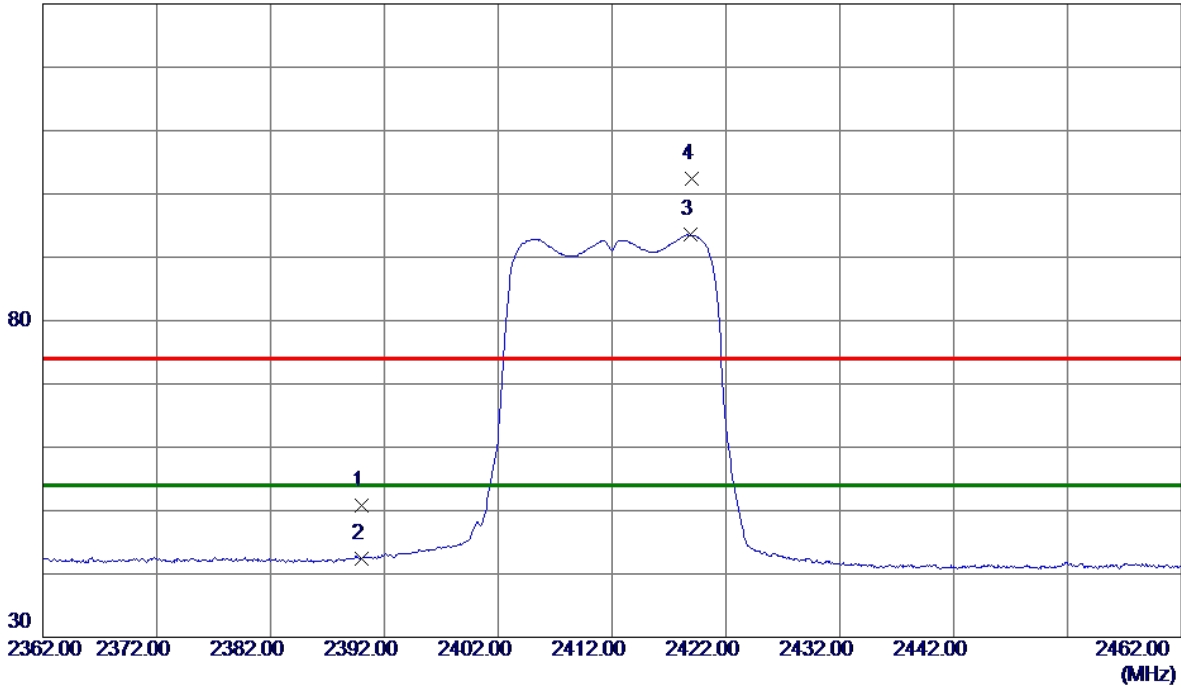
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4822.4580	27.54	3.57	31.11	54.00	-22.89	AVG	
2	4826.1700	38.18	3.58	41.76	74.00	-32.24	Peak	



Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2412 MHz

### Horizontal

130 dBuV/m

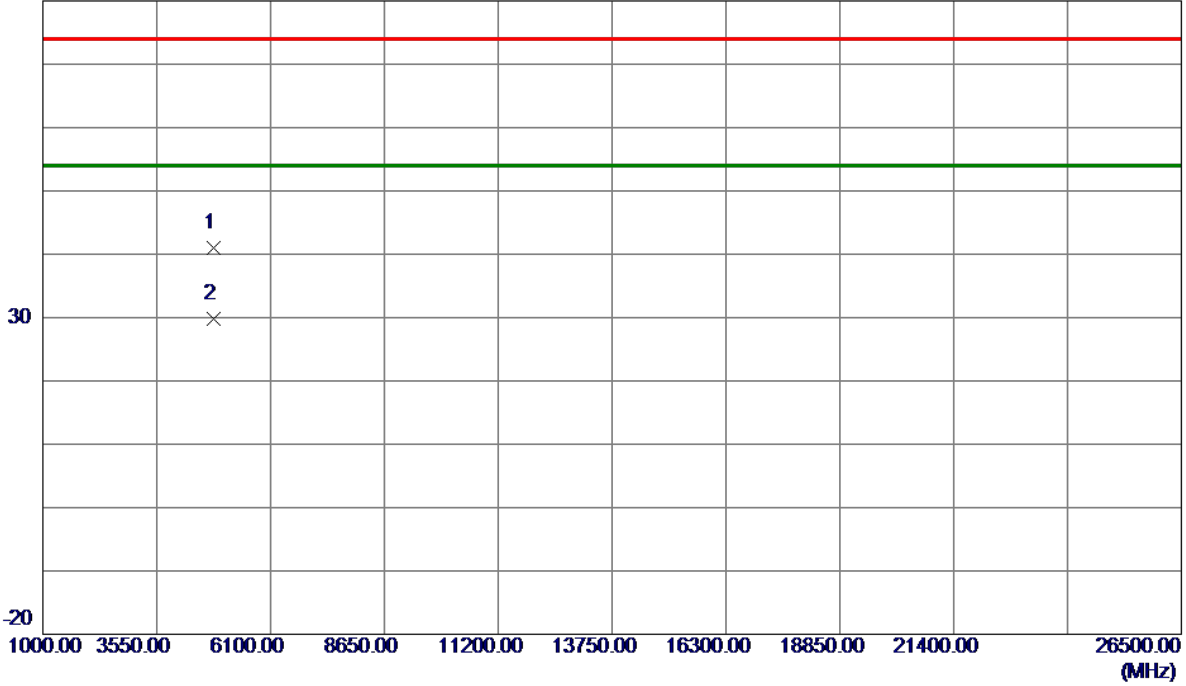


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	44.20	6.62	50.82	74.00	-23.18	Peak	
2	2390.0000	35.75	6.62	42.37	54.00	-11.63	AVG	
3 *	2418.8500	86.92	6.62	93.54	54.00	39.54	AVG	No Limit
4	2418.9500	95.81	6.62	102.43	74.00	28.43	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2412 MHz

**Horizontal**

80 dBuV/m

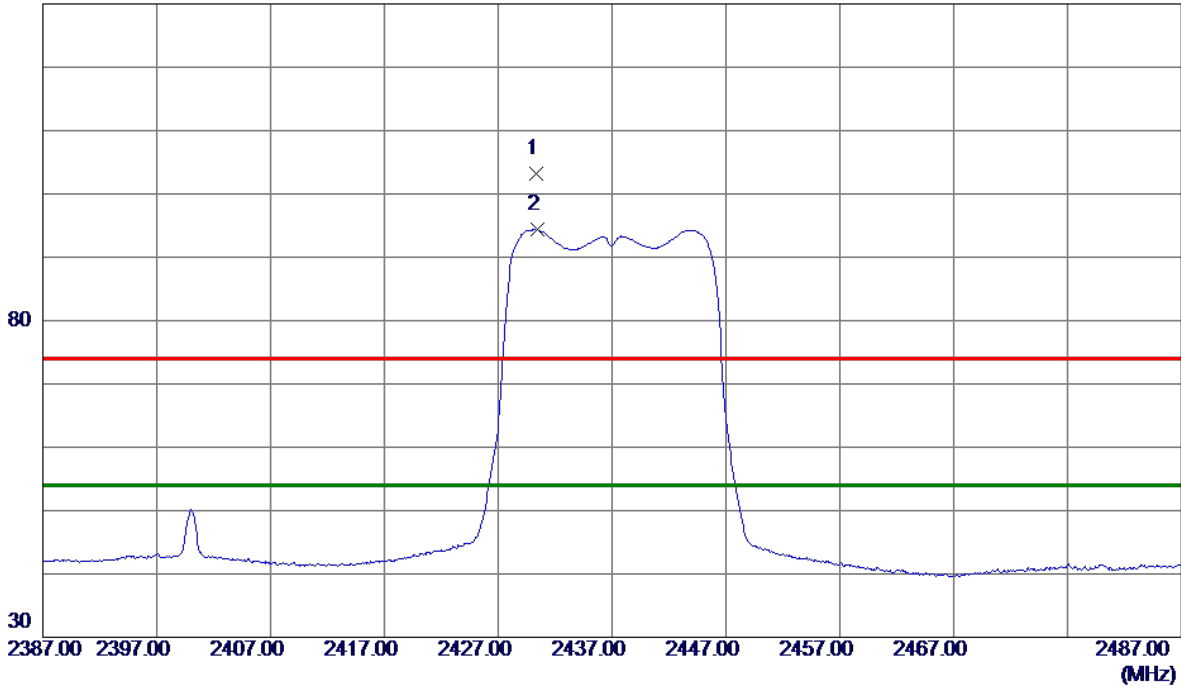


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4823.9850	37.49	3.57	41.06	74.00	-32.94	Peak	
2 *	4824.4880	26.19	3.57	29.76	54.00	-24.24	AVG	

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2437 MHz

**Vertical**

130 dBuV/m

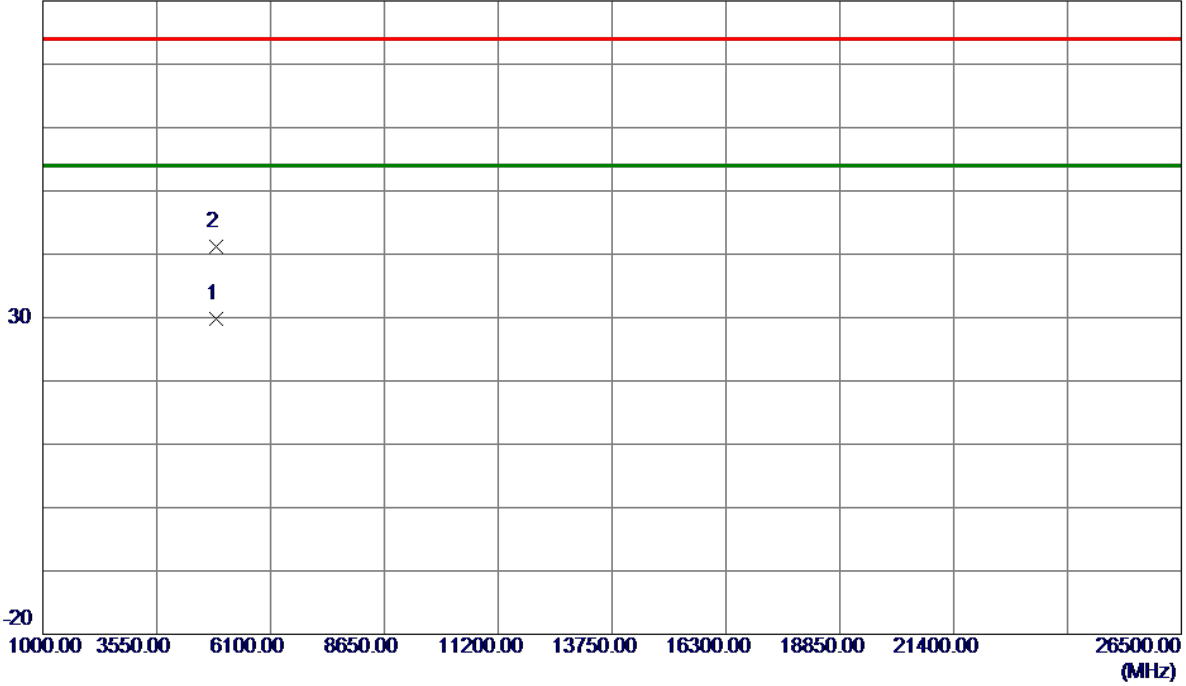


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2430.3000	96.50	6.62	103.12	74.00	29.12	Peak	No Limit
2 *	2430.4000	87.74	6.62	94.36	54.00	40.36	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2437 MHz

**Vertical**

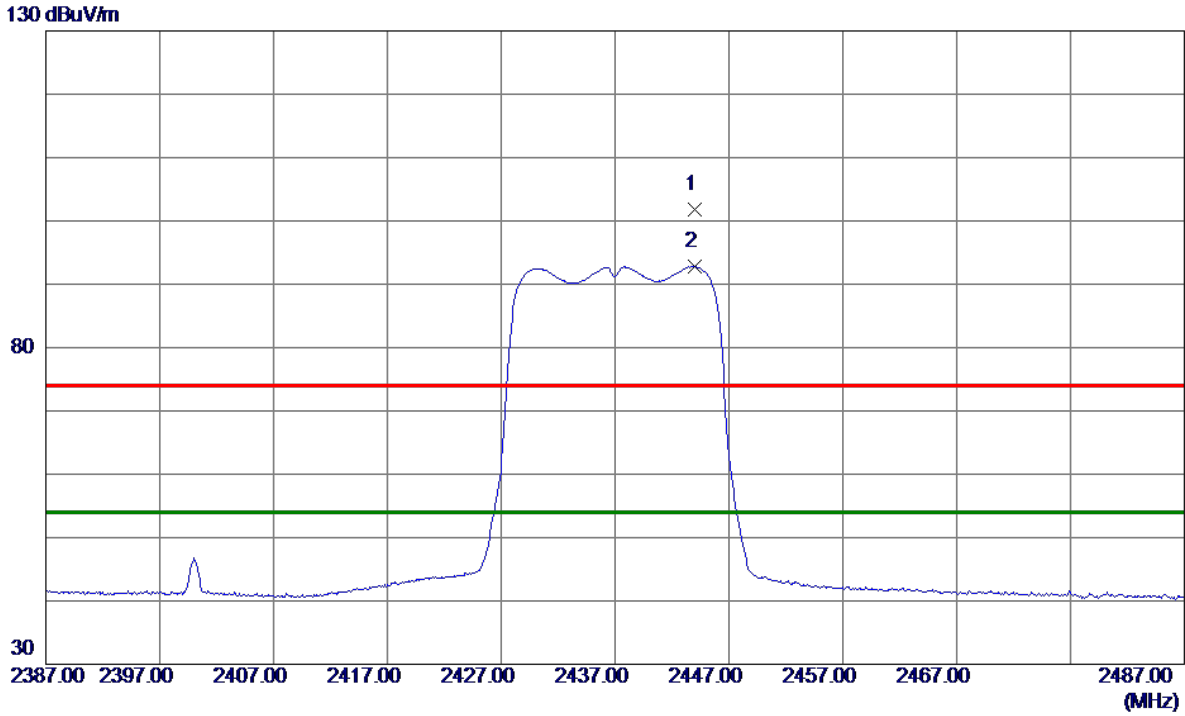
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4871.6400	26.13	3.68	29.81	54.00	-24.19	AVG	
2	4876.0700	37.47	3.69	41.16	74.00	-32.84	Peak	

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2437 MHz

### Horizontal

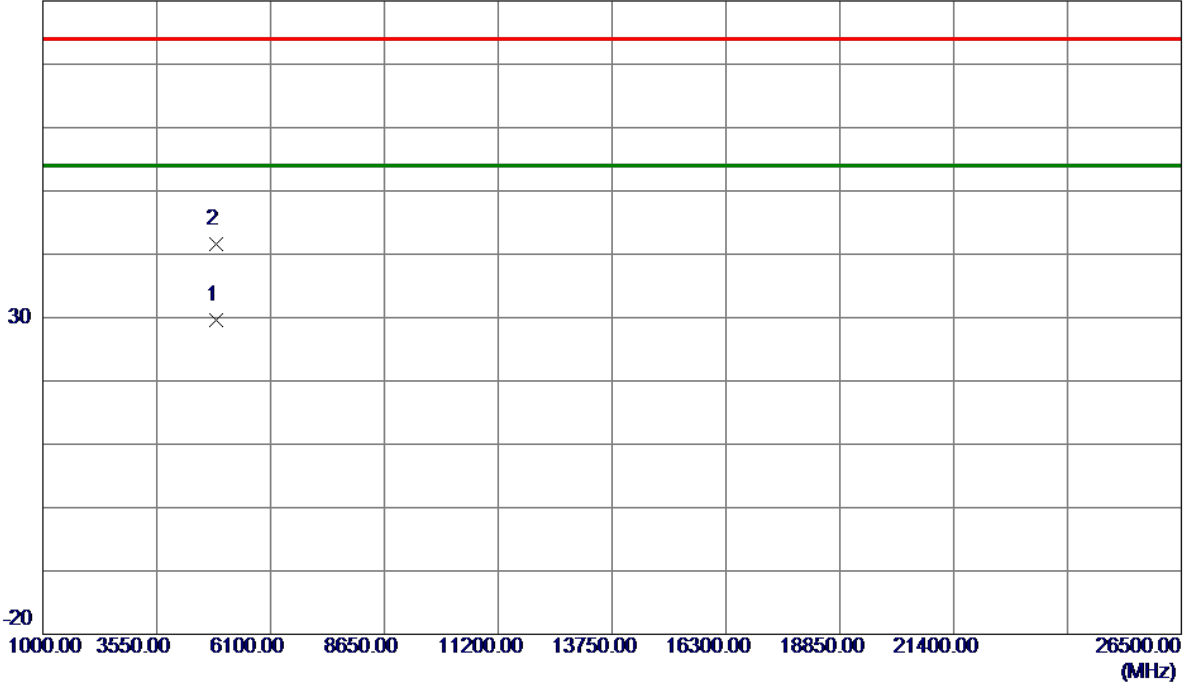


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2444.0000	95.19	6.61	101.80	74.00	27.80	Peak	No Limit
2 *	2444.0500	86.21	6.61	92.82	54.00	38.82	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2437 MHz

**Horizontal**

80 dBuV/m

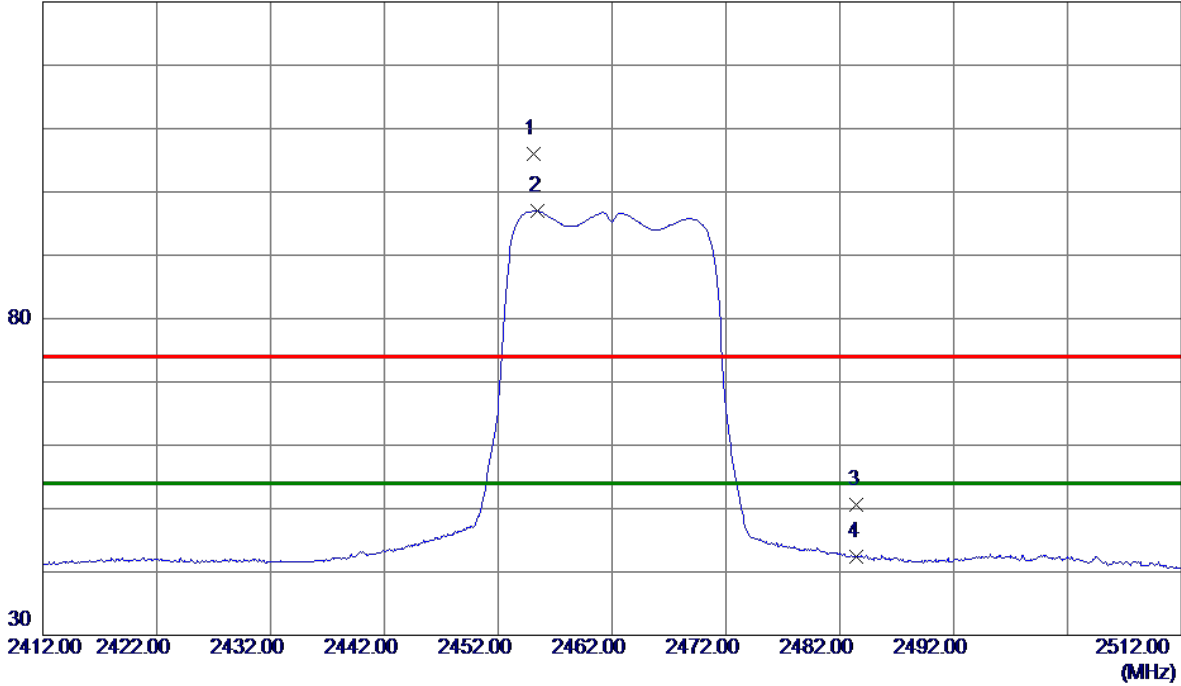


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4872.2730	25.83	3.68	29.51	54.00	-24.49	AVG	
2	4875.5070	37.85	3.68	41.53	74.00	-32.47	Peak	

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2462 MHz

**Vertical**

130 dBuV/m

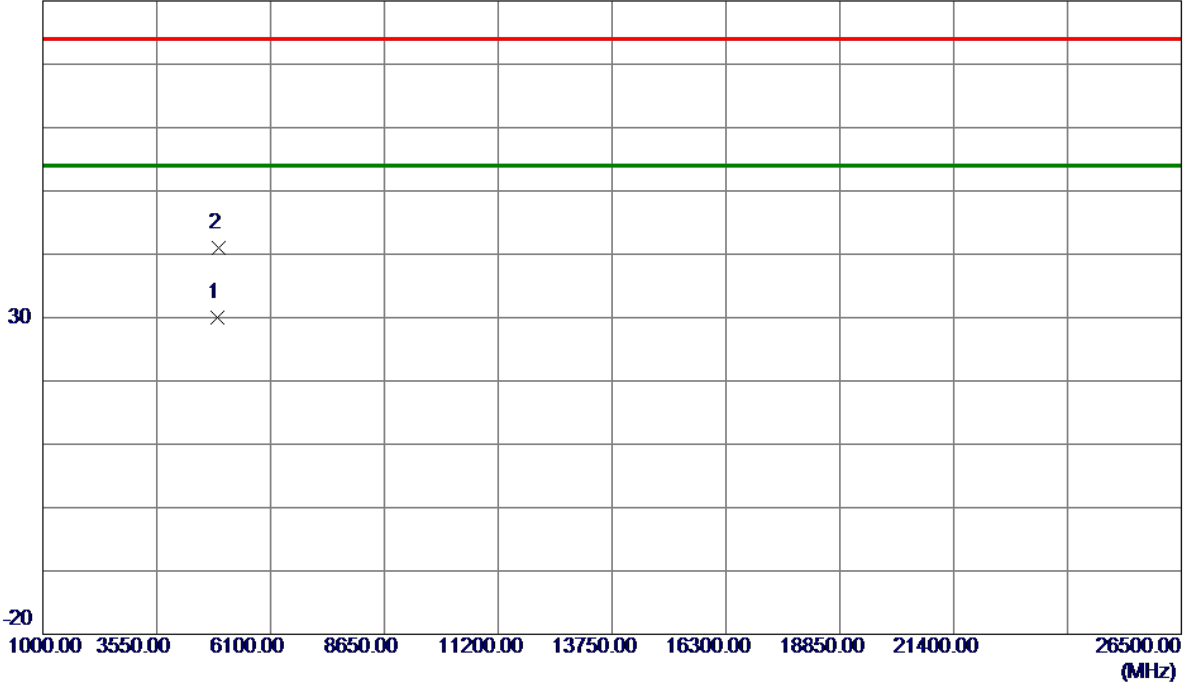


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2455.1000	99.36	6.61	105.97	74.00	31.97	Peak	No Limit
2 *	2455.5000	90.41	6.61	97.02	54.00	43.02	AVG	No Limit
3	2483.5000	44.00	6.61	50.61	74.00	-23.39	Peak	
4	2483.5000	35.78	6.61	42.39	54.00	-11.61	AVG	

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2462 MHz

**Vertical**

80 dBuV/m

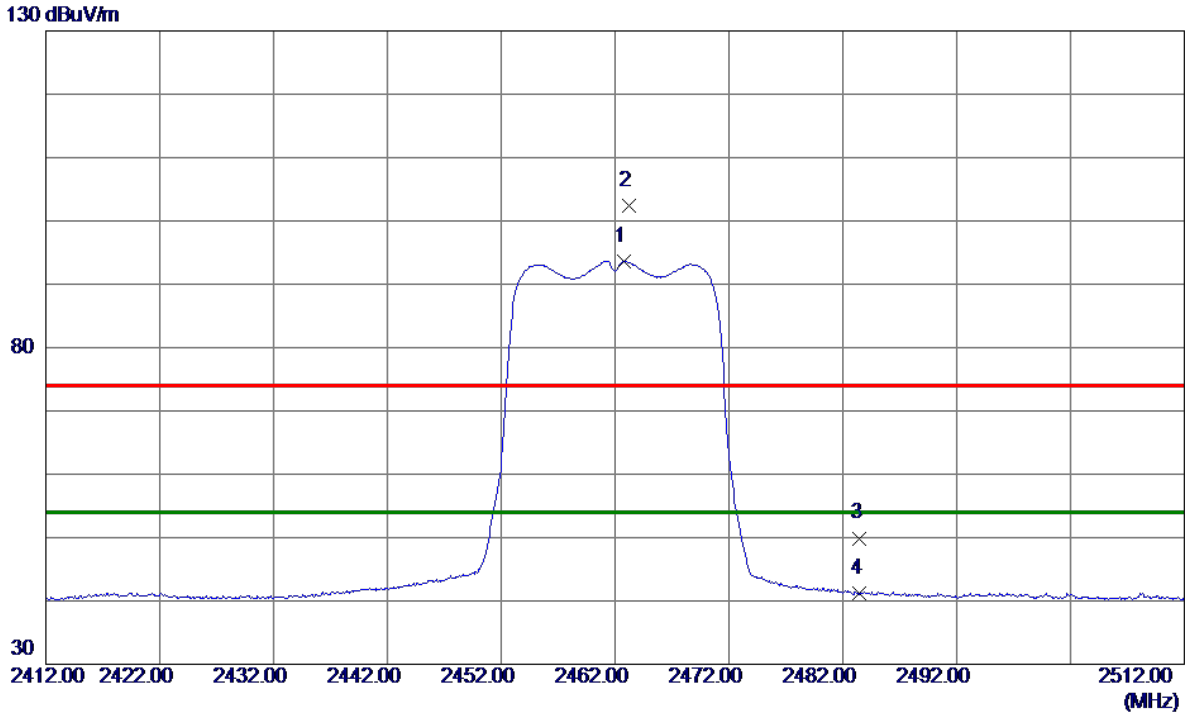


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4922.0470	26.30	3.79	30.09	54.00	-23.91	AVG	
2	4925.7100	37.13	3.80	40.93	74.00	-33.07	Peak	



Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2462 MHz

**Horizontal**

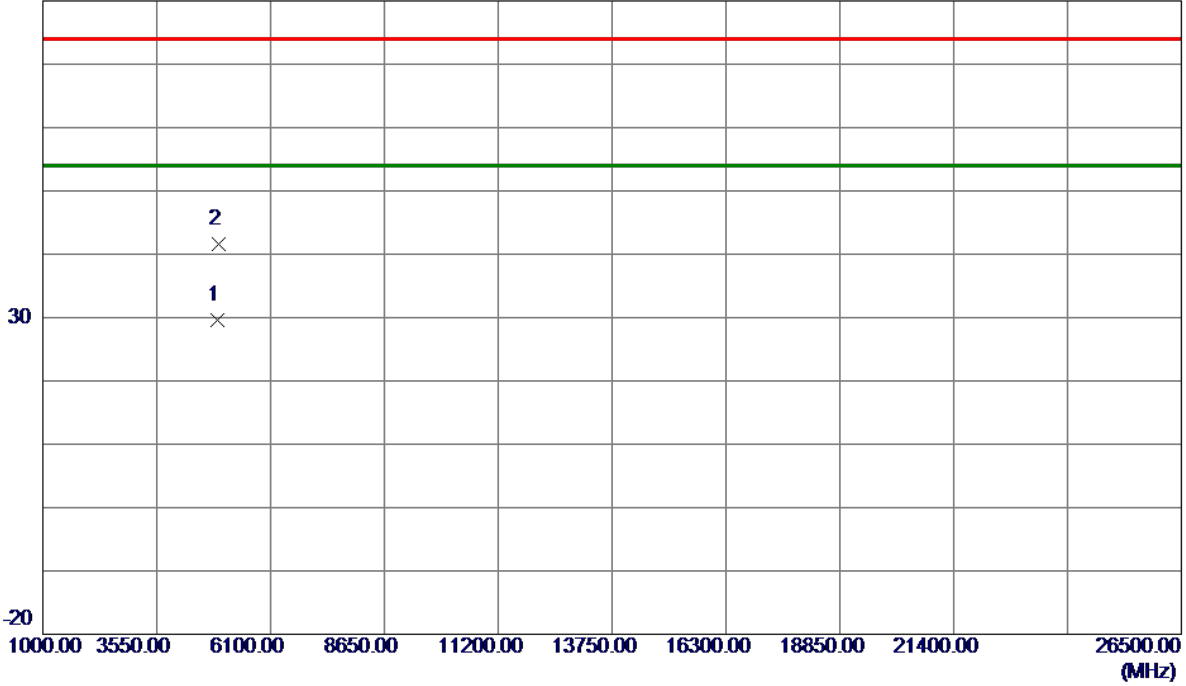


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2462.7500	87.05	6.61	93.66	54.00	39.66	AVG	No Limit
2	2463.2000	95.78	6.61	102.39	74.00	28.39	Peak	No Limit
3	2483.5000	43.29	6.61	49.90	74.00	-24.10	Peak	
4	2483.5000	34.59	6.61	41.20	54.00	-12.80	AVG	

Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2462 MHz

**Horizontal**

80 dBuV/m

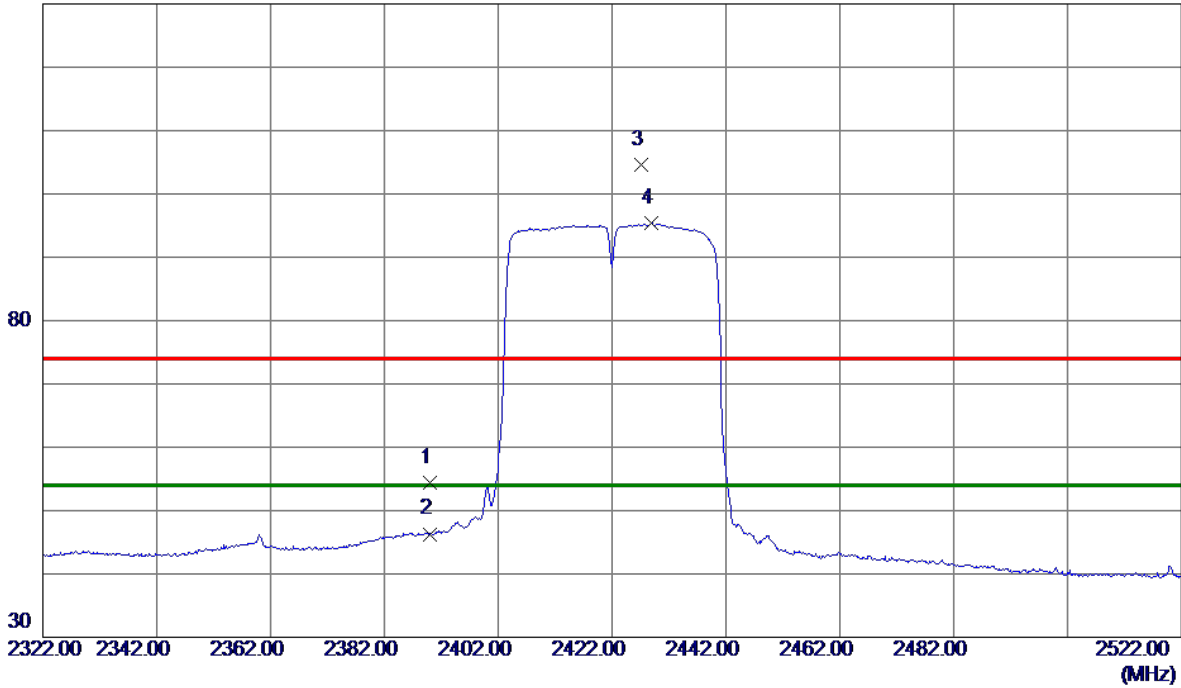


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4922.2780	25.85	3.79	29.64	54.00	-24.36	AVG	
2	4926.1880	37.72	3.80	41.52	74.00	-32.48	Peak	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

**Vertical**

130 dBuV/m

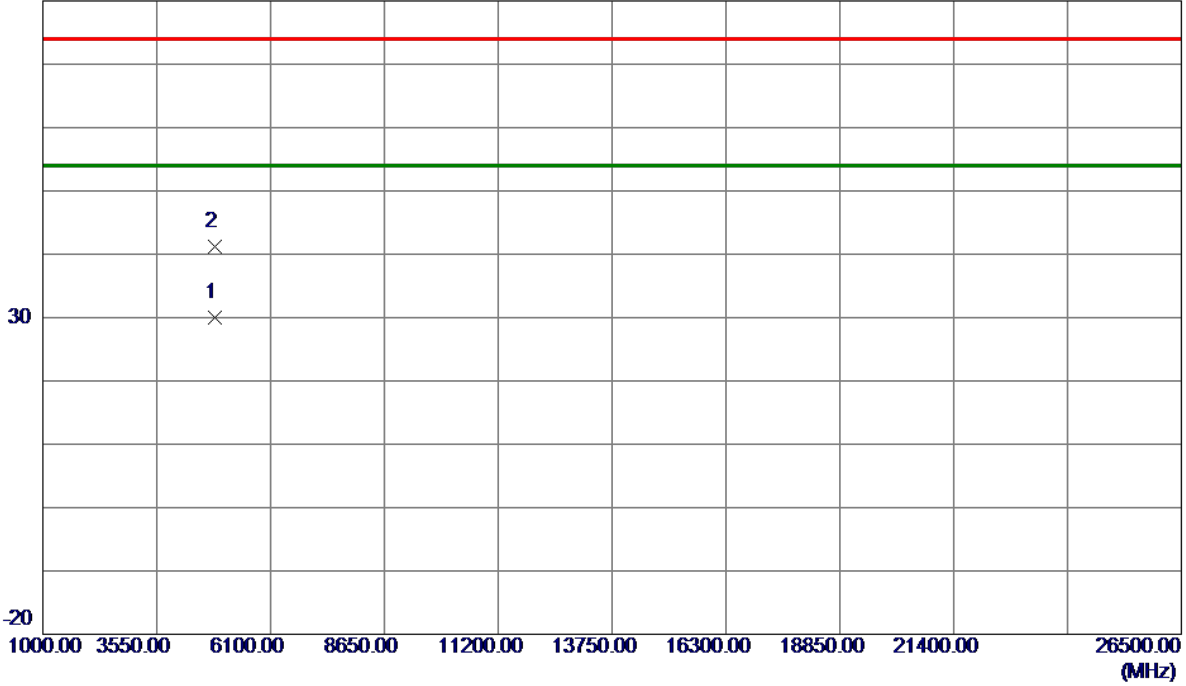


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	47.70	6.62	54.32	74.00	-19.68	Peak	
2	2390.0000	39.68	6.62	46.30	54.00	-7.70	AVG	
3	2427.2000	97.97	6.62	104.59	74.00	30.59	Peak	No Limit
4 *	2428.9000	88.71	6.62	95.33	54.00	41.33	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

**Vertical**

80 dBuV/m

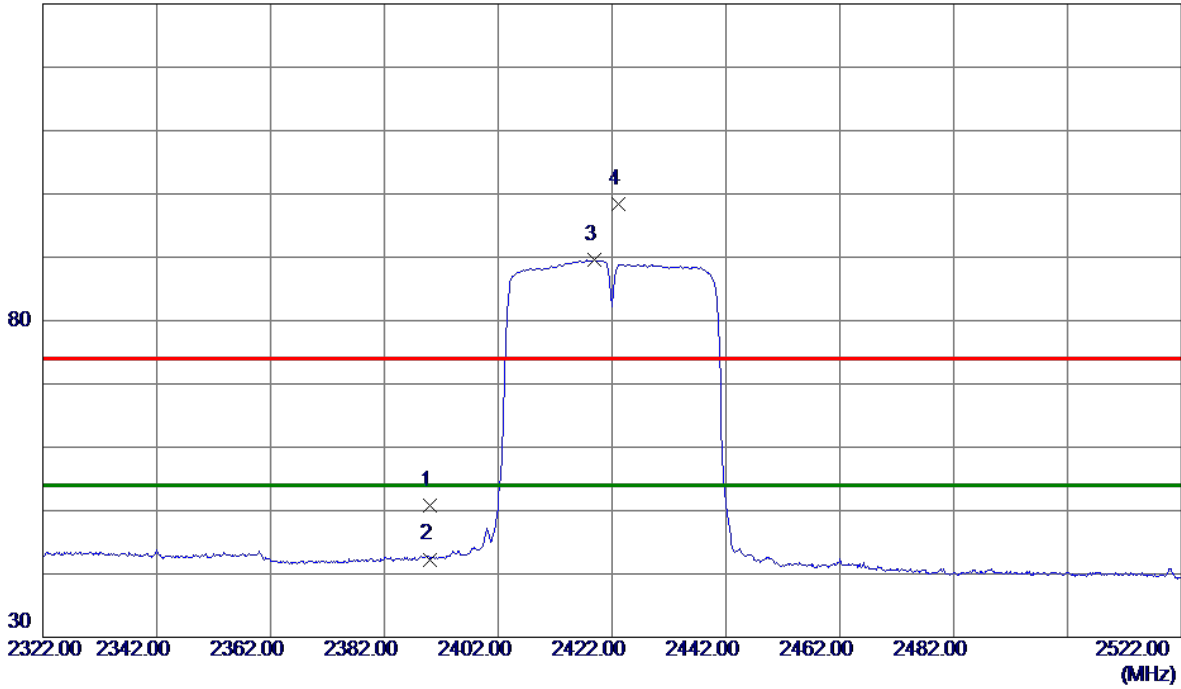


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4844.0950	26.45	3.62	30.07	54.00	-23.93	AVG	
2	4845.8150	37.56	3.62	41.18	74.00	-32.82	Peak	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

### Horizontal

130 dBuV/m

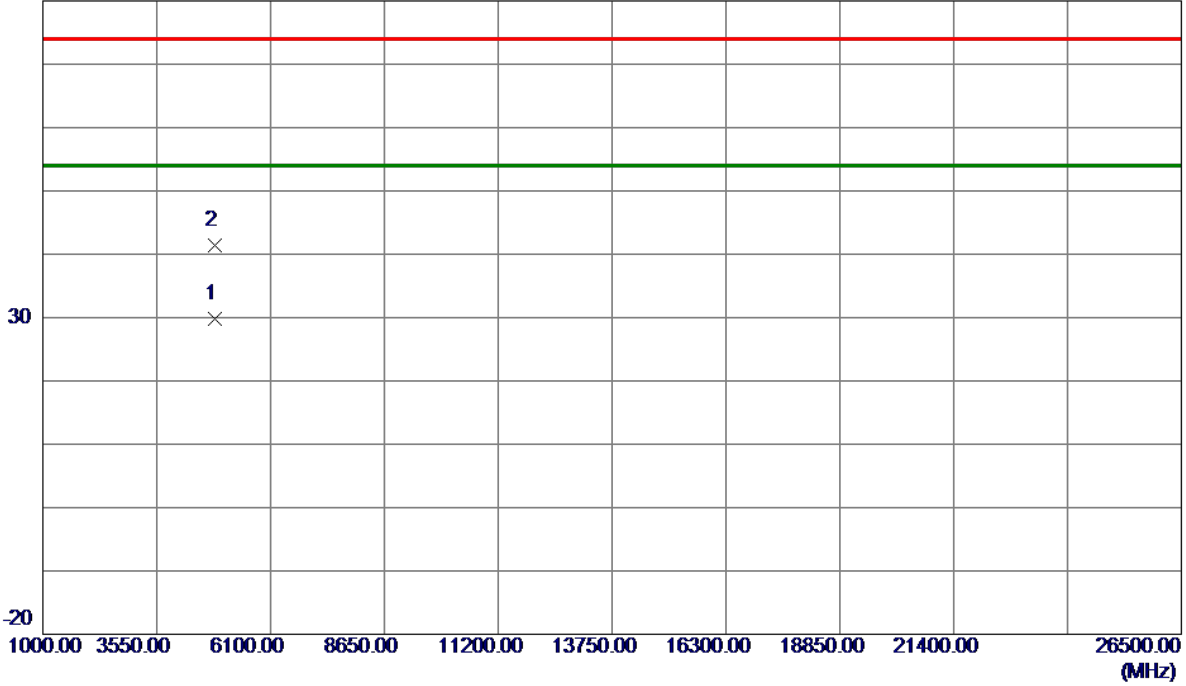


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	44.15	6.62	50.77	74.00	-23.23	Peak	
2	2390.0000	35.68	6.62	42.30	54.00	-11.70	AVG	
3 *	2418.9000	82.95	6.62	89.57	54.00	35.57	AVG	No Limit
4	2423.2000	91.80	6.62	98.42	74.00	24.42	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

**Horizontal**

80 dBuV/m

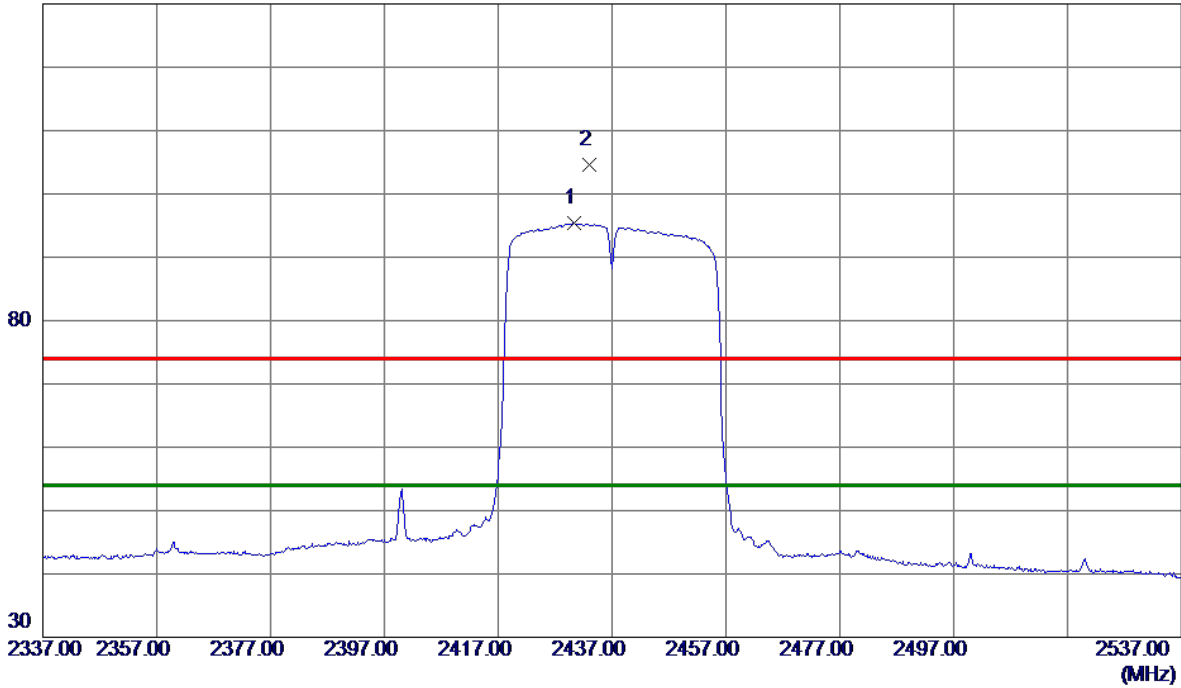


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4845.5730	26.20	3.62	29.82	54.00	-24.18	AVG	
2	4846.4270	37.74	3.62	41.36	74.00	-32.64	Peak	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

**Vertical**

130 dBuV/m

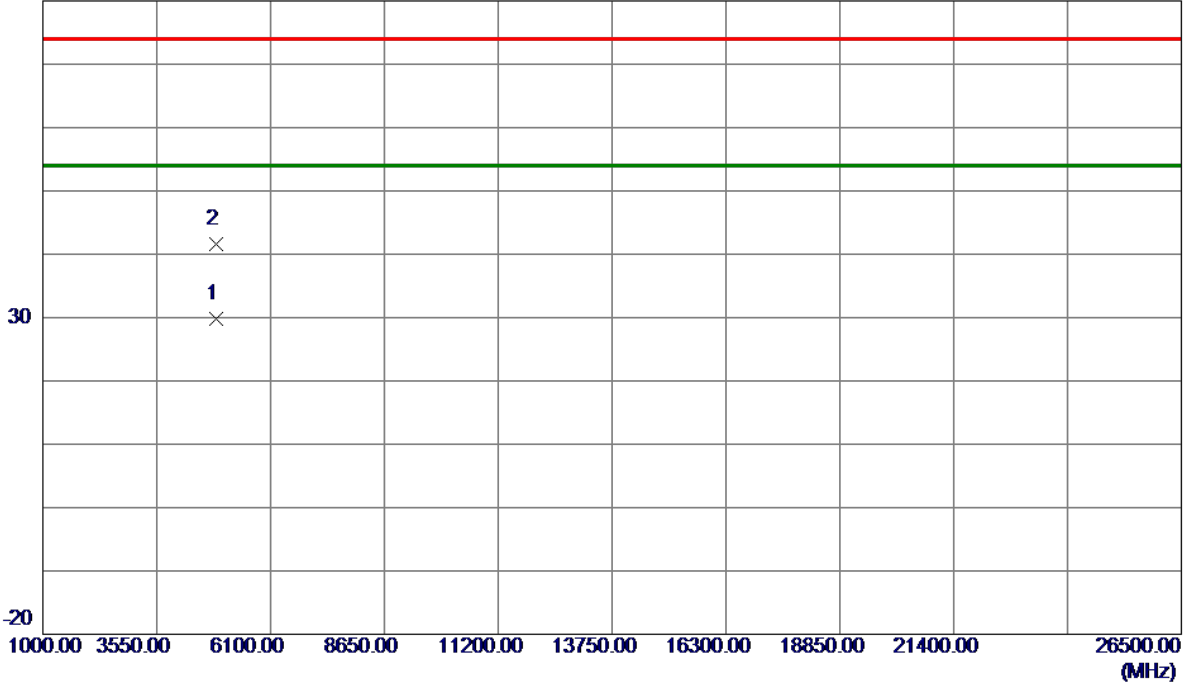


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2430.3000	88.79	6.62	95.41	54.00	41.41	AVG	No Limit
2	2433.0000	98.07	6.62	104.69	74.00	30.69	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

**Vertical**

80 dBuV/m

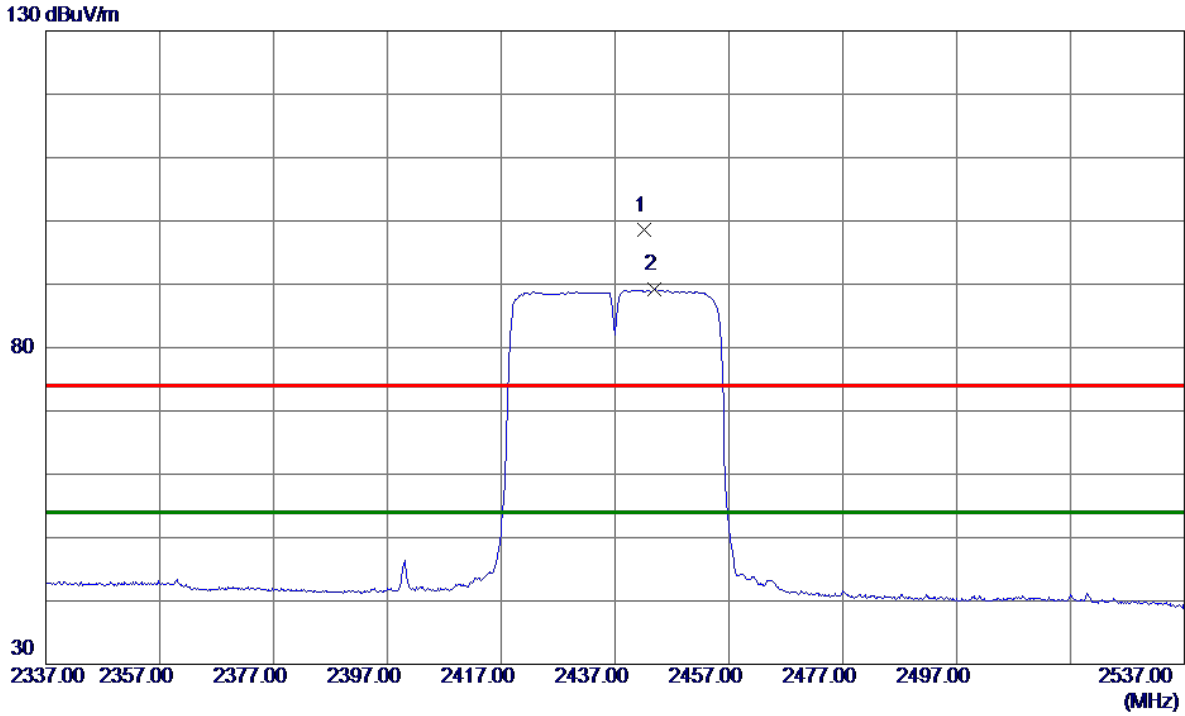


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4872.0019	26.09	3.68	29.77	54.00	-24.23	AVG	
2	4872.4080	37.92	3.68	41.60	74.00	-32.40	Peak	



Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

### Horizontal

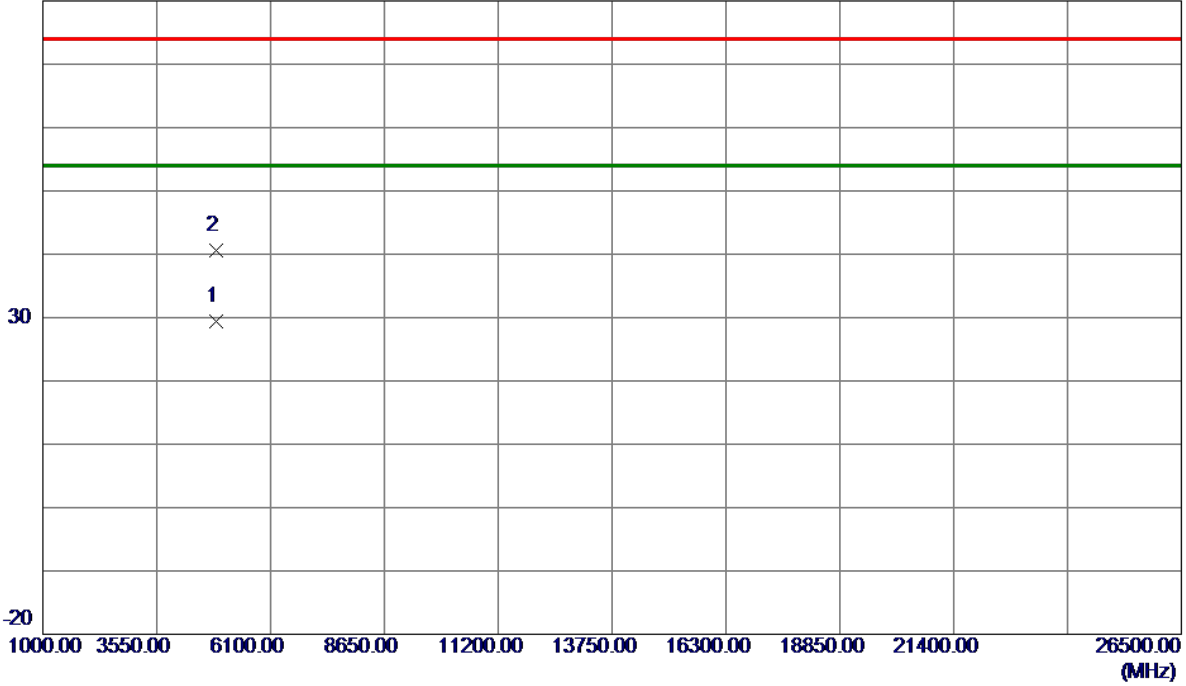


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2442.1000	91.89	6.61	98.50	74.00	24.50	Peak	No Limit
2 *	2443.9000	82.51	6.61	89.12	54.00	35.12	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

### Horizontal

80 dBuV/m

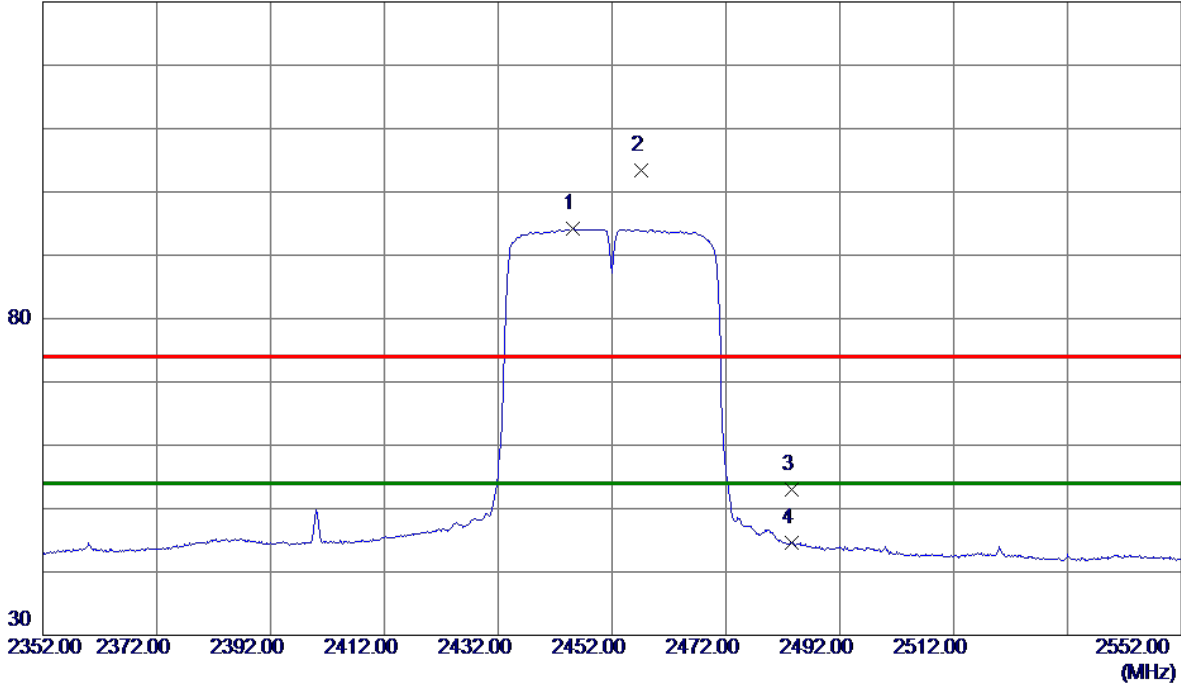


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4871.8600	25.73	3.68	29.41	54.00	-24.59	AVG	
2	4873.0250	36.85	3.68	40.53	74.00	-33.47	Peak	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452MHz

### Vertical

130 dBuV/m

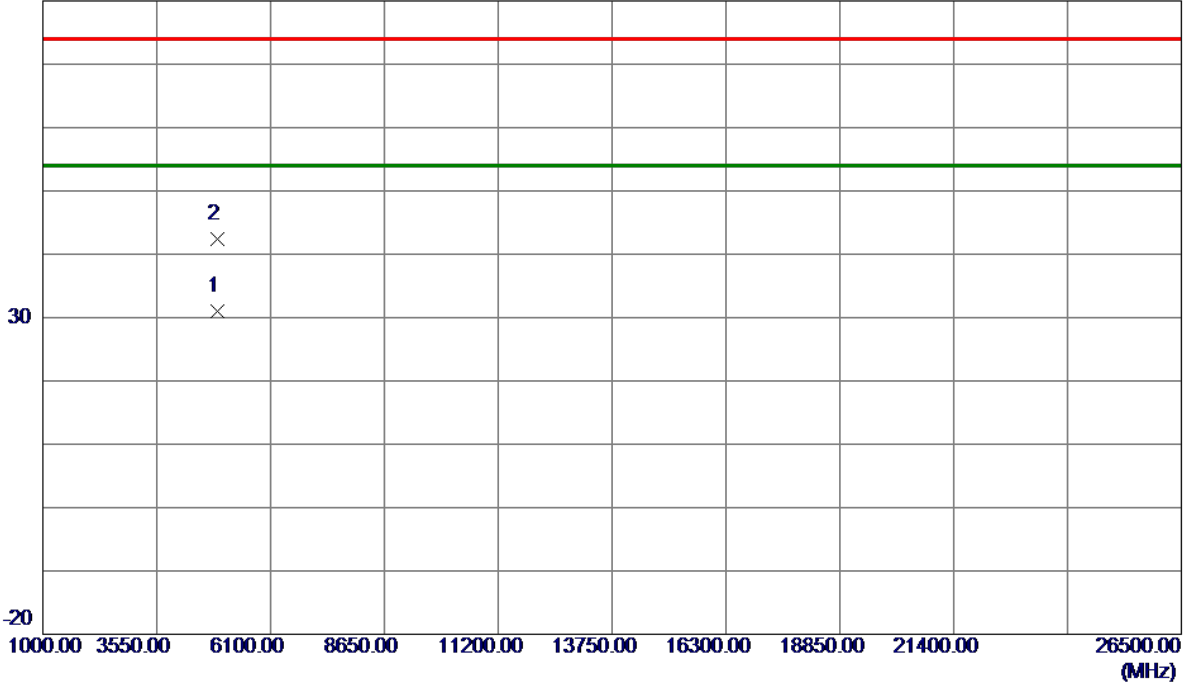


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2445.2000	87.54	6.61	94.15	54.00	40.15	AVG	No Limit
2	2457.2000	96.71	6.61	103.32	74.00	29.32	Peak	No Limit
3	2483.5000	46.37	6.61	52.98	74.00	-21.02	Peak	
4	2483.5000	38.02	6.61	44.63	54.00	-9.37	AVG	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452MHz

**Vertical**

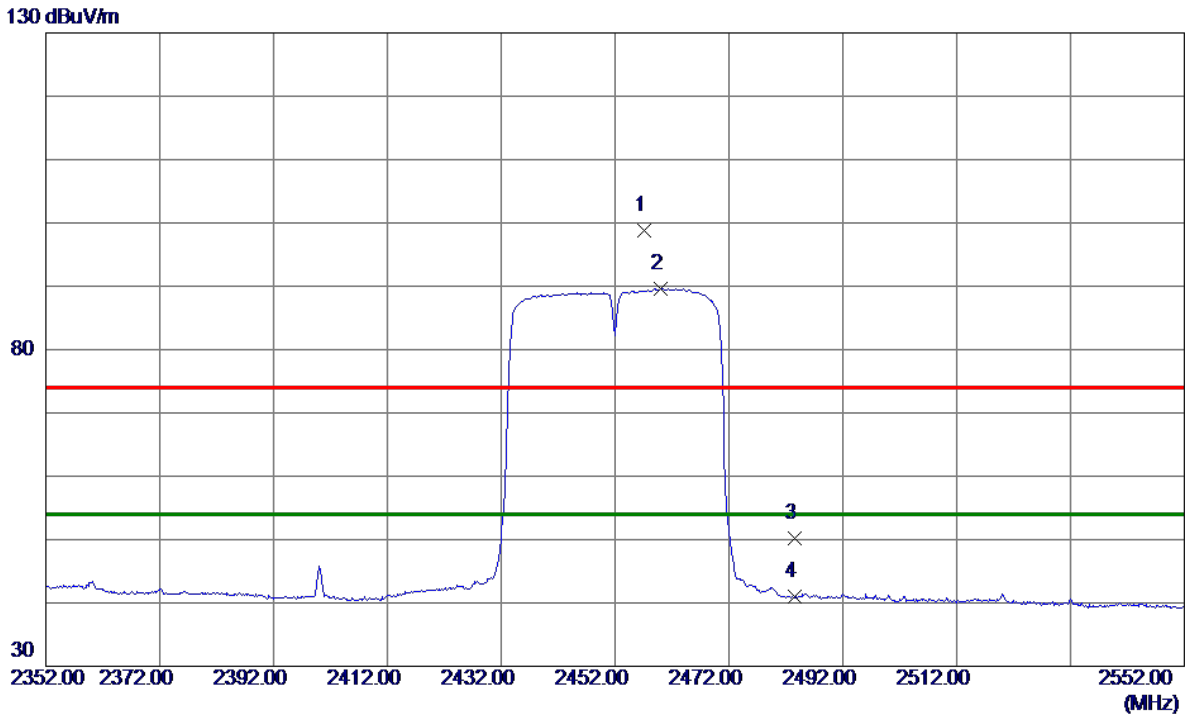
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4903.2400	27.27	3.75	31.02	54.00	-22.98	AVG	
2	4903.2919	38.73	3.75	42.48	74.00	-31.52	Peak	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452MHz

### Horizontal

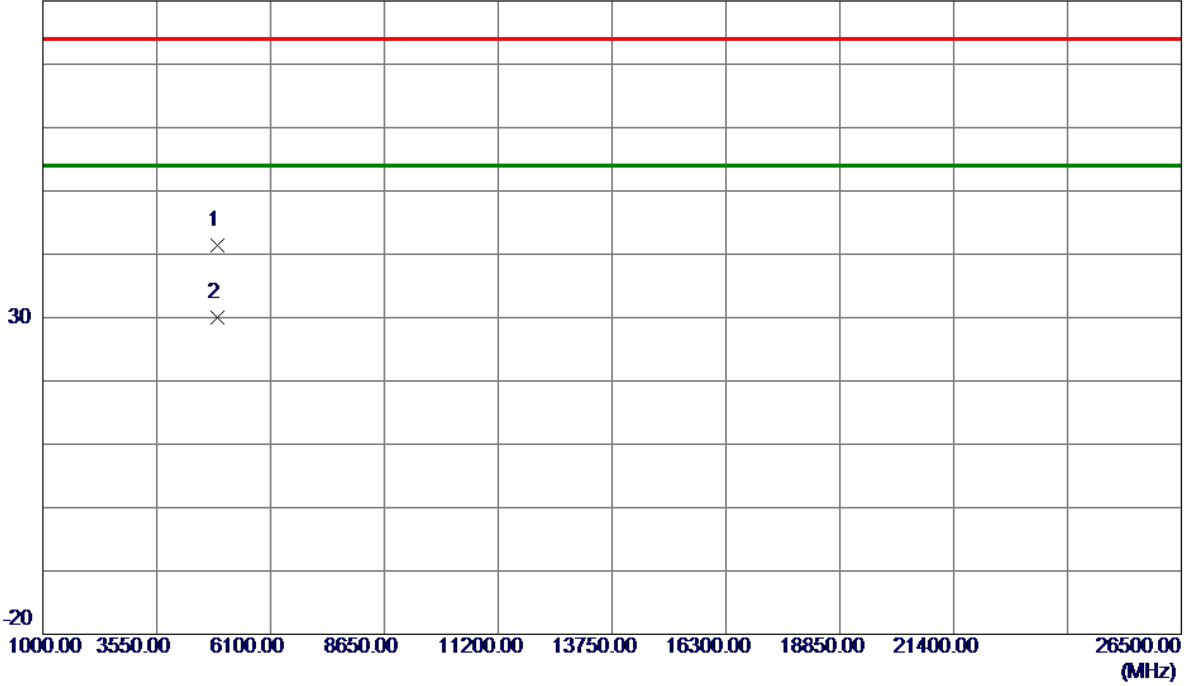


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2457.2000	92.28	6.61	98.89	74.00	24.89	Peak	No Limit
2 *	2460.1000	82.97	6.61	89.58	54.00	35.58	AVG	No Limit
3	2483.5000	43.61	6.61	50.22	74.00	-23.78	Peak	
4	2483.5000	34.39	6.61	41.00	54.00	-13.00	AVG	

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452MHz

**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	4901.6629	37.58	3.74	41.32	74.00	-32.68	Peak	
2 *	4902.1669	26.29	3.74	30.03	54.00	-23.97	AVG	

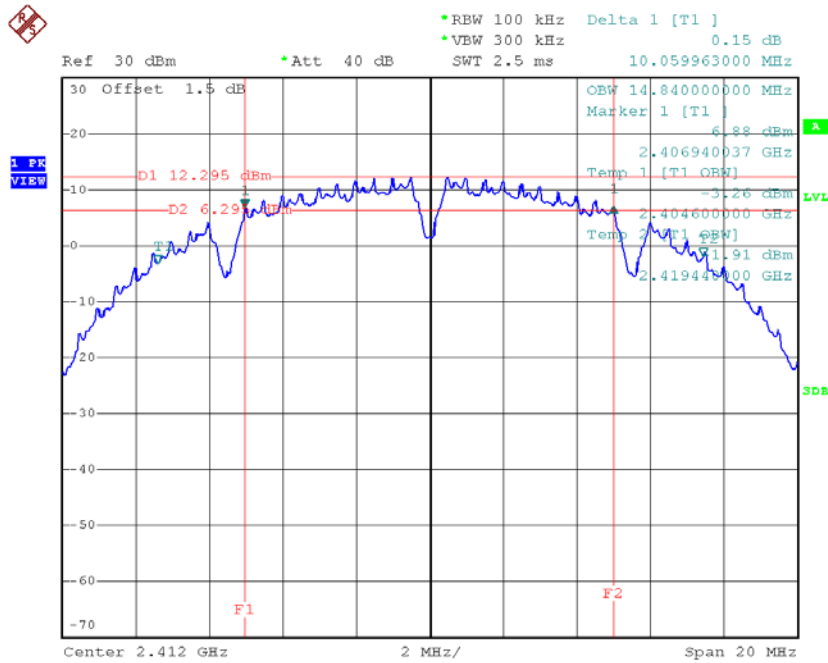
## APPENDIX E - BANDWIDTH

### Non-Beamforming

Test Mode: TX B Mode\_CH01/06/11

Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	10.06	14.84	500	Complies
2437	10.10	14.92	500	Complies
2462	10.10	14.84	500	Complies

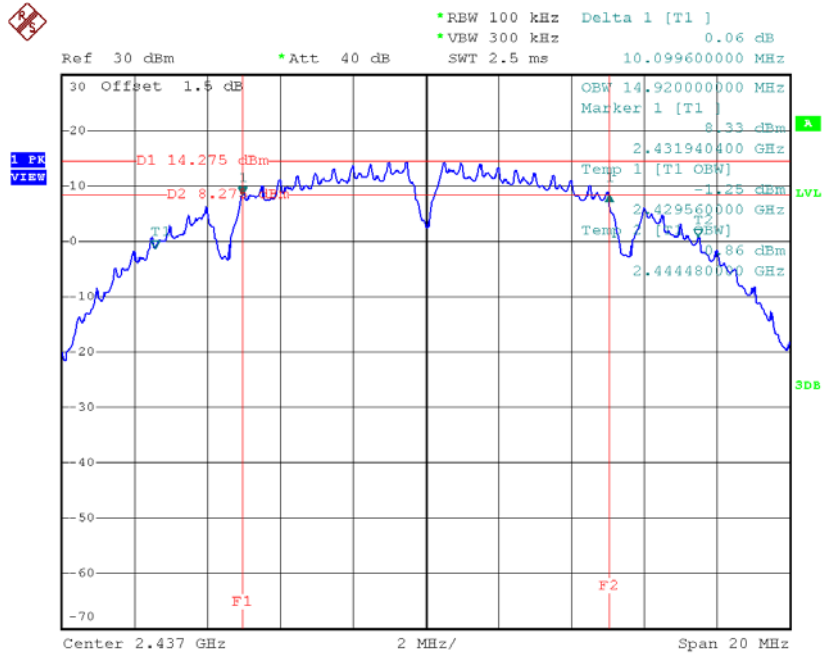
### TX CH01



Date: 11.OCT.2018 17:12:30

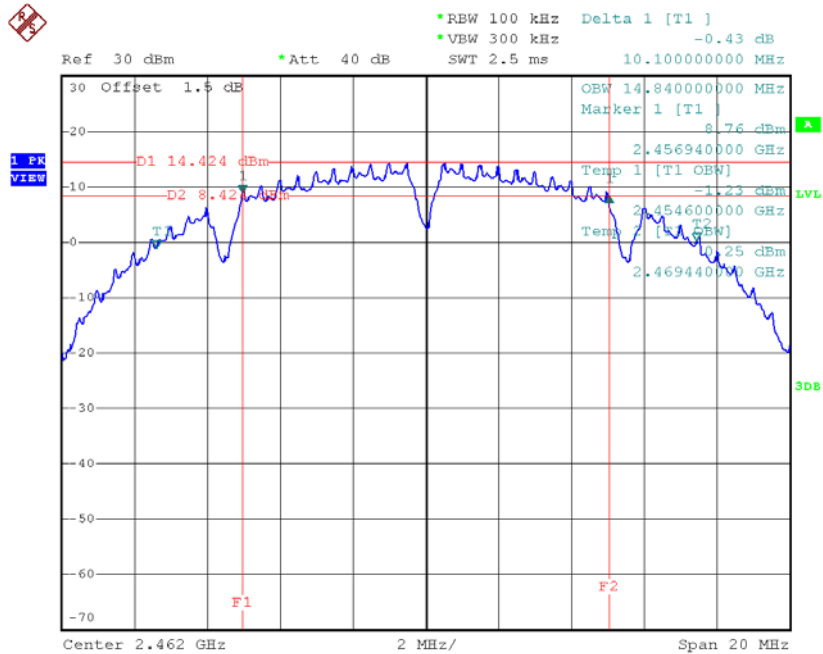


**TX CH06**



Date: 26.SEP.2018 17:46:14

**TX CH11**

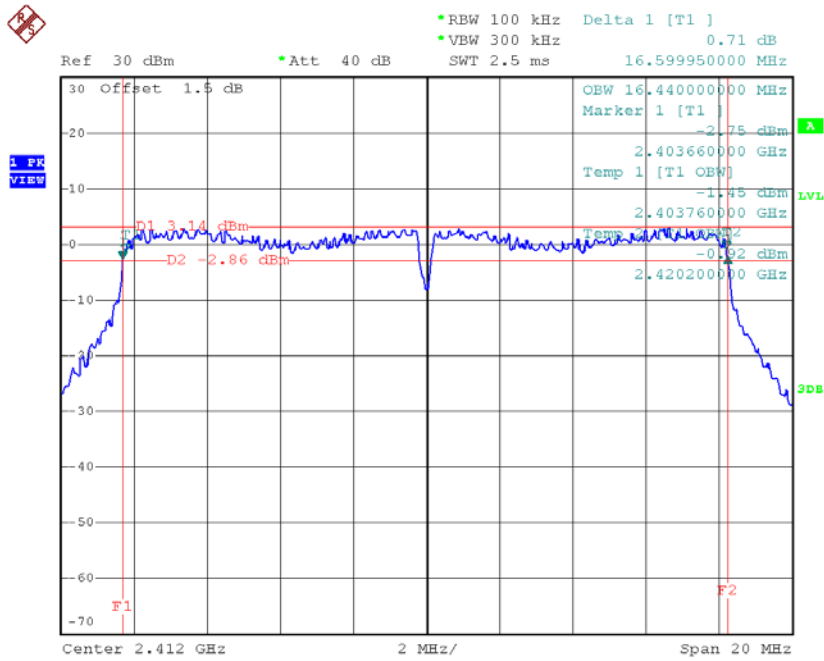


Date: 26.SEP.2018 17:48:07

**Test Mode: TX G Mode\_CH01/06/11**

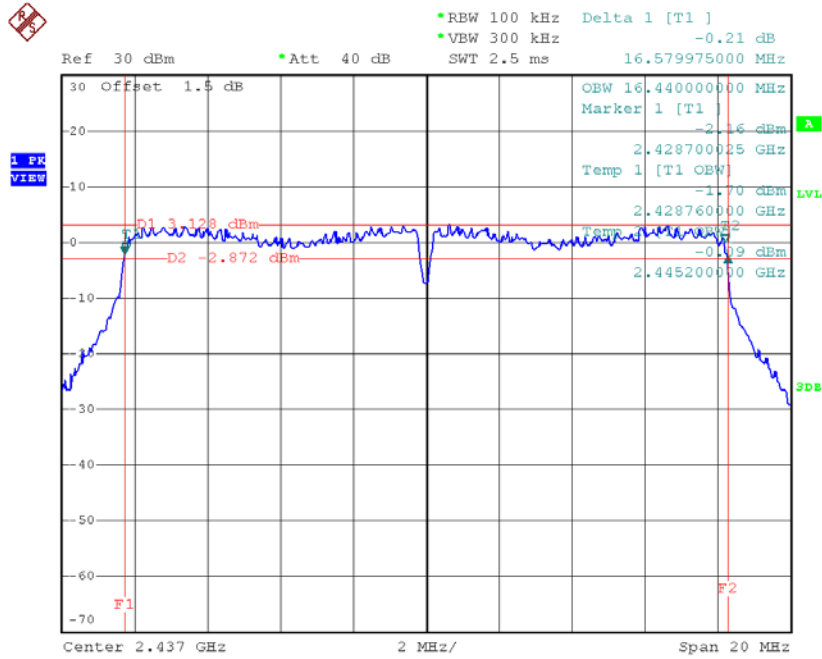
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	16.60	16.44	500	Complies
2437	16.58	16.44	500	Complies
2462	16.58	16.44	500	Complies

**TX CH01**



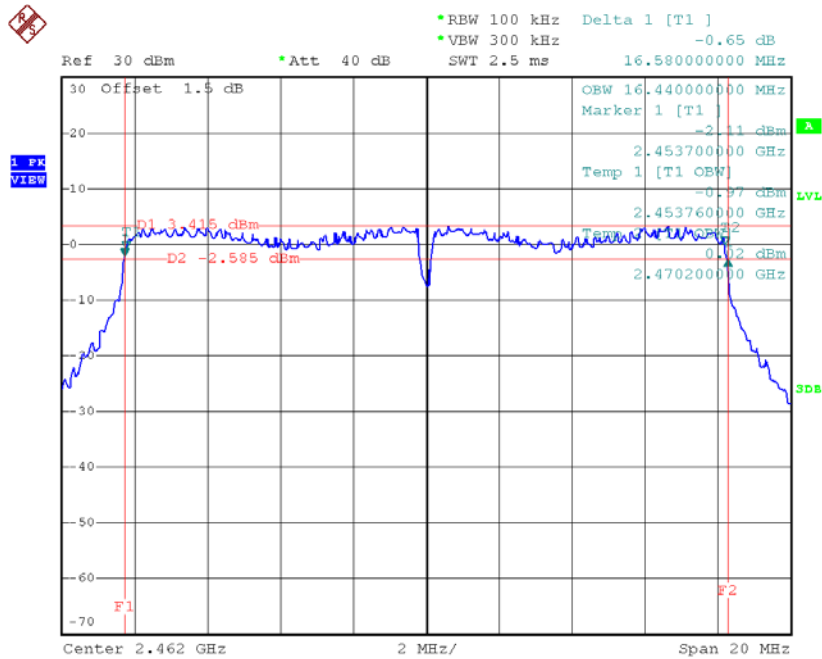
Date: 26.SEP.2018 17:49:57

**TX CH06**



Date: 26.SEP.2018 17:51:31

**TX CH11**

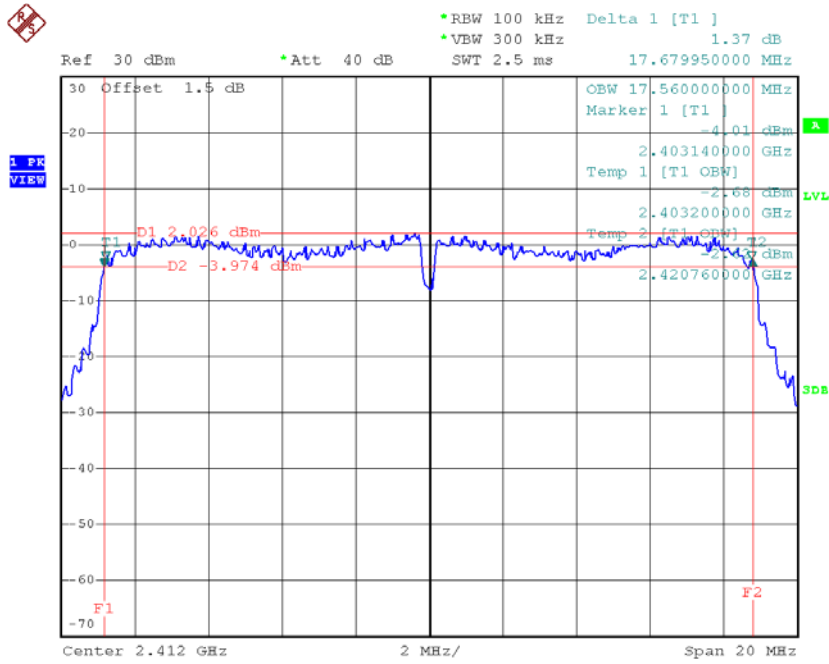


Date: 26.SEP.2018 17:52:54

**Test Mode: TX N-20MHz Mode\_CH01/06/11**

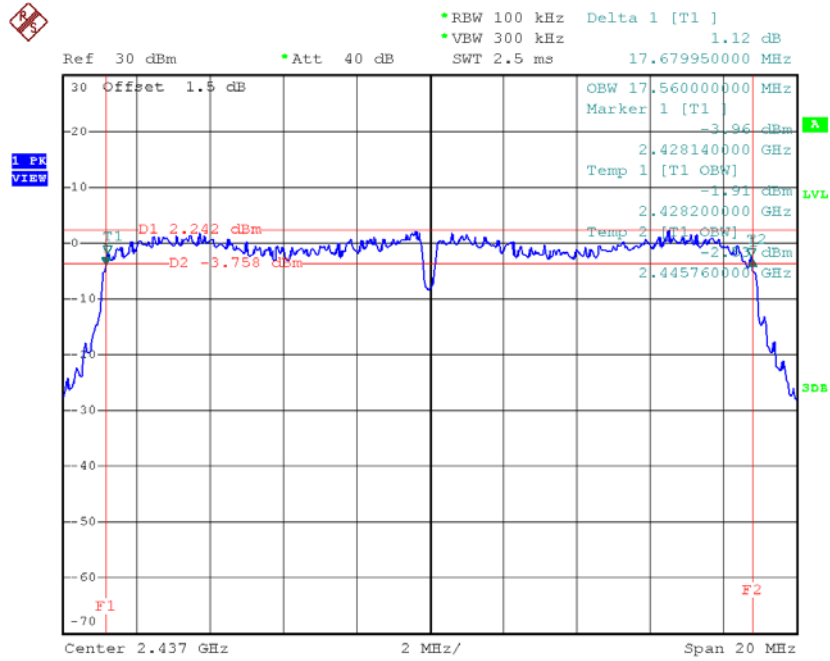
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	17.68	17.56	500	Complies
2437	17.68	17.56	500	Complies
2462	17.68	17.56	500	Complies

**TX CH01**



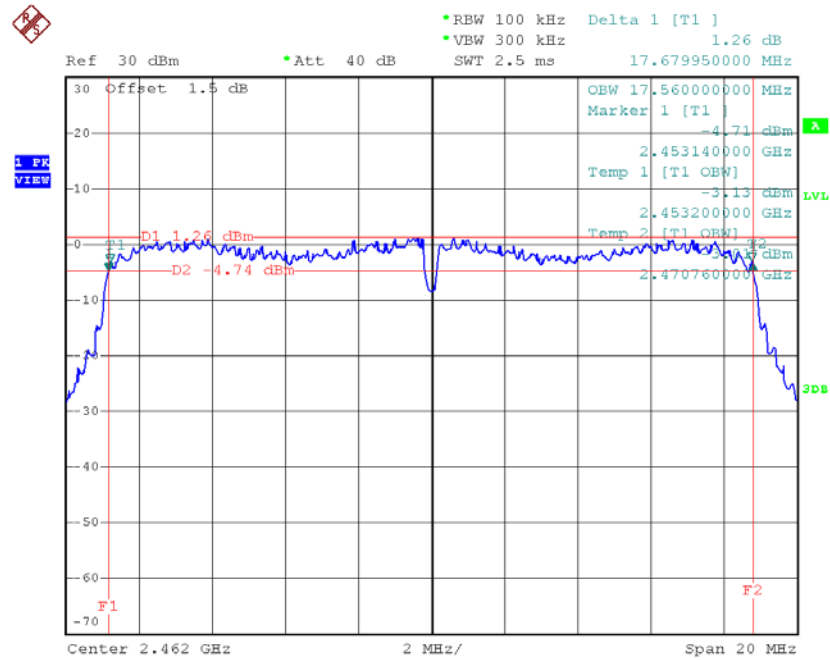
Date: 27.SEP.2018 09:35:17

**TX CH06**



Date: 27.SEP.2018 09:37:04

**TX CH11**

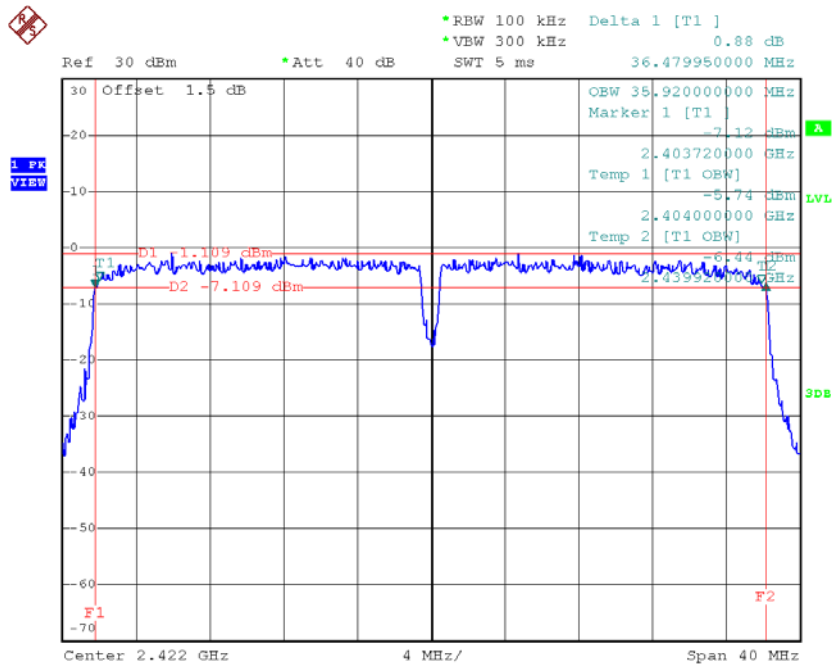


Date: 27.SEP.2018 09:38:25

**Test Mode: TX N-40MHz Mode\_CH03/06/09**

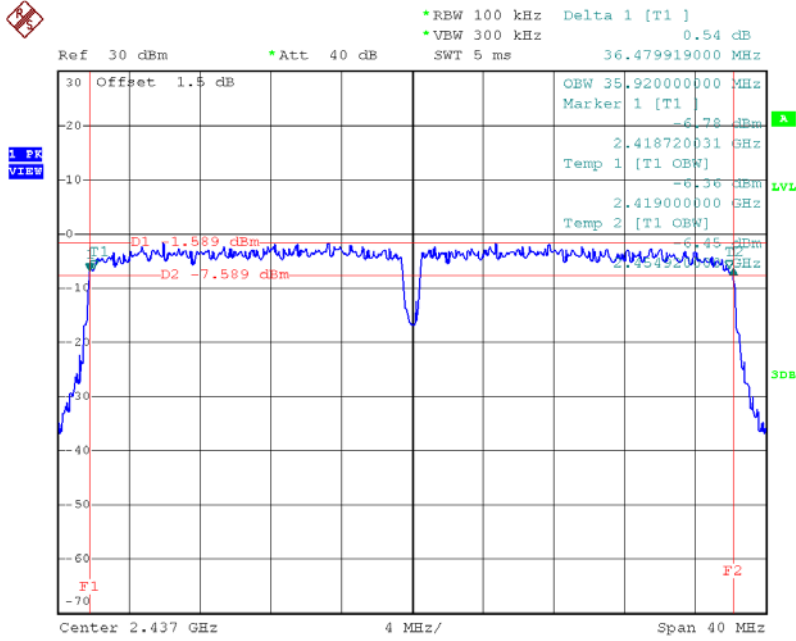
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2422	36.48	35.92	500	Complies
2437	36.48	35.92	500	Complies
2452	36.56	36.00	500	Complies

**TX CH03**



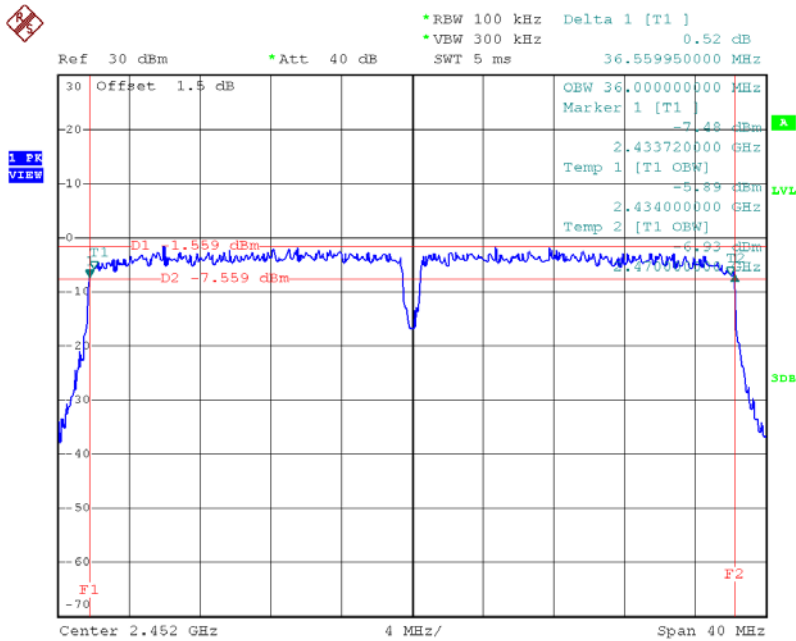
Date: 27.SEP.2018 09:41:07

### TX CH06



Date: 27.SEP.2018 09:44:22

### TX CH09



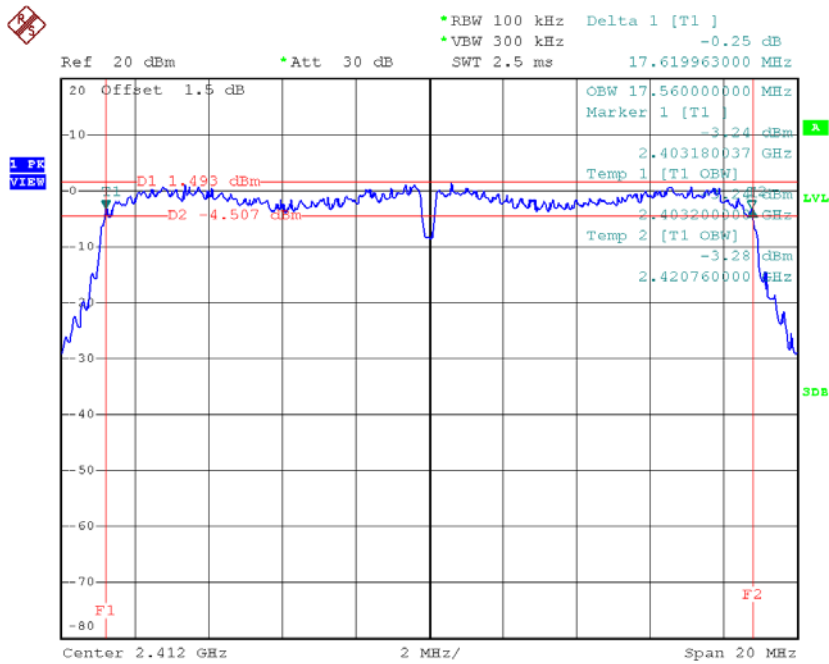
Date: 27.SEP.2018 09:45:47

### Beamforming

**Test Mode: TX N-20MHz Mode\_CH01/06/11**

Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	17.62	17.56	500	Complies
2437	17.68	17.56	500	Complies
2462	17.68	17.56	500	Complies

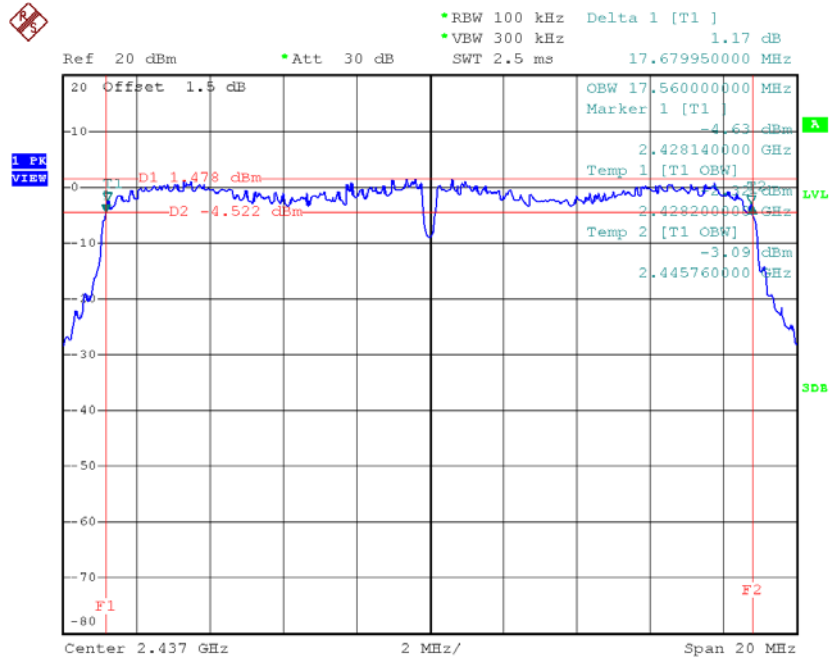
### TX CH01



Date: 27.SEP.2018 09:52:36

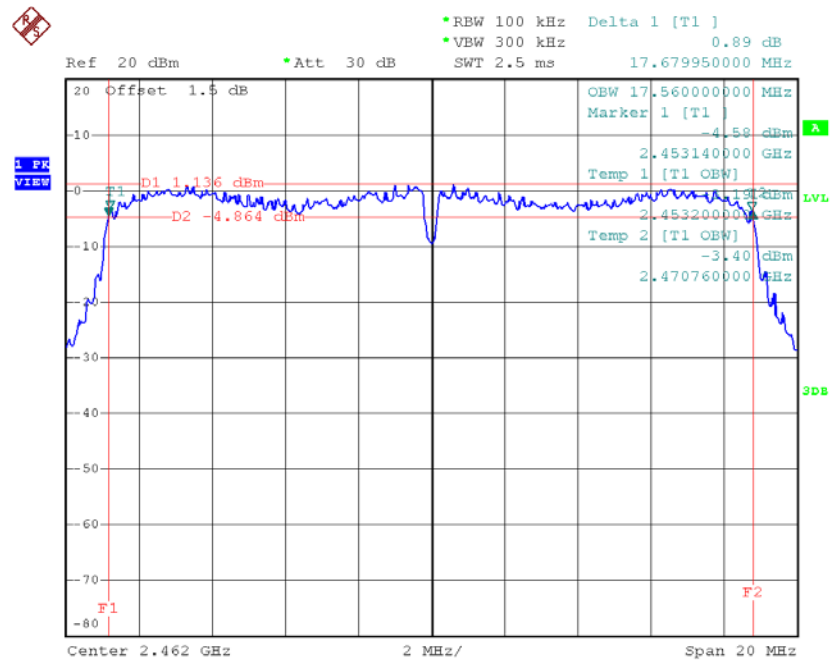


**TX CH06**



Date: 27.SEP.2018 09:54:03

**TX CH11**

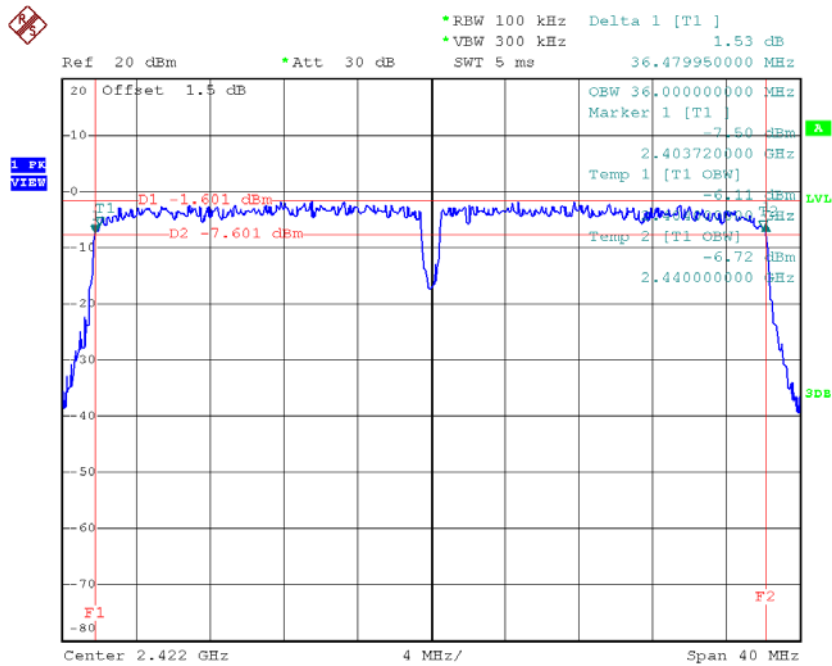


Date: 27.SEP.2018 09:55:36

**Test Mode: TX N-40MHz Mode\_CH03/06/09**

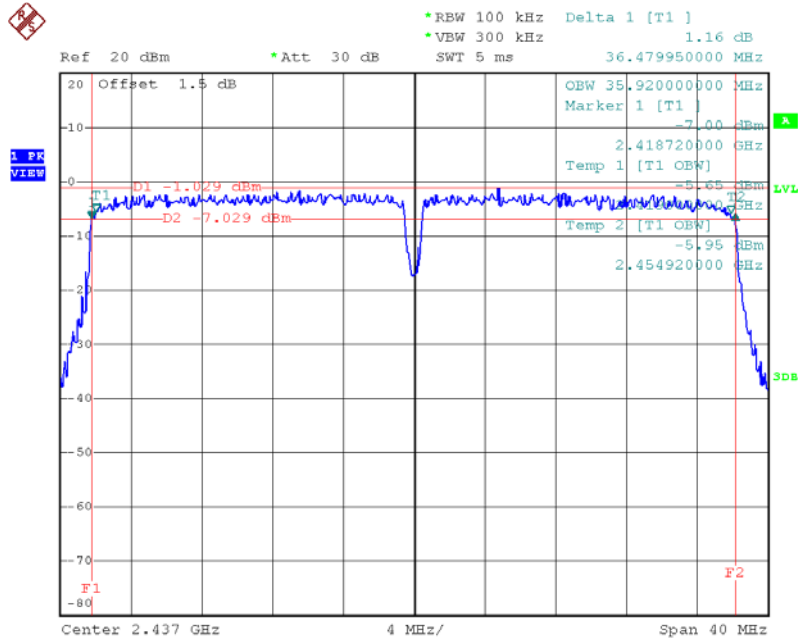
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2422	36.48	36.00	500	Complies
2437	36.48	35.92	500	Complies
2452	36.52	36.00	500	Complies

**TX CH03**



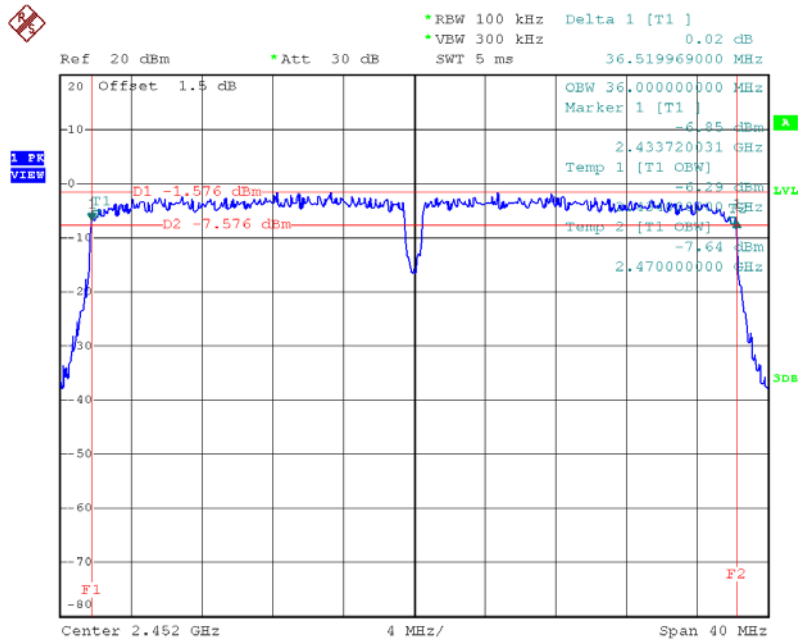
Date: 27.SEP.2018 10:00:16

**TX CH06**



Date: 27.SEP.2018 10:01:59

**TX CH09**



Date: 27.SEP.2018 10:03:30

## APPENDIX F - MAXIMUM OUTPUT POWER

**Non-Beamforming**

<b>Test Mode: TX B Mode_CH01/06/11</b>					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	26.15	0.41	30.00	1.00	Complies
2437	28.11	0.65	30.00	1.00	Complies
2462	28.08	0.64	30.00	1.00	Complies

<b>Test Mode: TX G Mode_CH01/06/11</b>					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	28.26	0.67	30.00	1.00	Complies
2437	28.18	0.66	30.00	1.00	Complies
2462	28.19	0.66	30.00	1.00	Complies

Test Mode: TX N20 Mode_CH01/06/11_ANT 1					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	23.02	0.20	28.49	0.71	Complies
2437	23.13	0.21	28.49	0.71	Complies
2462	22.83	0.19	28.49	0.71	Complies

Test Mode: TX N20 Mode_CH01/06/11_ANT 2					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	23.06	0.20	28.49	0.71	Complies
2437	23.57	0.23	28.49	0.71	Complies
2462	23.89	0.24	28.49	0.71	Complies

Test Mode: TX N20 Mode_CH01/06/11_Total					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	26.05	0.40	28.49	0.71	Complies
2437	26.37	0.43	28.49	0.71	Complies
2462	26.40	0.44	28.49	0.71	Complies

Test Mode: TX N40 Mode_CH03/06/09_ANT 1					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2422	22.94	0.20	28.49	0.71	Complies
2437	22.82	0.19	28.49	0.71	Complies
2452	22.73	0.19	28.49	0.71	Complies

Test Mode: TX N40 Mode_CH03/06/09_ANT 2					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2422	23.36	0.22	28.49	0.71	Complies
2437	23.35	0.22	28.49	0.71	Complies
2452	23.37	0.22	28.49	0.71	Complies

Test Mode: TX N40 Mode_CH03/06/09_Total					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2422	26.17	0.41	28.49	0.71	Complies
2437	26.10	0.41	28.49	0.71	Complies
2452	26.07	0.40	28.49	0.71	Complies

### Beamforming

Test Mode: TX N20 Mode_CH01/06/11_ANT 1					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	22.82	0.19	28.50	0.71	Complies
2437	23.02	0.20	28.50	0.71	Complies
2462	22.59	0.18	28.50	0.71	Complies

Test Mode: TX N20 Mode_CH01/06/11_ANT 2					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	22.95	0.20	28.50	0.71	Complies
2437	23.41	0.22	28.50	0.71	Complies
2462	23.63	0.23	28.50	0.71	Complies

Test Mode: TX N20 Mode_CH01/06/11_Total					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	25.90	0.39	28.50	0.71	Complies
2437	26.23	0.42	28.50	0.71	Complies
2462	26.15	0.41	28.50	0.71	Complies



Test Mode: TX N40 Mode_CH03/06/09_ANT 1					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2422	22.77	0.19	28.50	0.71	Complies
2437	22.82	0.19	28.50	0.71	Complies
2452	22.55	0.18	28.50	0.71	Complies

Test Mode: TX N40 Mode_CH03/06/09_ANT 2					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2422	23.36	0.22	28.50	0.71	Complies
2437	23.21	0.21	28.50	0.71	Complies
2452	23.14	0.21	28.50	0.71	Complies

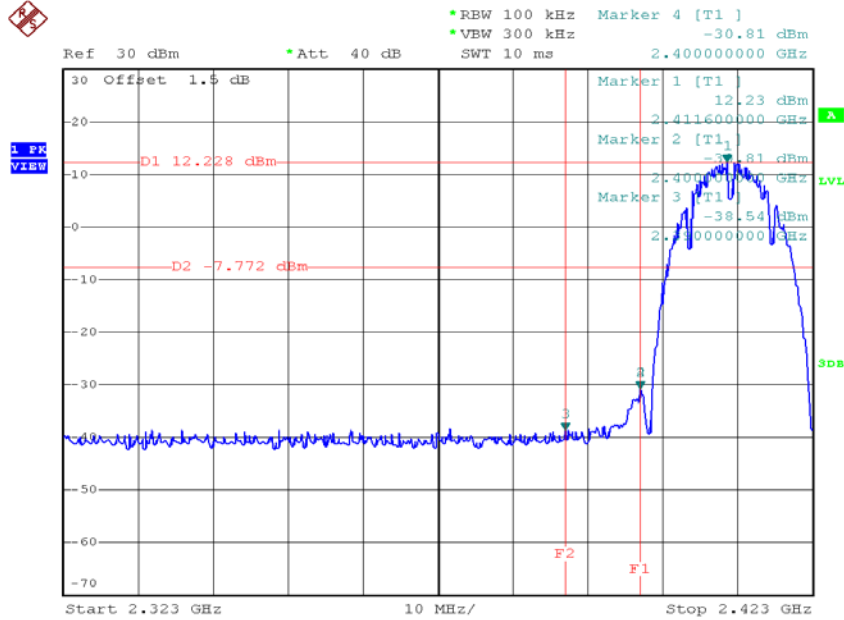
Test Mode: TX N40 Mode_CH03/06/09_Total					
Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2422	26.09	0.41	28.50	0.71	Complies
2437	26.03	0.40	28.50	0.71	Complies
2452	25.87	0.39	28.50	0.71	Complies

# APPENDIX G - ANTENNA CONDUCTED SPURIOUS EMISSION

**Non-Beamforming**

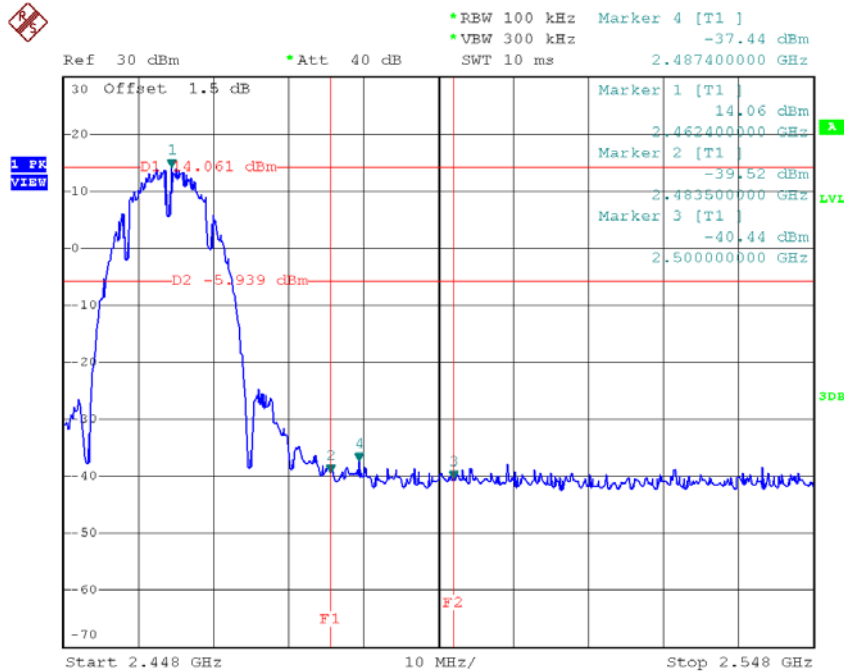
**Test Mode: TX B Mode**

**TX B mode CH01**



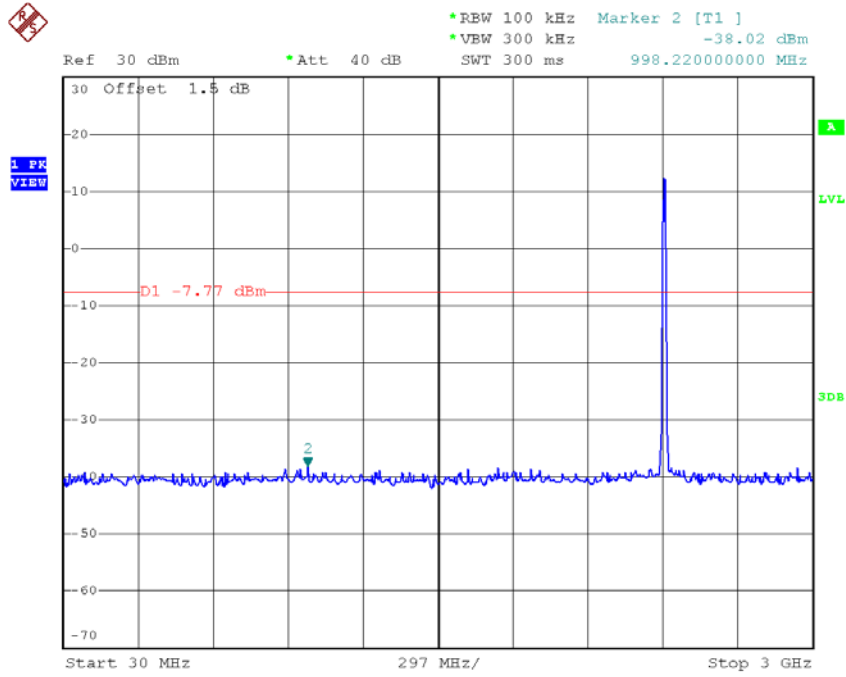
Date: 11.OCT.2018 17:12:39

**TX B mode CH11**

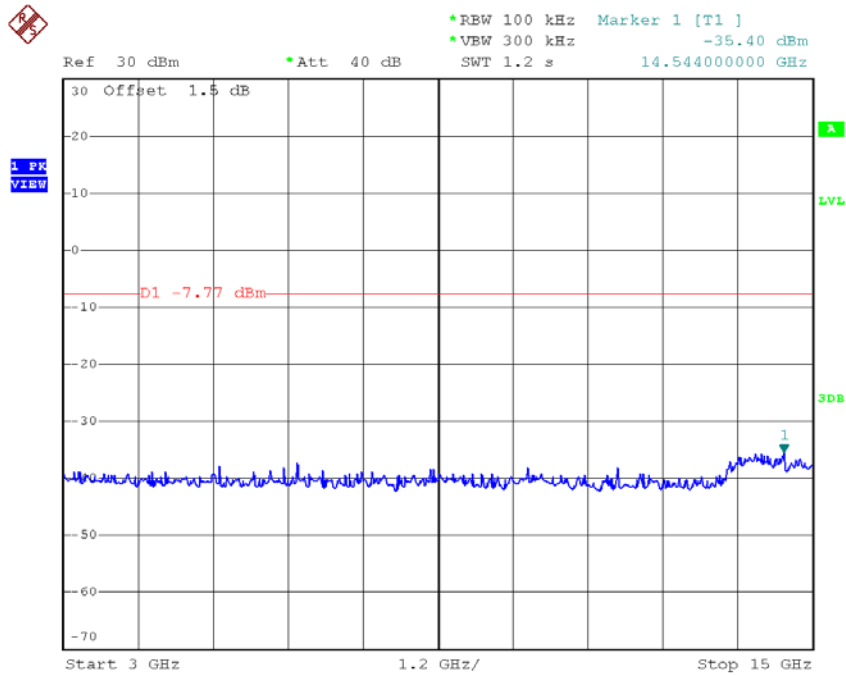


Date: 26.SEP.2018 17:48:17

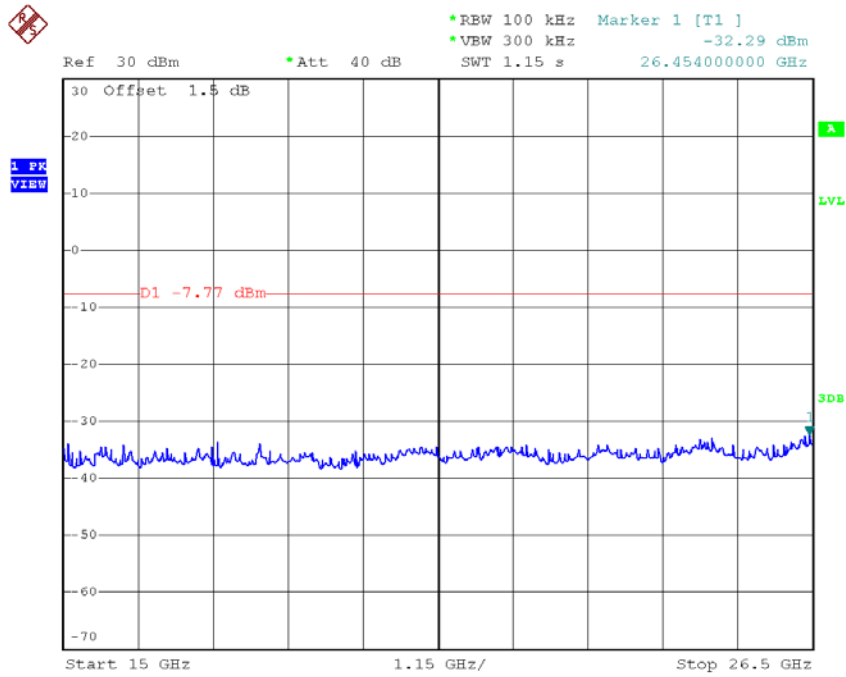
### TX B mode CH01 (10 Harmonic of the frequency)



Date: 11.OCT.2018 17:12:53

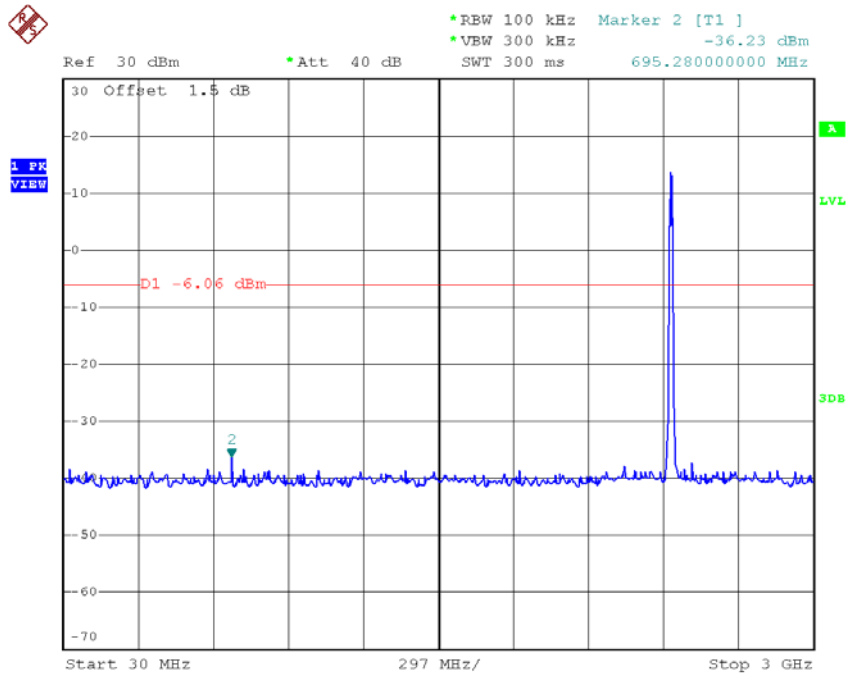


Date: 11.OCT.2018 17:13:03

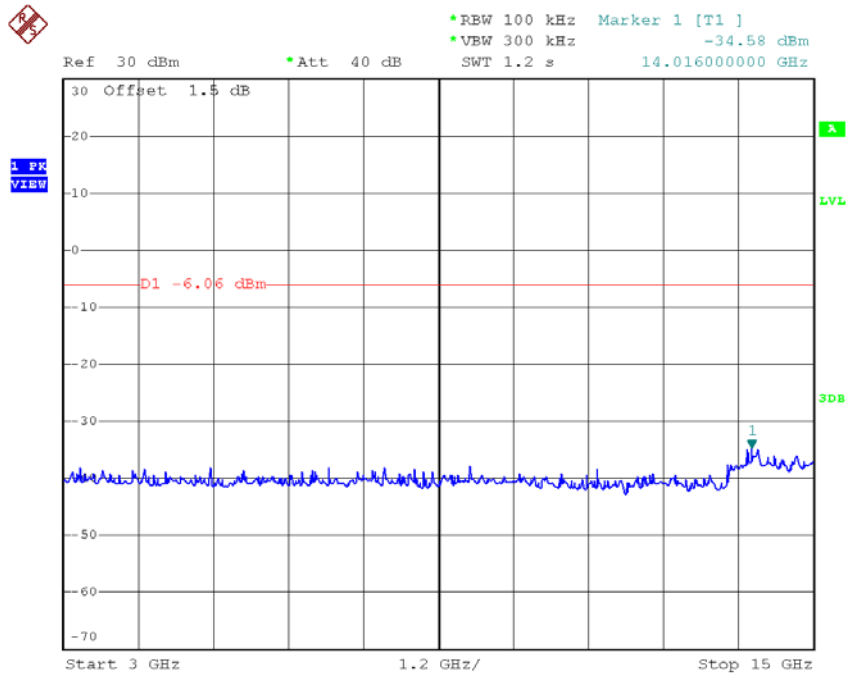


Date: 11.OCT.2018 17:13:12

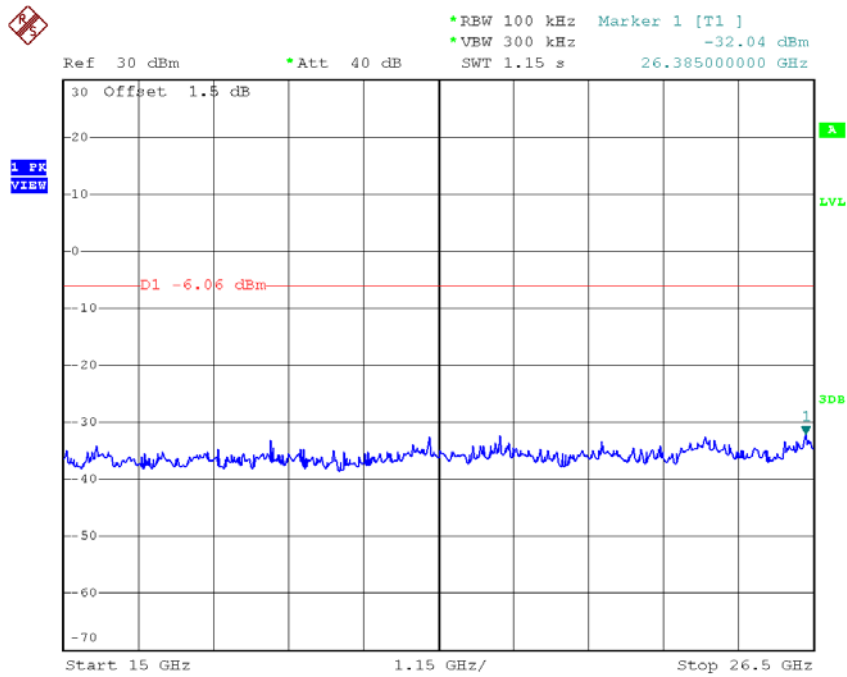
### TX B mode CH06 (10 Harmonic of the frequency)



Date: 26.SEP.2018 17:46:38

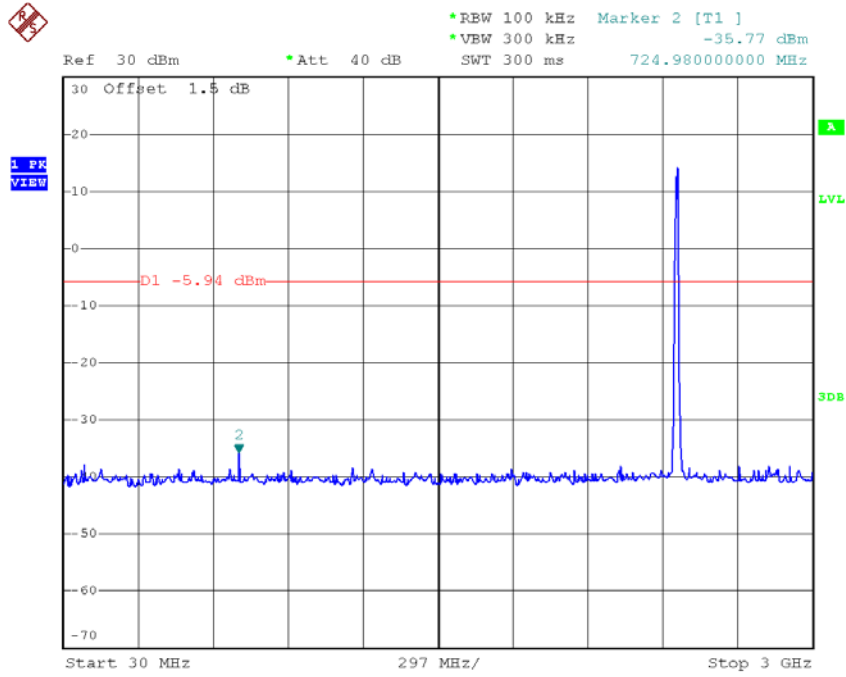


Date: 26.SEP.2018 17:46:47

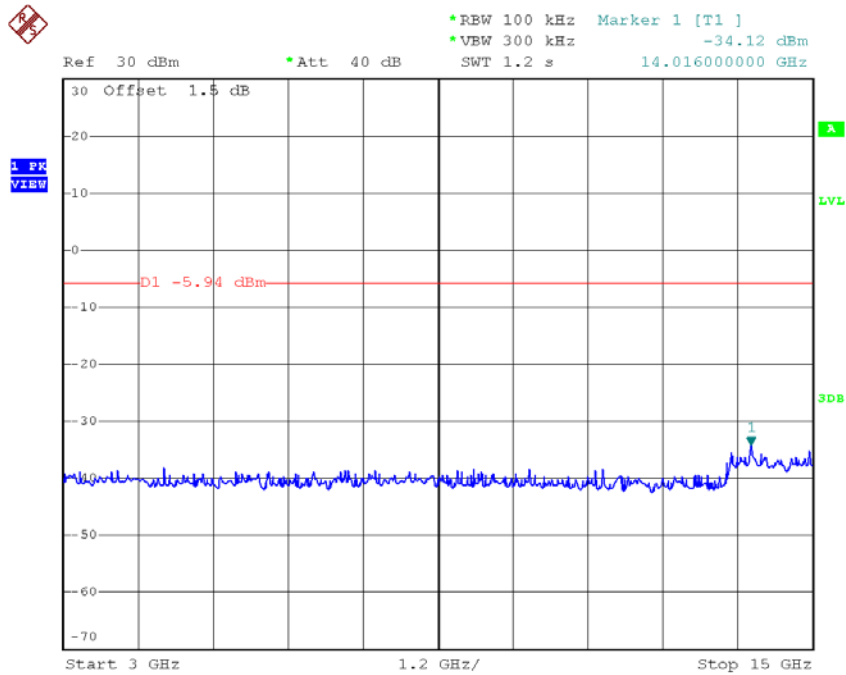


Date: 26.SEP.2018 17:46:56

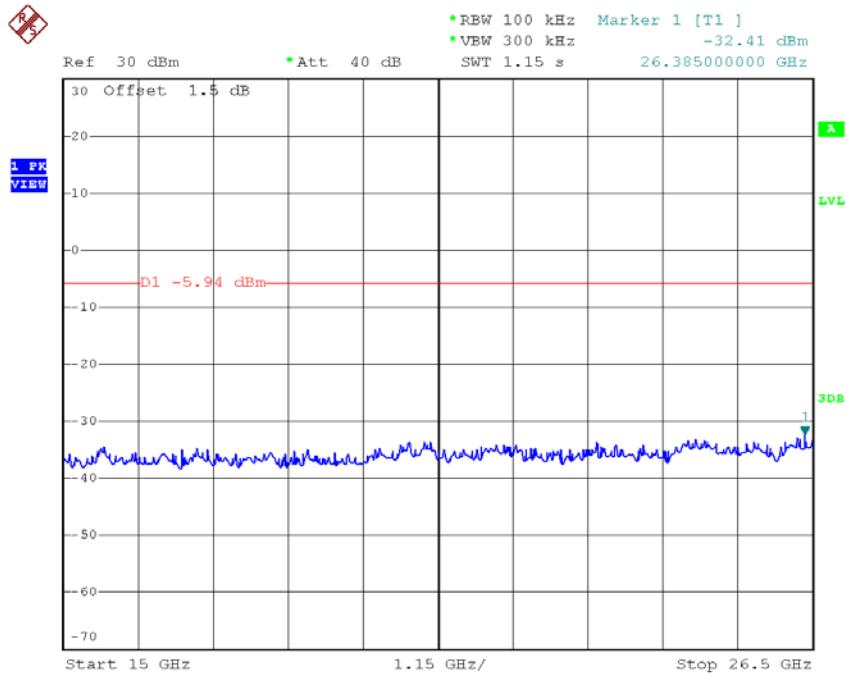
### TX B mode CH11 (10 Harmonic of the frequency)



Date: 26.SEP.2018 17:48:31



Date: 26.SEP.2018 17:48:40

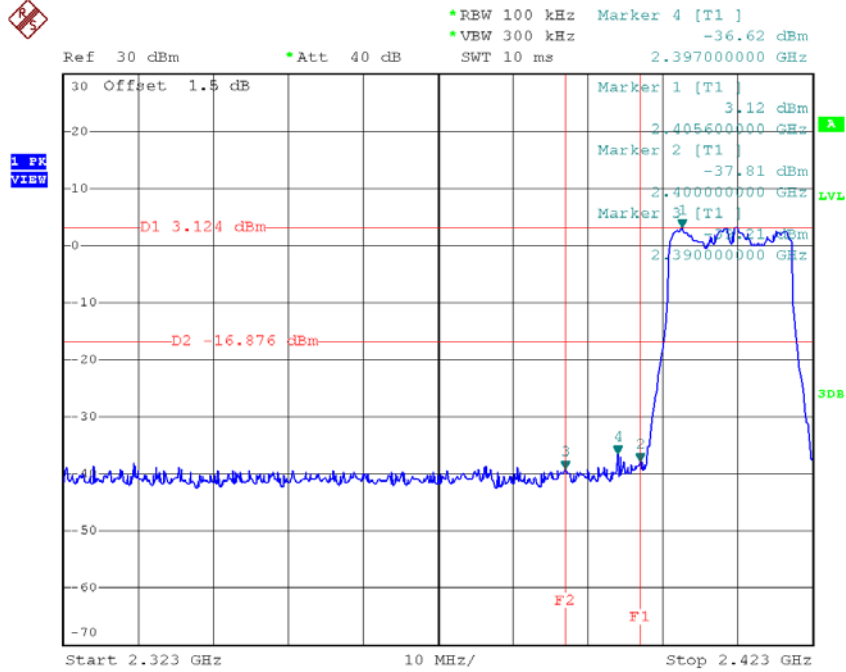


Date: 26.SEP.2018 17:48:49



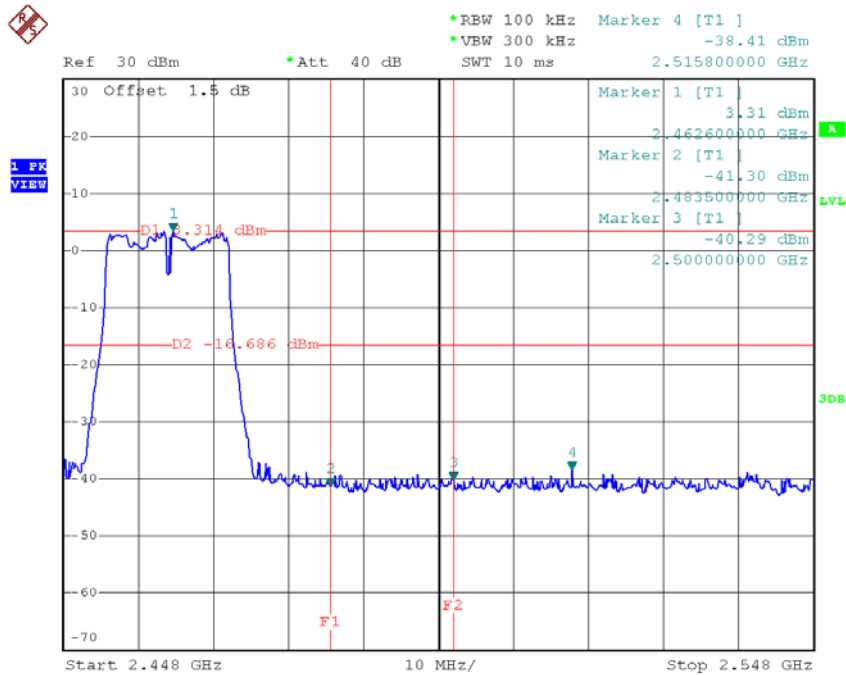
**Test Mode: TX G Mode**

**TX G mode CH01**



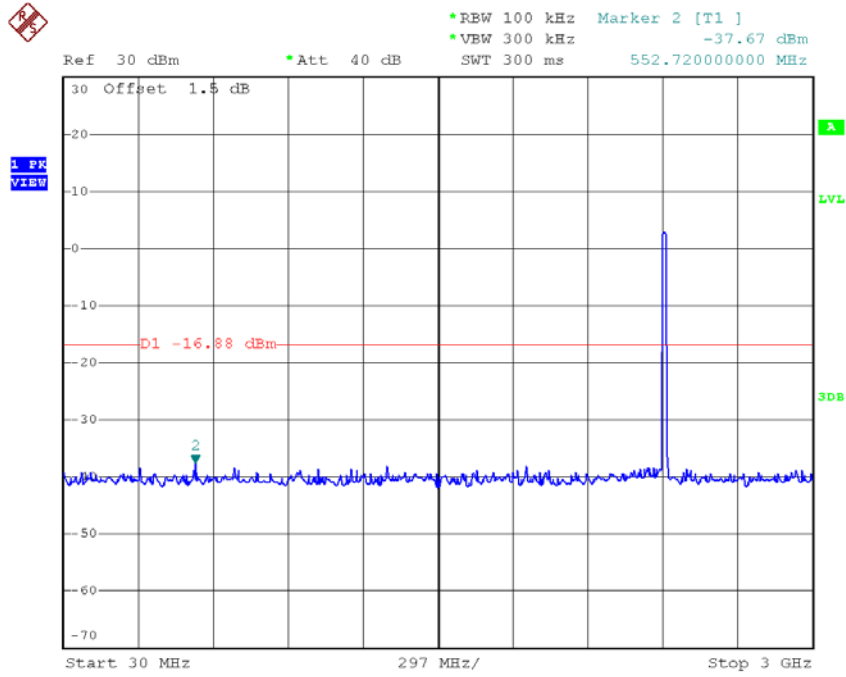
Date: 26.SEP.2018 17:50:06

**TX G mode CH11**

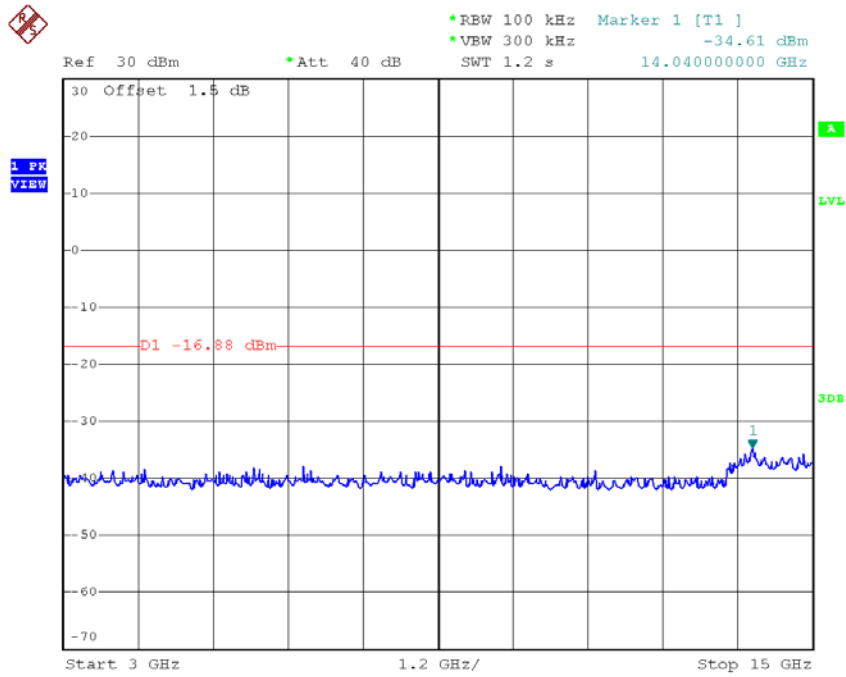


Date: 26.SEP.2018 17:53:03

### TX G mode CH01 (10 Harmonic of the frequency)



Date: 26.SEP.2018 17:50:20



Date: 26.SEP.2018 17:50:29