

FCC Radio Test Report

FCC ID: TE7KLM100

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

Project No. : 1812C029
Equipment : Kasa Light Wi-Fi Module
Test Model : KLM100
Series Model : N/A
Applicant : TP-Link Technologies Co., Ltd.
Address : Building 24(floors 1,3,4,5) and 28(floors 1-4) Central
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Date of Receipt : Dec. 05, 2018
Date of Test : Dec. 06, 2018~Dec. 21, 2018
Issued Date : Jan. 08, 2019
Tested by : BTL Inc.

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Certificate #5123.02

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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.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Dec. 29, 2018
R01	1. Added a test setup photo of Partial enlarged. 2. Updated the limit of 99% OBW.	Jan. 08, 2019

1. GENERAL SUMMARY

Equipment : Kasa Light Wi-Fi Module
Brand Name : tp-link
Test Model : KLM100
Series Model : N/A
Applicant : TP-Link Technologies Co., Ltd.
Manufacturer : TP-Link Technologies Co., Ltd.
Address : Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Factory : TP-Link Technologies Co., Ltd.
Address : Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Date of Test : Dec. 06, 2018~Dec. 21, 2018
Test Sample : Engineering Sample
No.: D181211171 for Conducted, D181211170 for Radiated
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-1-1812C029) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

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)	Bandwidth	PASS	
15.247(b)(3)	Average 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 Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

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 %, $U=2\times U_c(y)$.

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 MHz~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	Kasa Light Wi-Fi Module		
Brand Name	tp-link		
Test Model	KLM100		
Series Model	N/A		
Model Difference(s)	N/A		
Power Rating	DC 3.3V(On-Board)		
Product Description	Operation Frequency		2412 MHz ~2462 MHz
	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 65 Mbps
	Average Output Power (Max.)		802.11b: 17.86 dBm 802.11g: 17.81 dBm 802.11n(20 MHz): 17.96 dBm

Note:

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

CH01 - CH11 for 802.11b, 802.11g, 802.11n(20 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	TP-LINK	N/A	Printed	N/A	1.50

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible 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-20MHz Mode Channel 01/06/11
Mode 4	TX Mode
Mode 5	TX B Mode CHANNEL 01/02/06/10/11
Mode 6	TX G Mode CHANNEL 01/02/06/10/11
Mode 7	TX N-20MHz Mode CHANNEL 01/02/06/10/11

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 4	TX Mode

For Radiated Test – Below 1G

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-20MHz Mode Channel 01/06/11

For Radiated Test – Above 1G

Final Test Mode:	Description
Mode 5	TX B Mode CHANNEL 01/02/06/10/11
Mode 6	TX G Mode CHANNEL 01/02/06/10/11
Mode 7	TX N-20MHz Mode CHANNEL 01/02/06/10/11

For Band Edge Test	
Final Test Mode:	Description
Mode 5	TX B Mode CHANNEL 01/02/06/10/11
Mode 6	TX G Mode CHANNEL 01/02/06/10/11
Mode 7	TX N-20MHz Mode CHANNEL 01/02/06/10/11

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-20MHz Mode Channel 01/06/11

Average 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-20MHz Mode Channel 01/06/11

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-20MHz Mode Channel 01/06/11

Note:

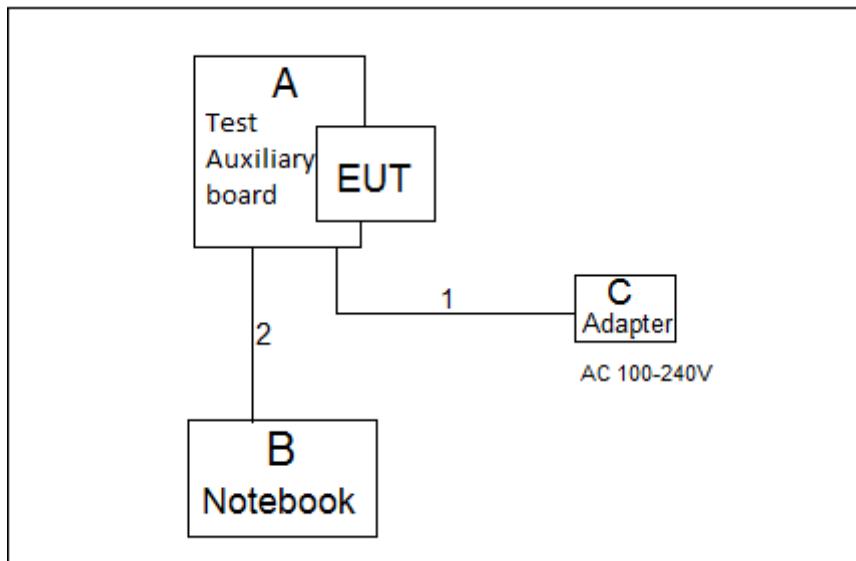
- (1) The measurements are performed at the high, middle, low available channels.
- (3) For radiated 30 MHz to 1000 MHz test, the 802.11b is found to be the worst case and recorded.
- (4) The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

3.3 TABLE OF PARAMETERS OF TEST 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

Test software version	QA_Tool_v3.2.0		
Frequency (MHz)	2412	2437	2462
802.11b	1C	1D	1E
802.11g	1E	20	21
802.11n (20 MHz)	21	22	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.
A	Test Auxiliary board	N/A	N/A	N/A	N/A
B	Notebook	Lenovo	G410	N/A	N/A
C	Adapter	HUAWEI	HW-050100U01	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.0m	DC Cable
2	NO	NO	0.9m	Data 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 μ 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

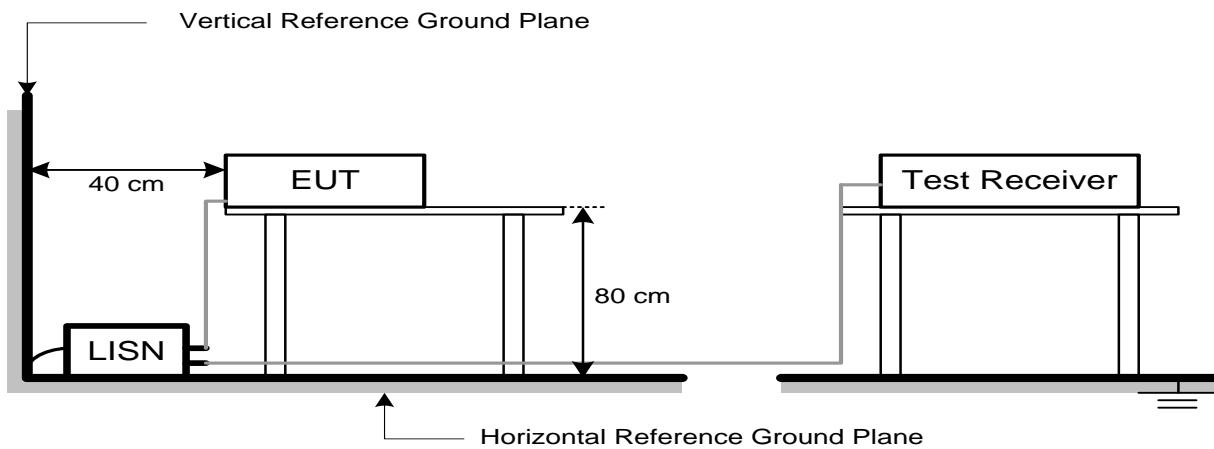
4.1.2 TEST PROCEDURE

- 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: 53% 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

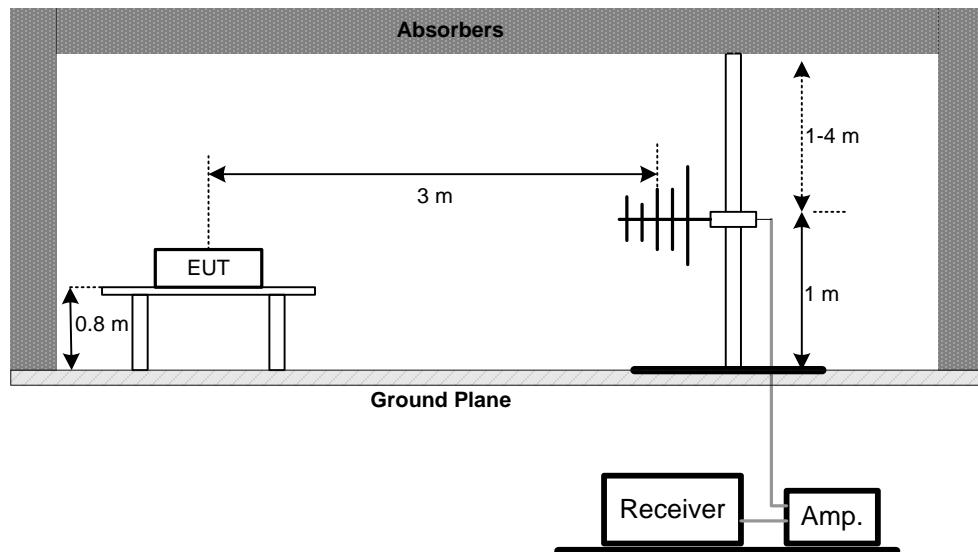
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The measuring distance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

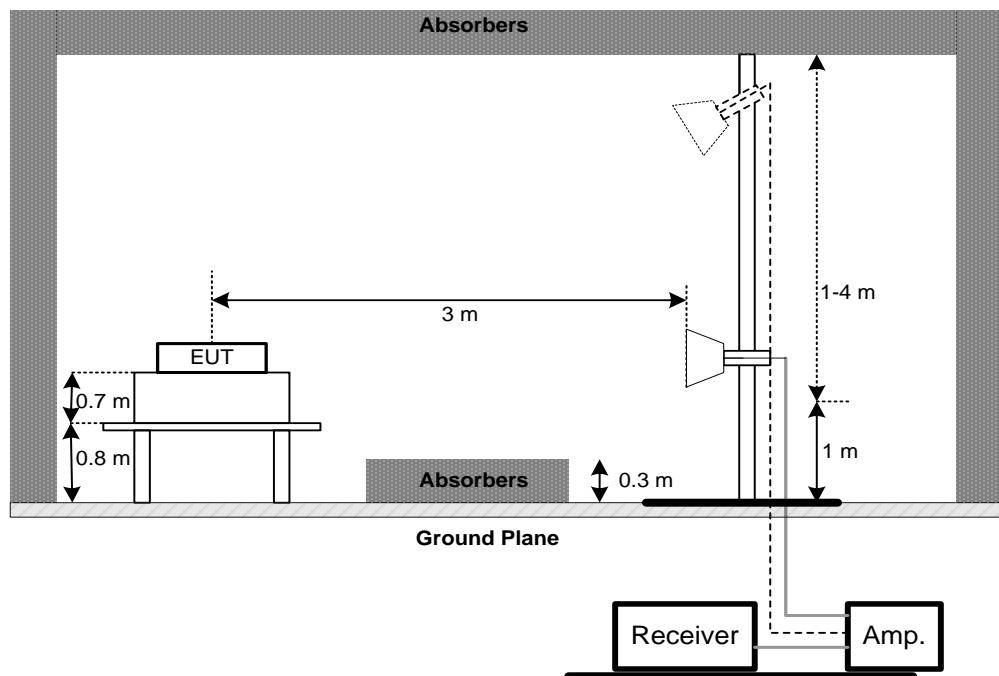
No deviation

4.2.4 TEST SETUP

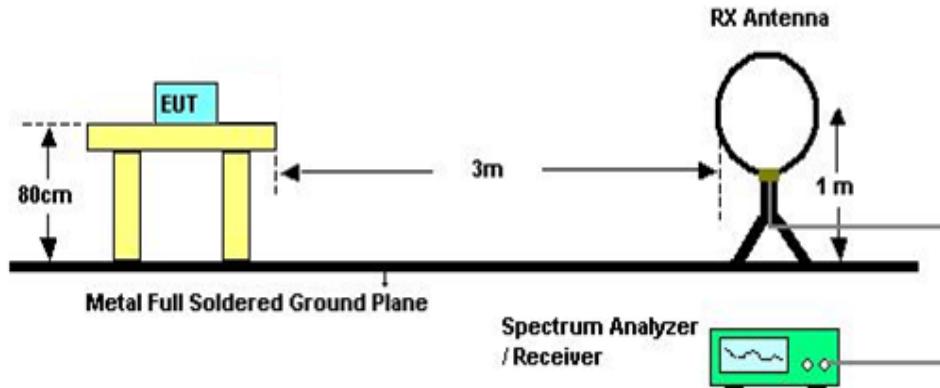
(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



(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 (dB_{UV}) + 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)	6dB Bandwidth	2400-2483.5	PASS
	99% OBW		

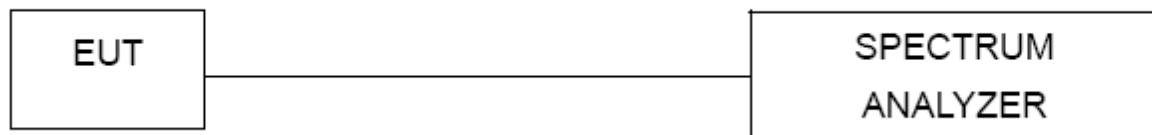
5.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. The bandwidth was performed in accordance with method 11.8 of ANSI C63.10-2013.
- c. For 6dB Bandwidth Spectrum setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.
For 99% OBW Spectrum Setting: For B,G,N20 mode: RBW= 300KHz, VBW=1MHz,For N40 mode: RBW= 1MHz, VBW=3MHz 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: 23.6°C Relative Humidity: 38.9% Test Voltage: AC 120V/60Hz

5.1.6 TEST RESULTS

Please refer to the Appendix E.

6. AVERAGE 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)	Average 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 conducted output power was performed in accordance with methodor 11.9.2.3 of ANSI C63.10-2013

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: 23.6°C Relative Humidity: 38.9% 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 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. 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: 23.6°C Relative Humidity: 38.9% 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

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

8.1.2 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: 23.6°C Relative Humidity: 38.9% 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

Bandwidth

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

Average 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**

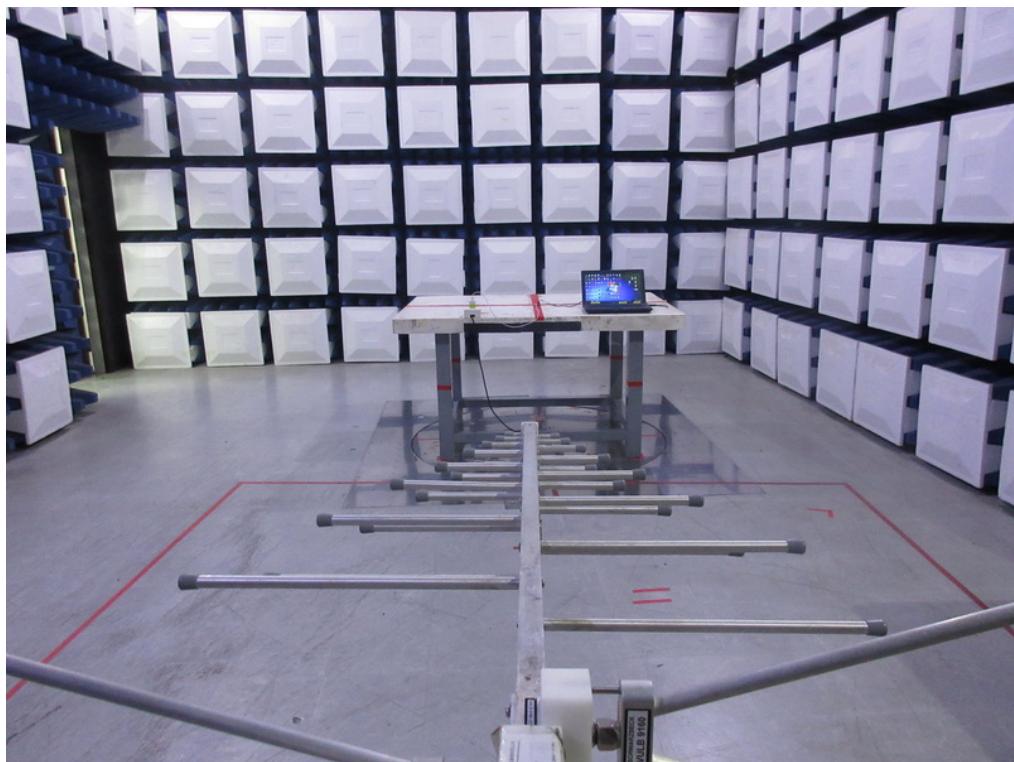
Radiated Measurement Photos

9 kHz to 30 MHz



Radiated Measurement Photos

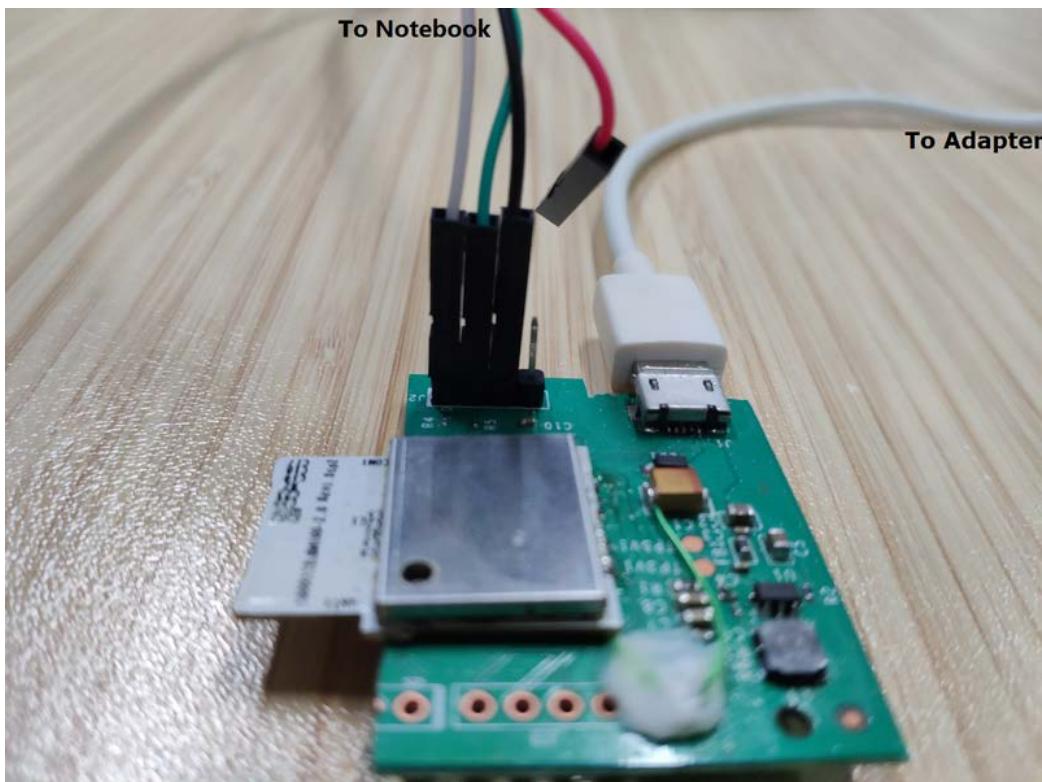
30 MHz to 1000 MHz



Radiated Measurement Photos

Above 1000 MHz

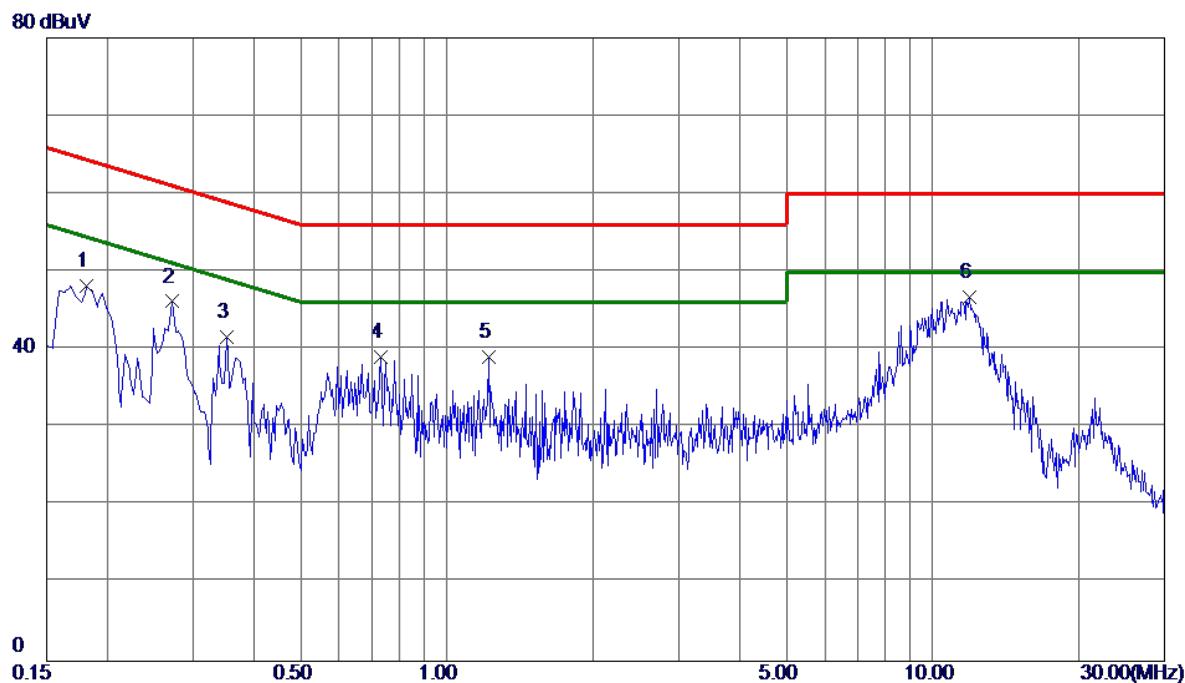


Test Setup Photo - Partial Enlarged

APPENDIX A - CONDUCTED EMISSION

Test Mode: TX Mode

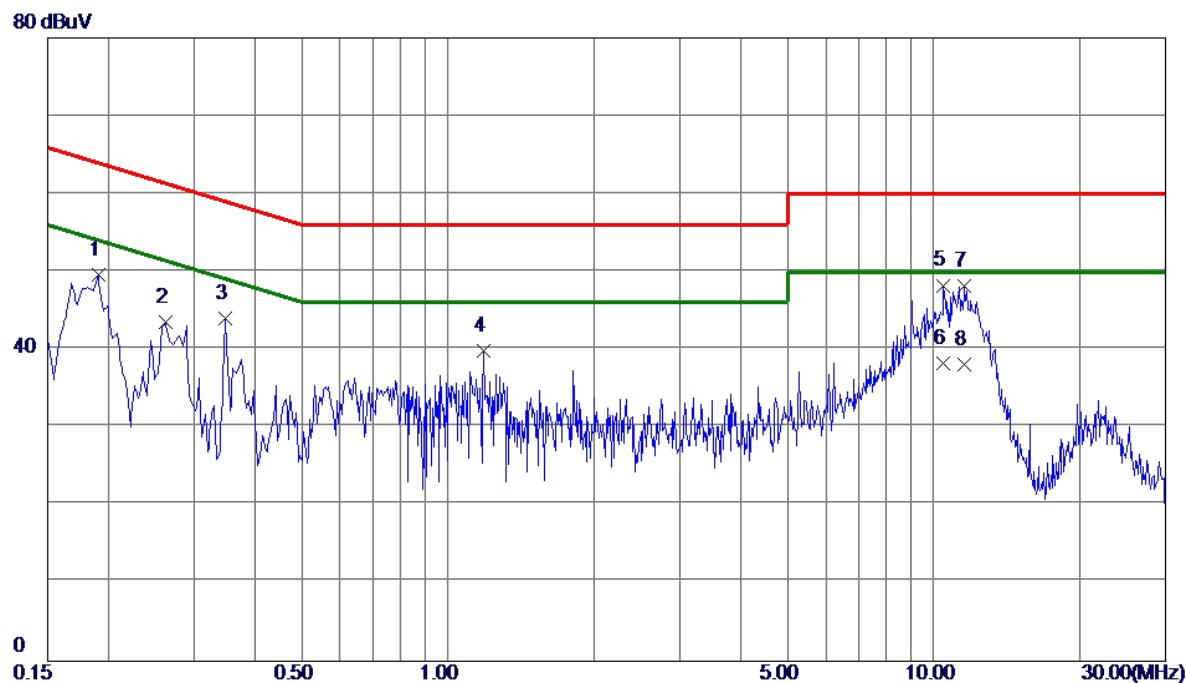
Line



No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV	dB	dBuV	dBuV	dB		
1	0.1815	38.30	9.82	48.12	64.42	-16.30	Peak	
2	0.2714	36.34	9.82	46.16	61.07	-14.91	Peak	
3	0.3525	31.74	9.81	41.55	58.90	-17.35	Peak	
4	0.7304	29.14	9.88	39.02	56.00	-16.98	Peak	
5	1.2164	29.07	9.94	39.01	56.00	-16.99	Peak	
6 *	11.9220	36.19	10.59	46.78	60.00	-13.22	Peak	

Test Mode: TX Mode

Neutral

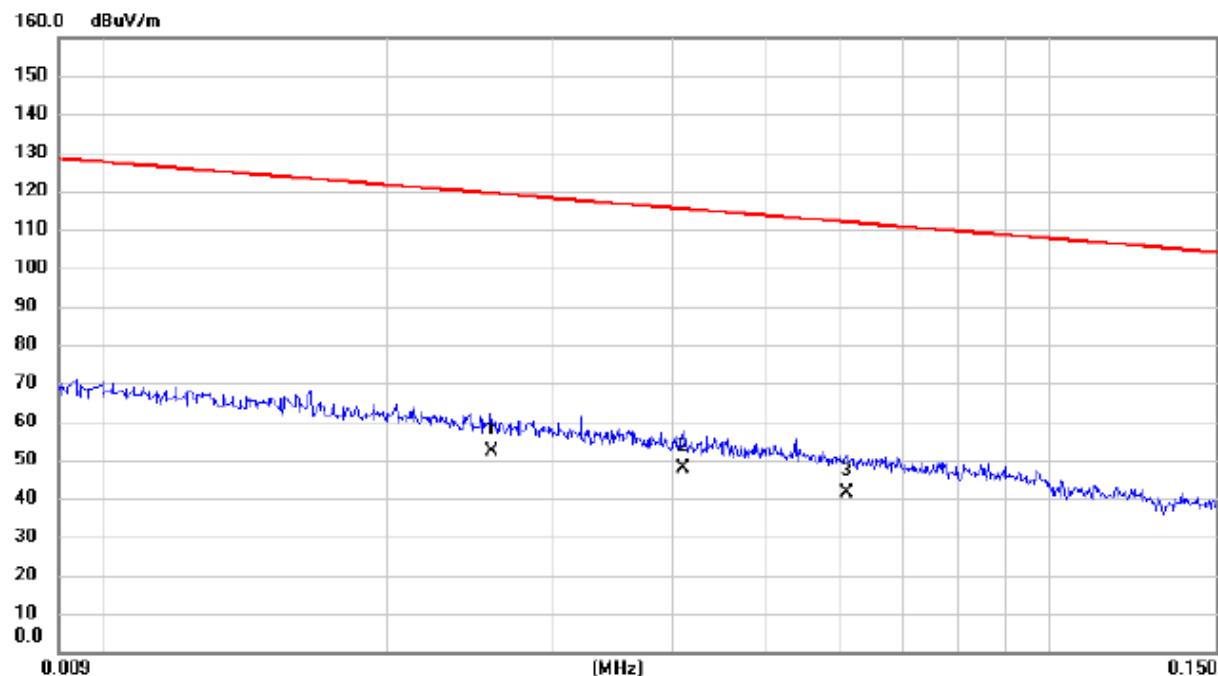


No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1905	39.67	9.91	49.58	64.01	-14.43	Peak	
2	0.2625	33.60	9.92	43.52	61.35	-17.83	Peak	
3	0.3480	34.03	9.95	43.98	59.01	-15.03	Peak	
4	1.1849	29.74	10.13	39.87	56.00	-16.13	Peak	
5	10.4685	37.47	10.77	48.24	60.00	-11.76	Peak	
6 *	10.4685	27.50	10.77	38.27	50.00	-11.73	AVG	
7	11.5710	37.29	10.85	48.14	60.00	-11.86	Peak	
8	11.5710	27.30	10.85	38.15	50.00	-11.85	AVG	

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

Test Mode: TX Mode

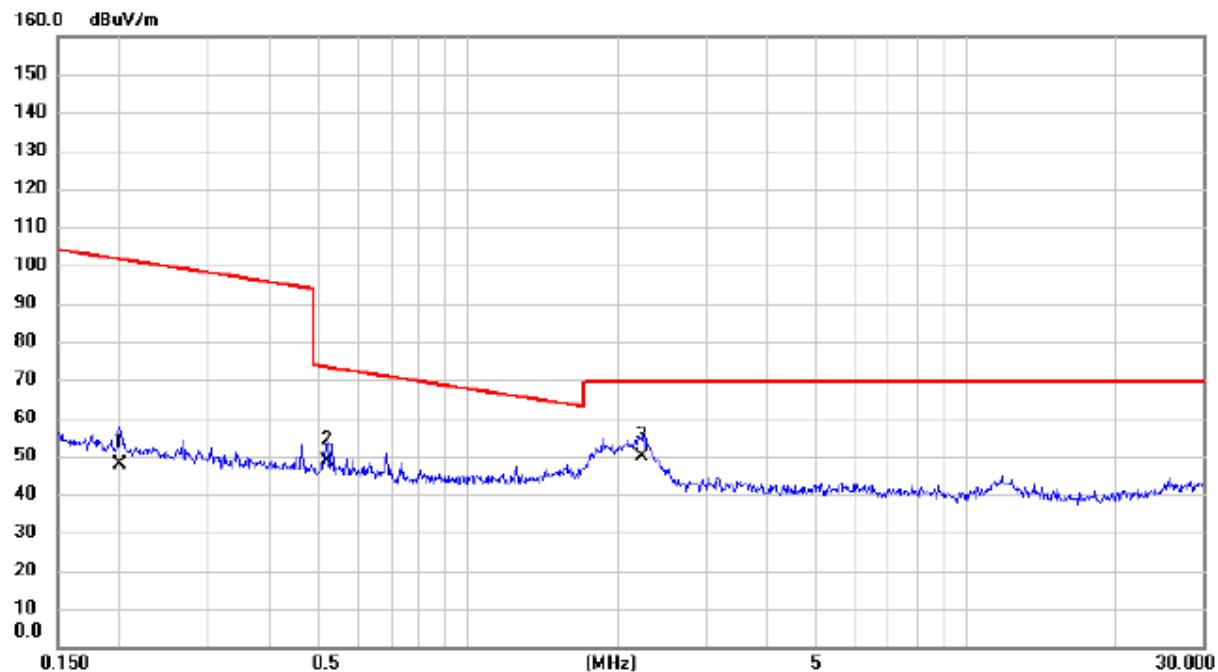
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1	*	0.0258	32.20	19.92	52.12	119.37	-67.25	AVG
2		0.0411	28.10	19.68	47.78	115.33	-67.55	AVG
3		0.0611	21.90	19.31	41.21	111.88	-70.67	AVG

Test Mode: TX Mode

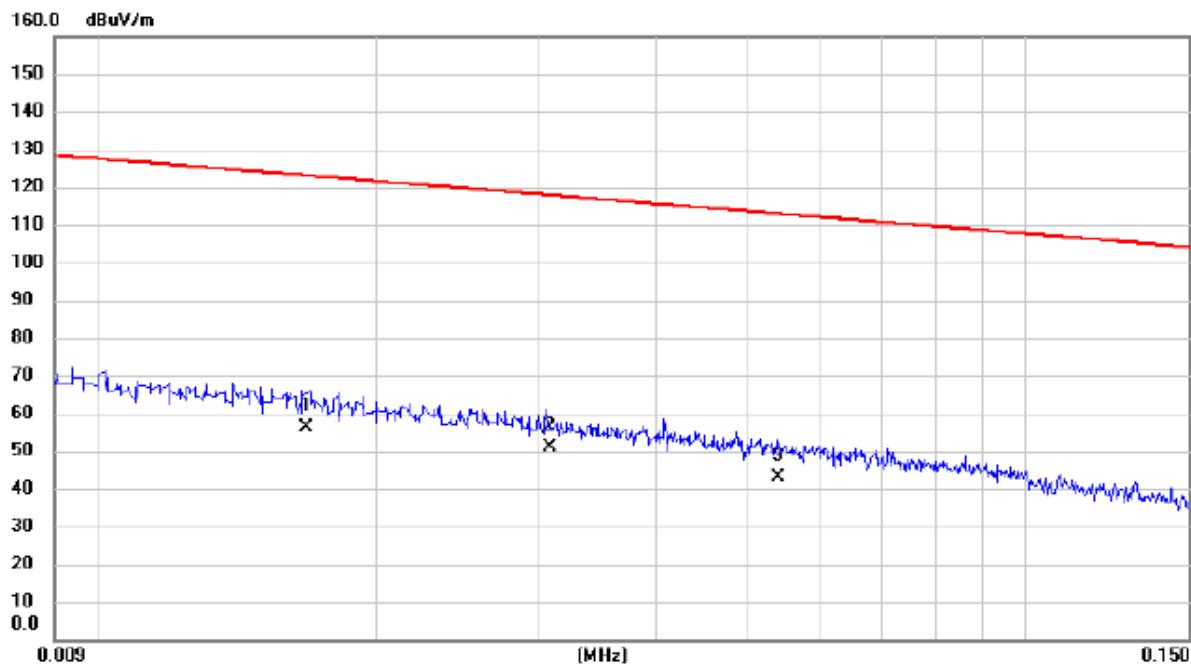
Ant 0°



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1992	30.45	17.16	47.61	101.62	-54.01	AVG	
2		0.5210	31.80	16.95	48.75	73.27	-24.52	QP	
3	*	2.2427	32.80	16.97	49.77	69.54	-19.77	QP	

Test Mode: TX Mode

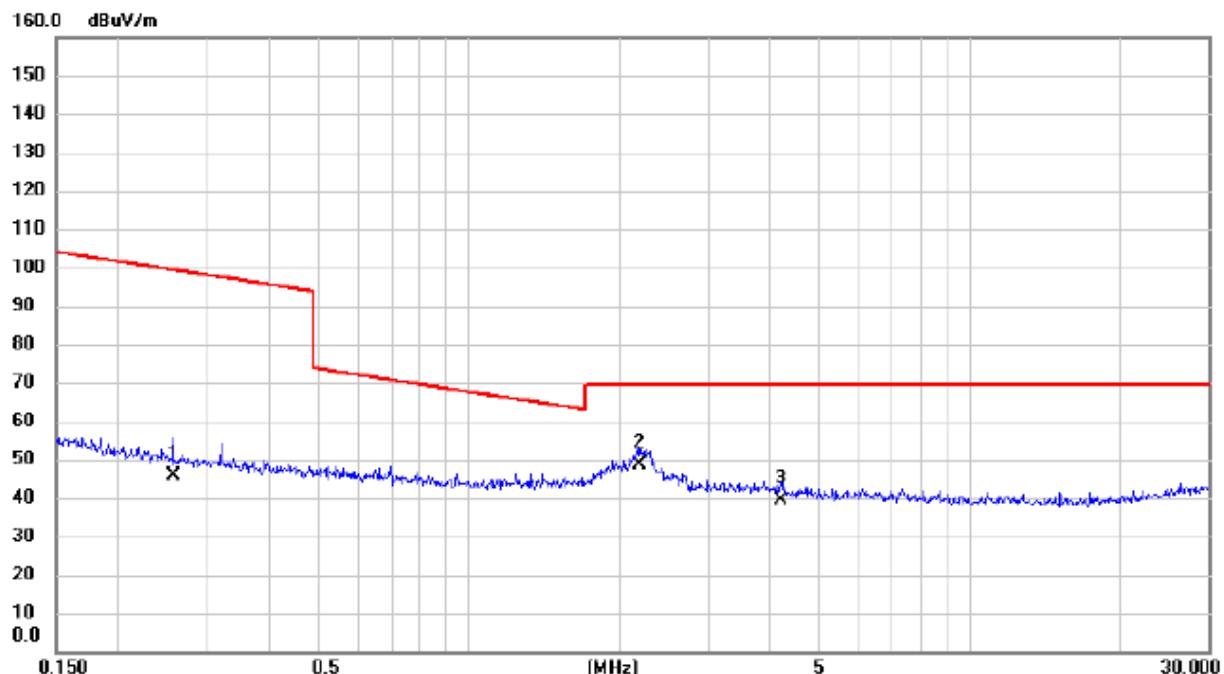
Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
							dB	Detector
1		0.0168	35.90	20.47	56.37	123.10	-66.73	AVG
2	*	0.0307	31.30	19.84	51.14	117.86	-66.72	AVG
3		0.0541	23.60	19.45	43.05	112.94	-69.89	AVG

Test Mode: TX Mode

Ant 90°

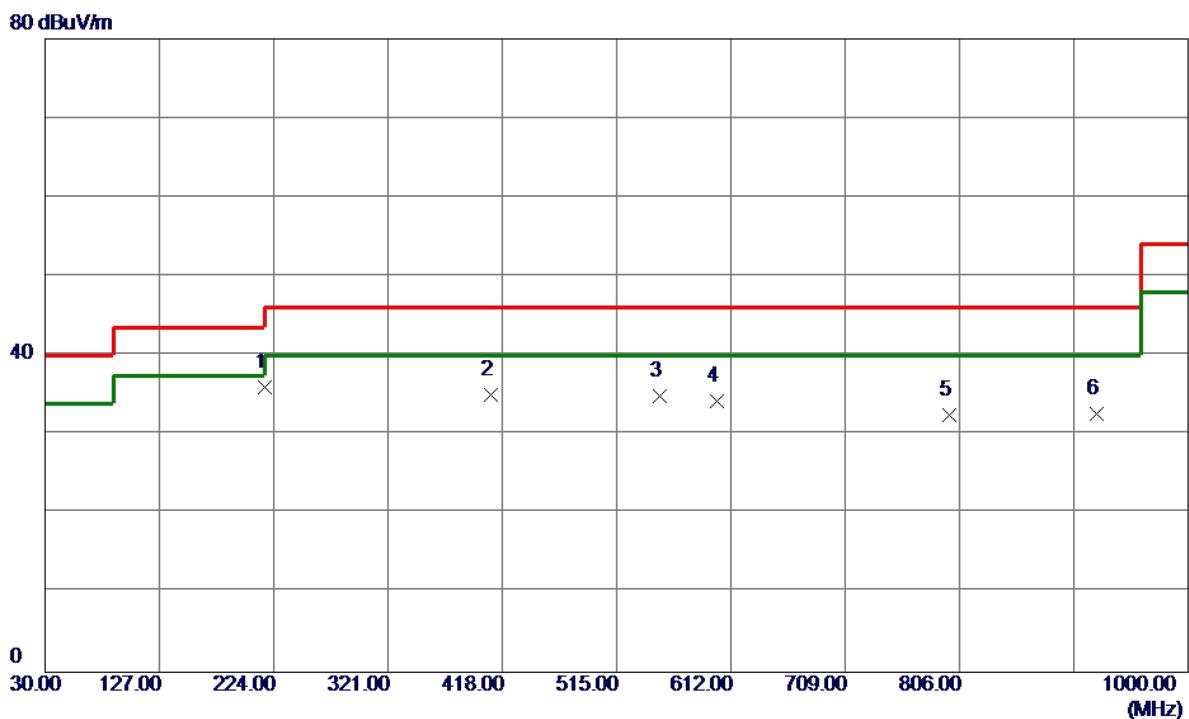


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.2568	28.90	17.06	45.96	99.41	-53.45	AVG	
2	*	2.1840	31.50	17.01	48.51	69.54	-21.03	QP	
3		4.1907	23.80	15.64	39.44	69.54	-30.10	QP	

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

Test Mode: TX B Mode Channel 01

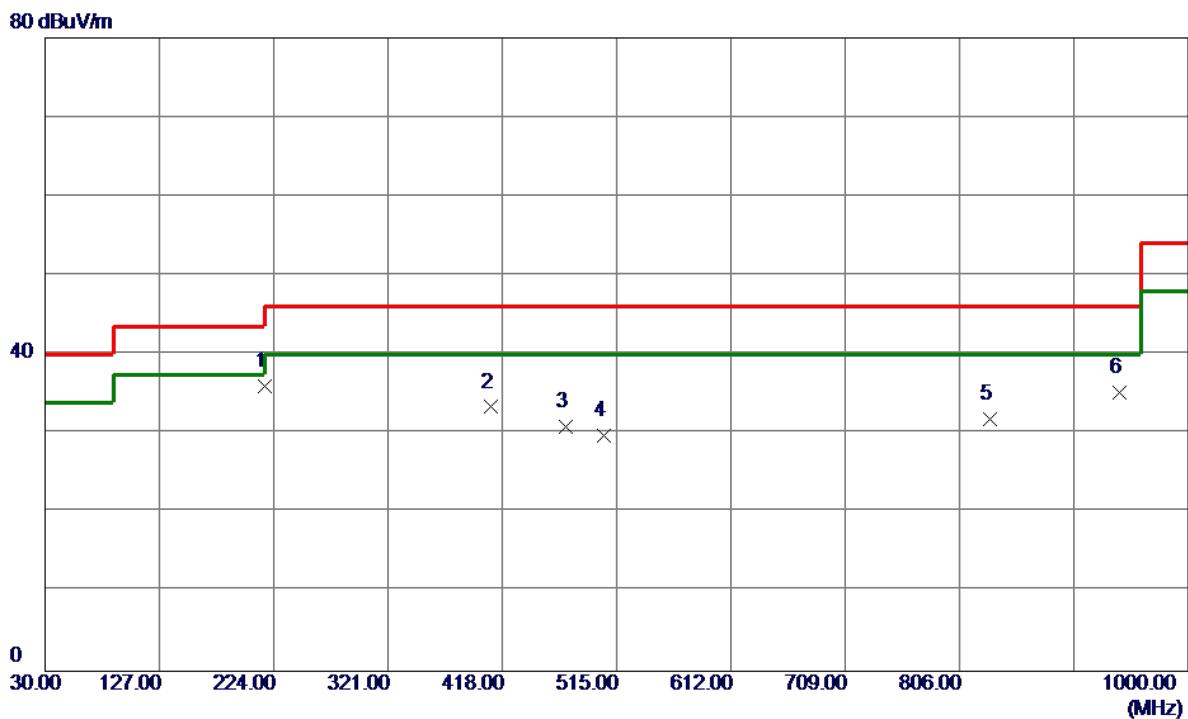
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
							MHz	dBuV/m
1 *	216.2400	50.95	-14.99	35.96	46.00	-10.04	Peak	
2	407.8150	44.16	-9.07	35.09	46.00	-10.91	Peak	
3	551.8600	40.30	-5.49	34.81	46.00	-11.19	Peak	
4	599.8750	40.61	-6.30	34.31	46.00	-11.69	Peak	
5	797.2700	33.74	-1.20	32.54	46.00	-13.46	Peak	
6	922.8850	32.31	0.32	32.63	46.00	-13.37	Peak	

Test Mode: TX B Mode Channel 01

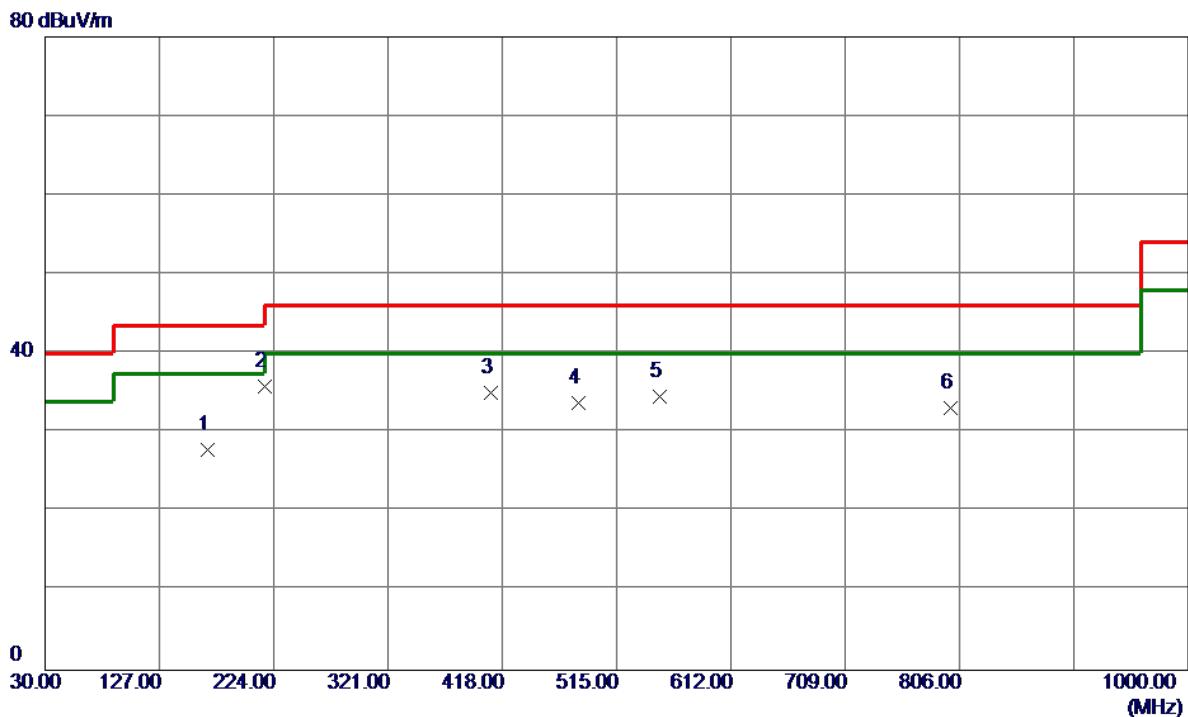
Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	216.2400	50.93	-14.99	35.94	46.00	-10.06	Peak	
2	407.8150	42.43	-9.07	33.36	46.00	-12.64	Peak	
3	471.8350	38.71	-7.89	30.82	46.00	-15.18	Peak	
4	503.8450	38.09	-8.29	29.80	46.00	-16.20	Peak	
5	831.7050	33.34	-1.53	31.81	46.00	-14.19	Peak	
6	941.8000	34.10	1.08	35.18	46.00	-10.82	Peak	

Test Mode: TX B Mode Channel 06

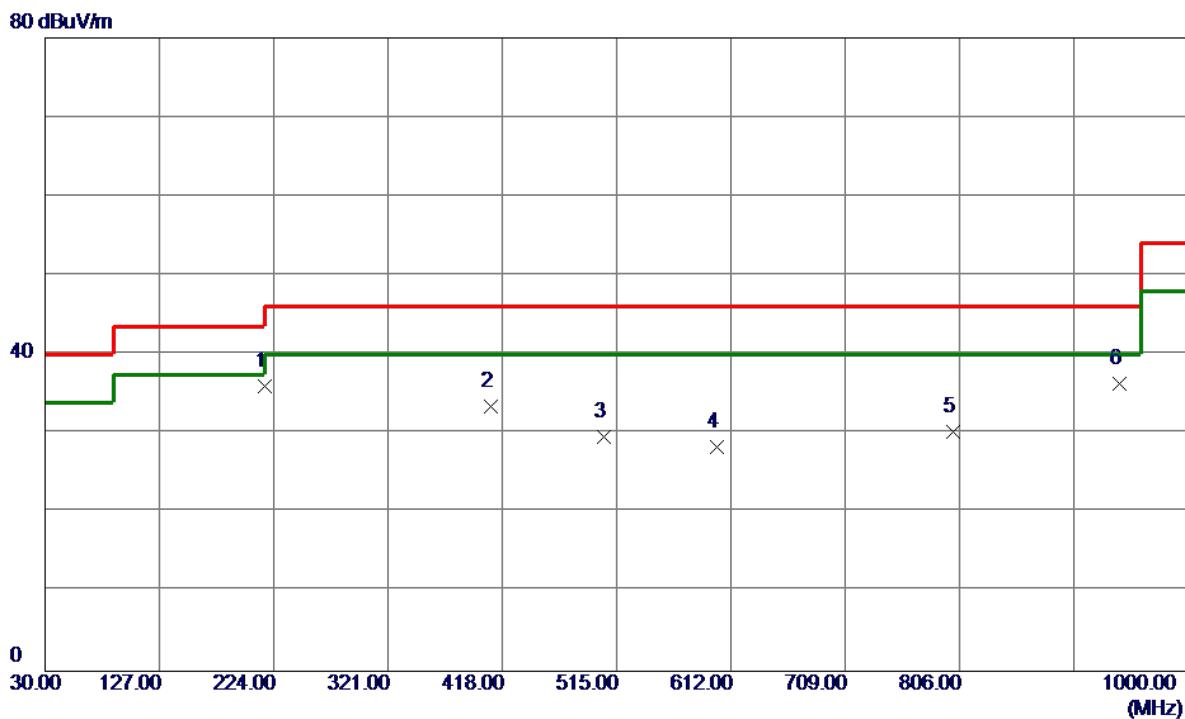
Vertical



No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	168.2250	38.97	-11.09	27.88	43.50	-15.62	Peak	
2 *	216.2400	50.87	-14.99	35.88	46.00	-10.12	Peak	
3	407.8150	44.14	-9.07	35.07	46.00	-10.93	Peak	
4	482.9900	41.92	-8.15	33.77	46.00	-12.23	Peak	
5	551.8600	40.05	-5.49	34.56	46.00	-11.44	Peak	
6	798.2400	34.21	-1.15	33.06	46.00	-12.94	Peak	

Test Mode: TX B Mode Channel 06

Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	216.2400	50.95	-14.99	35.96	46.00	-10.04	Peak	
2	407.8150	42.47	-9.07	33.40	46.00	-12.60	Peak	
3	503.8450	37.84	-8.29	29.55	46.00	-16.45	Peak	
4	599.8750	34.67	-6.30	28.37	46.00	-17.63	Peak	
5	800.1800	31.24	-1.04	30.20	46.00	-15.80	Peak	
6 *	941.8000	35.24	1.08	36.32	46.00	-9.68	Peak	

Test Mode: TX B Mode Channel 11

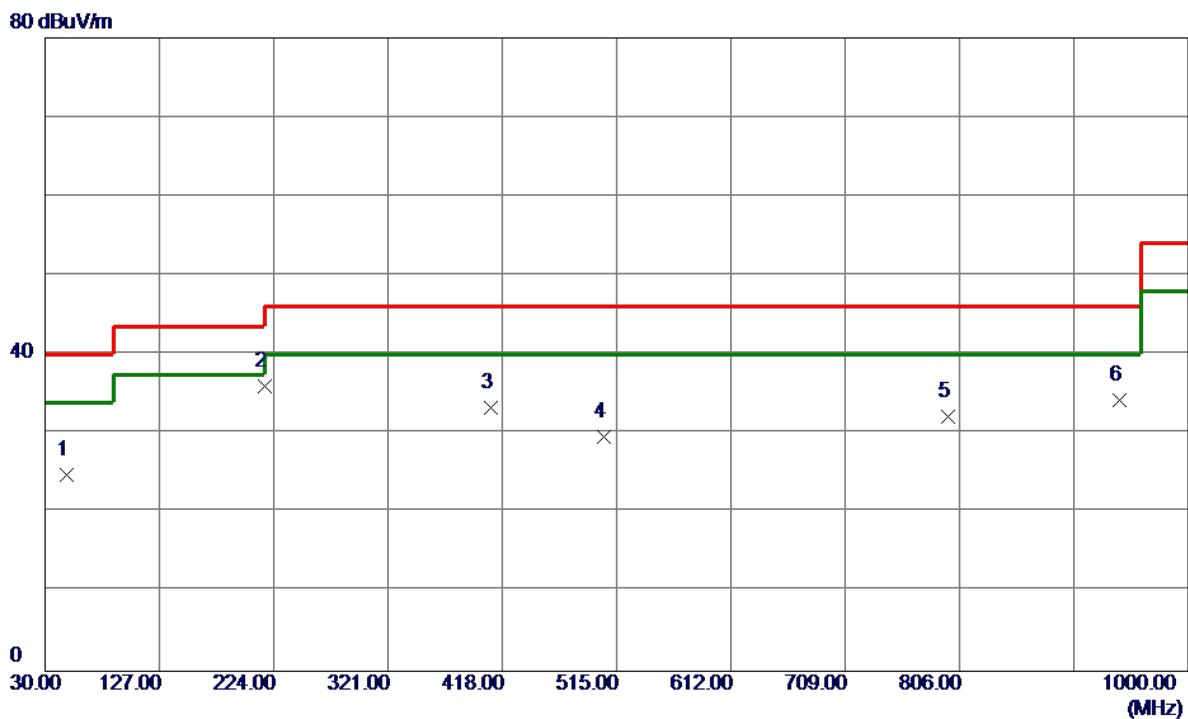
Vertical



No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	216.2400	50.85	-14.99	35.86	46.00	-10.14	Peak	
2 *	407.8150	45.33	-9.07	36.26	46.00	-9.74	Peak	
3	551.8600	40.80	-5.49	35.31	46.00	-10.69	Peak	
4	599.8750	40.51	-6.30	34.21	46.00	-11.79	Peak	
5	797.2700	33.78	-1.20	32.58	46.00	-13.42	Peak	
6	921.9150	34.51	0.28	34.79	46.00	-11.21	Peak	

Test Mode: TX B Mode Channel 11

Horizontal



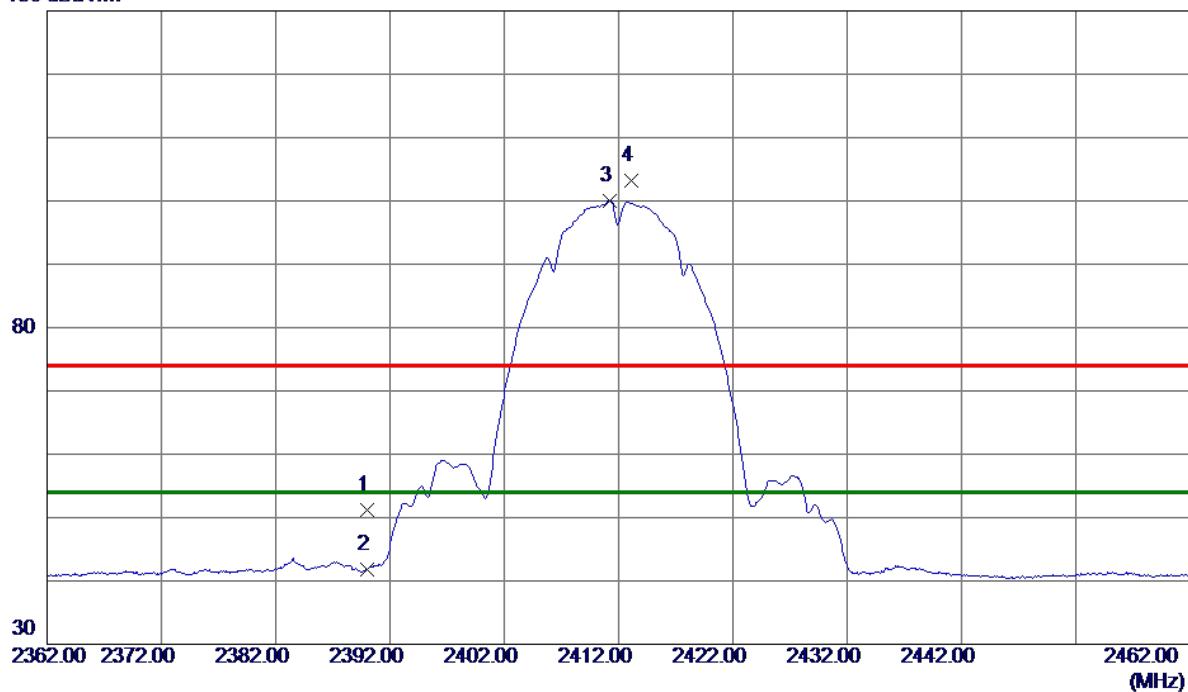
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	47.9450	39.69	-14.82	24.87	40.00	-15.13	Peak	
2 *	216.2400	51.01	-14.99	36.02	46.00	-9.98	Peak	
3	407.8150	42.42	-9.07	33.35	46.00	-12.65	Peak	
4	503.8450	37.87	-8.29	29.58	46.00	-16.42	Peak	
5	796.7849	33.46	-1.23	32.23	46.00	-13.77	Peak	
6	941.8000	33.20	1.08	34.28	46.00	-11.72	Peak	

APPENDIX D - RADIATED EMISSION (ABOVE 1000 MHZ)

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

Vertical

130 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2390.0000	42.01	9.11	51.12	74.00	-22.88	Peak	
2	2390.0000	32.72	9.11	41.83	54.00	-12.17	AVG	
3 *	2411.2500	90.88	9.16	100.04	54.00	46.04	AVG	No Limit
4	2413.1500	93.97	9.17	103.14	74.00	29.14	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

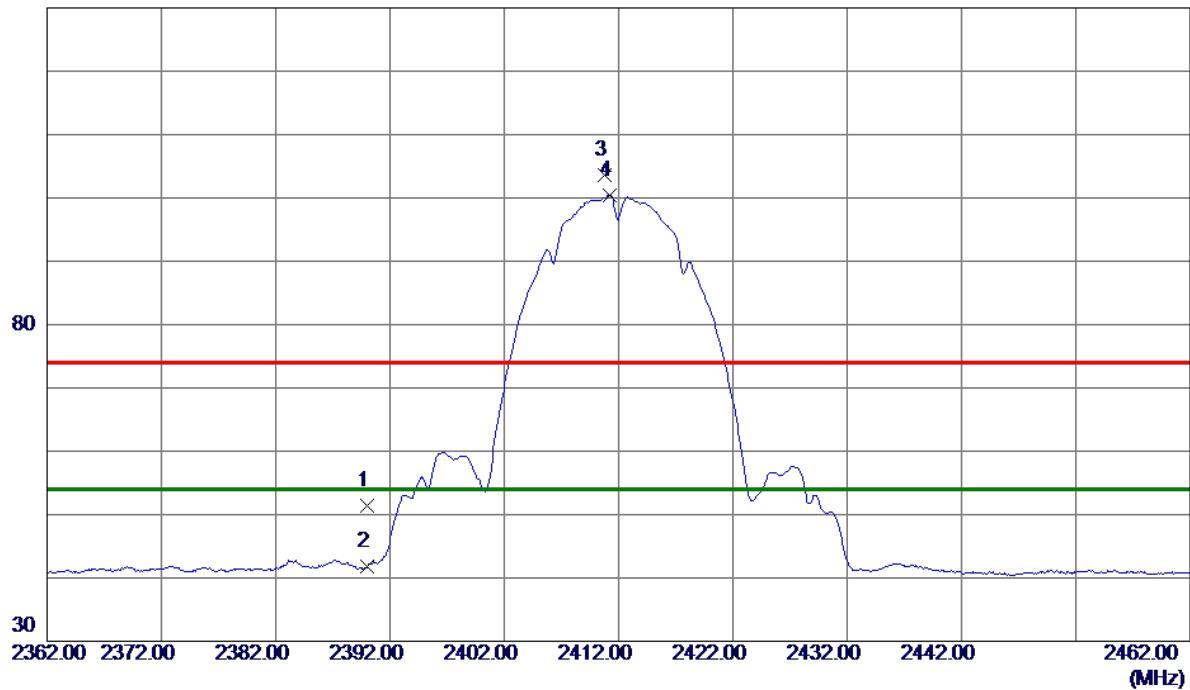
Vertical

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4823.9430	44.05	4.83	48.88	74.00	-25.12	Peak	
2 *	4824.0160	36.11	4.83	40.94	54.00	-13.06	AVG	

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

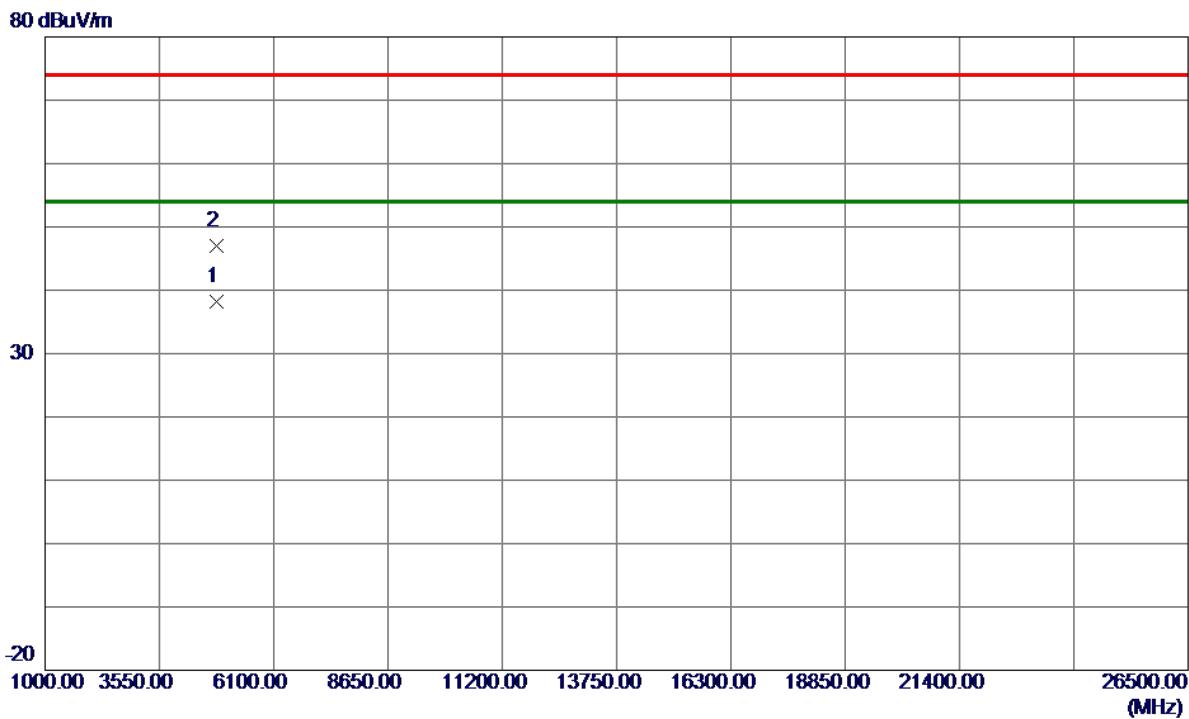
Horizontal

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	42.28	9.11	51.39	74.00	-22.61	Peak	
2	2390.0000	32.69	9.11	41.80	54.00	-12.20	AVG	
3	2410.8000	94.41	9.16	103.57	74.00	29.57	Peak	No Limit
4 *	2411.2000	91.31	9.16	100.47	54.00	46.47	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

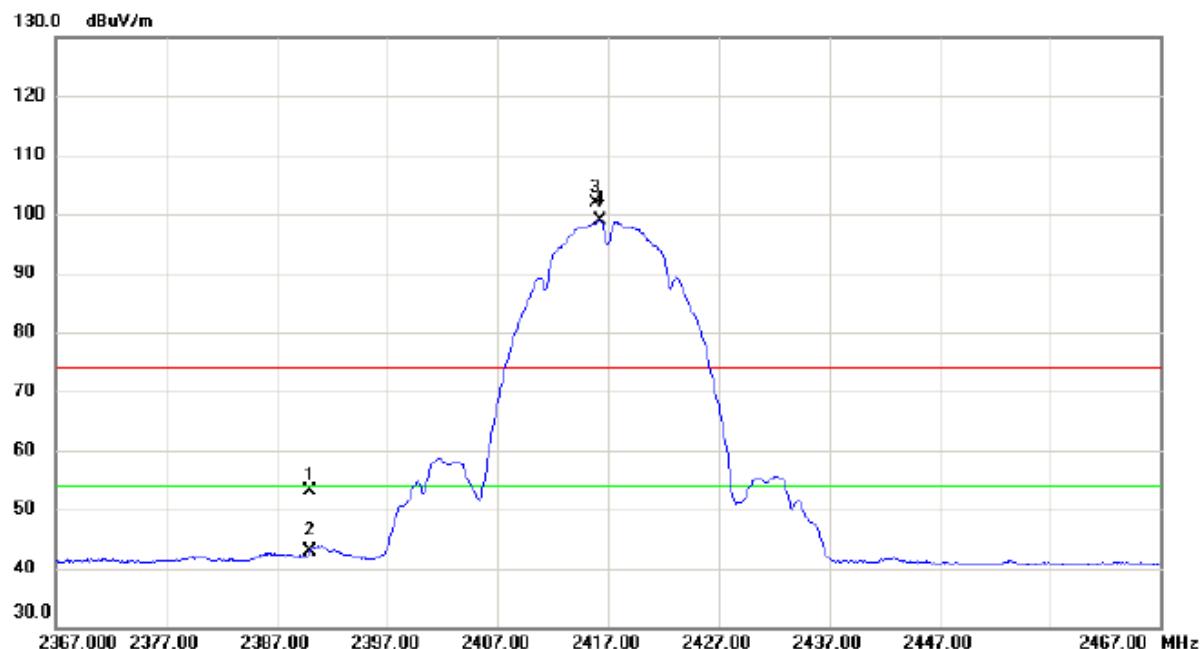
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4823.9060	33.44	4.83	38.27	54.00	-15.73	AVG	
2	4824.1970	42.10	4.83	46.93	74.00	-27.07	Peak	

Orthogonal Axis : X

Test Mode : TX B Mode 2417MHz

Vertical

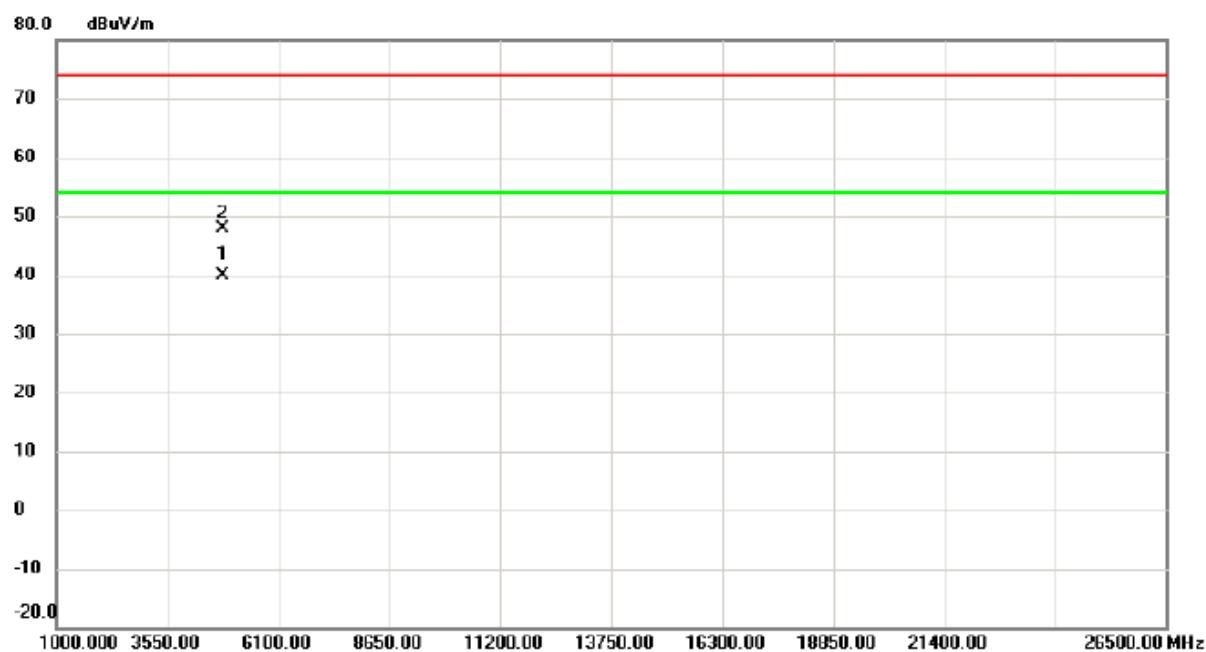


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	
1		2390.000	44.11	9.11	53.22	74.00	-20.78	peak
2		2390.000	33.66	9.11	42.77	54.00	-11.23	AVG
3	X	2415.900	92.81	9.18	101.99	74.00	27.99	peak No Limit
4	*	2416.250	89.80	9.18	98.98	54.00	44.98	AVG No Limit

Orthogonal Axis : X

Test Mode : TX B Mode 2417MHz

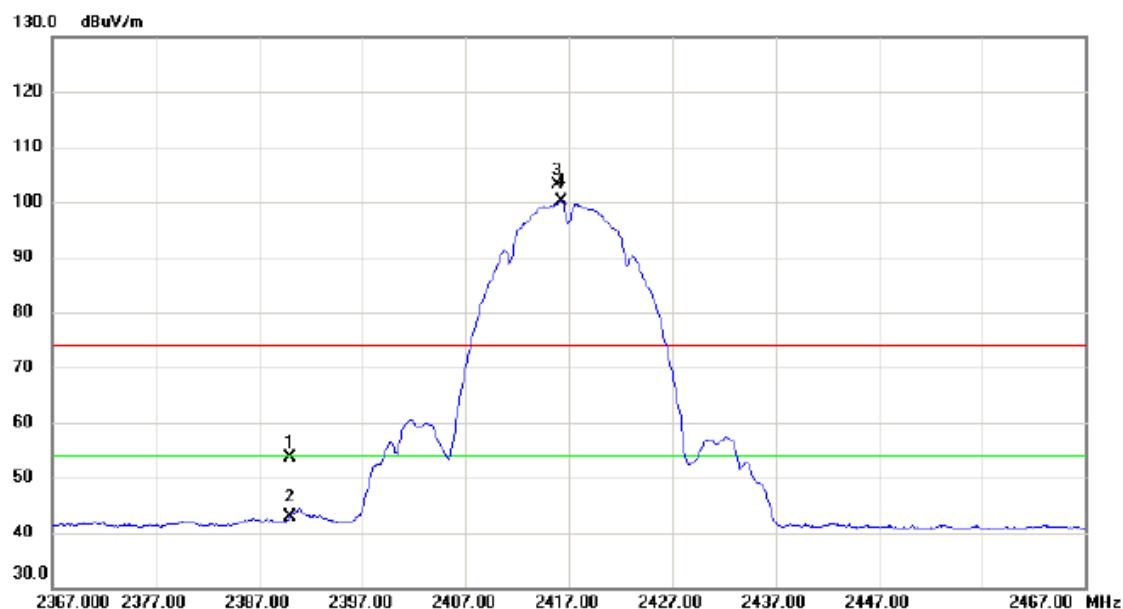
Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	*	4834.001	34.91	4.87	39.78	54.00	-14.22	AVG
2		4834.099	43.00	4.87	47.87	74.00	-26.13	peak

Orthogonal Axis : X

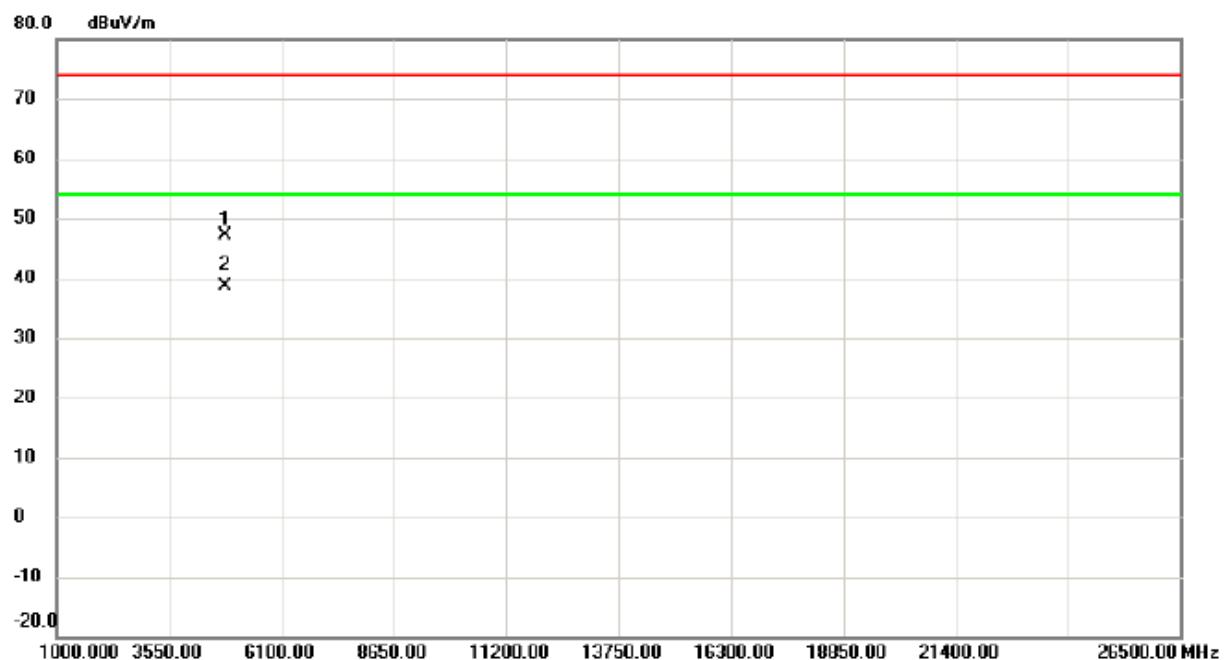
Test MODE : TX B Mode 2417MHz

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		2390.000	44.48	9.11	53.59	74.00	-20.41	peak
2		2390.000	33.82	9.11	42.93	54.00	-11.07	AVG
3	X	2415.850	93.94	9.18	103.12	74.00	29.12	peak No Limit
4	*	2416.250	90.87	9.18	100.05	54.00	46.05	AVG No Limit

Orthogonal Axis : X

Test Mode : TX B Mode 2417MHz

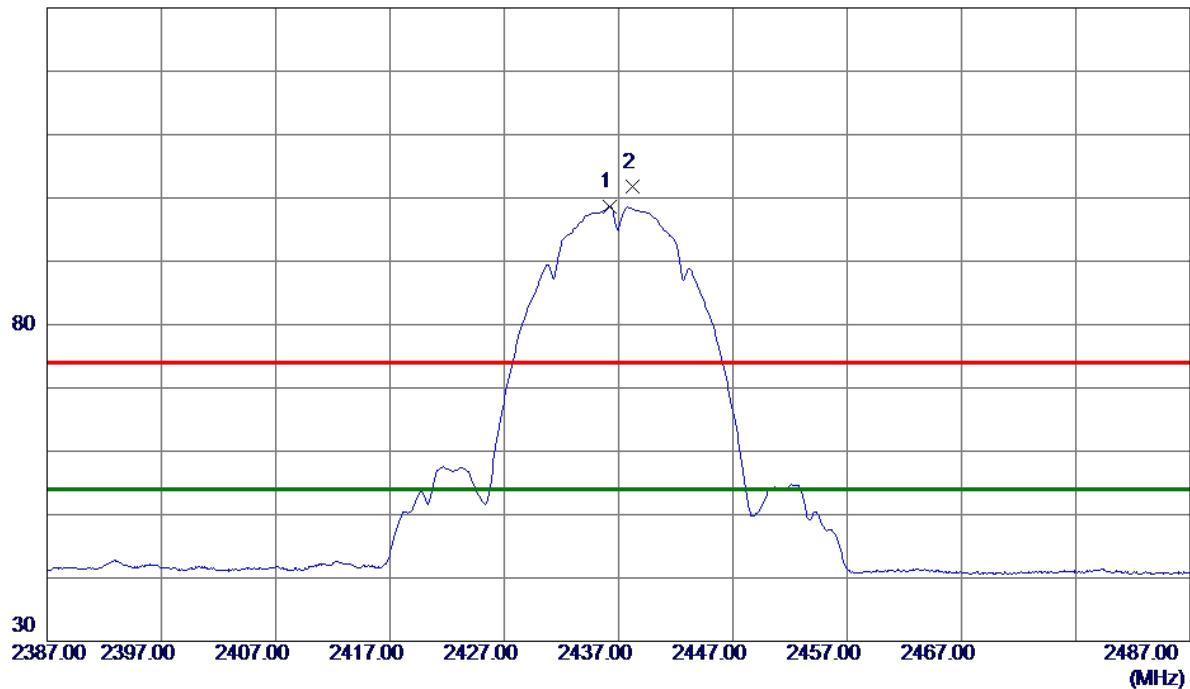
Horizontal

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		4833.690	42.32	4.86	47.18	74.00	-26.82	peak
2	*	4833.959	33.65	4.87	38.52	54.00	-15.48	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

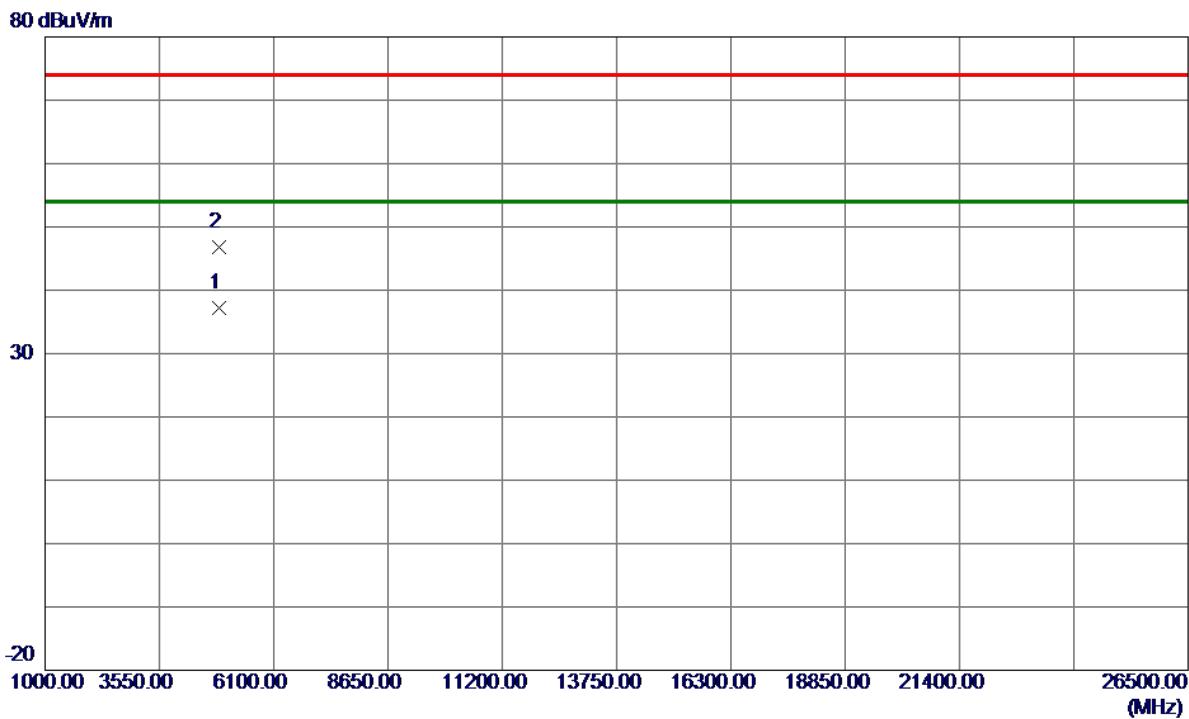
Vertical

130 dBuV/m



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1 *	2436.2500	89.40	9.23	98.63	54.00	44.63	AVG	No Limit
2	2438.2500	92.47	9.23	101.70	74.00	27.70	Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

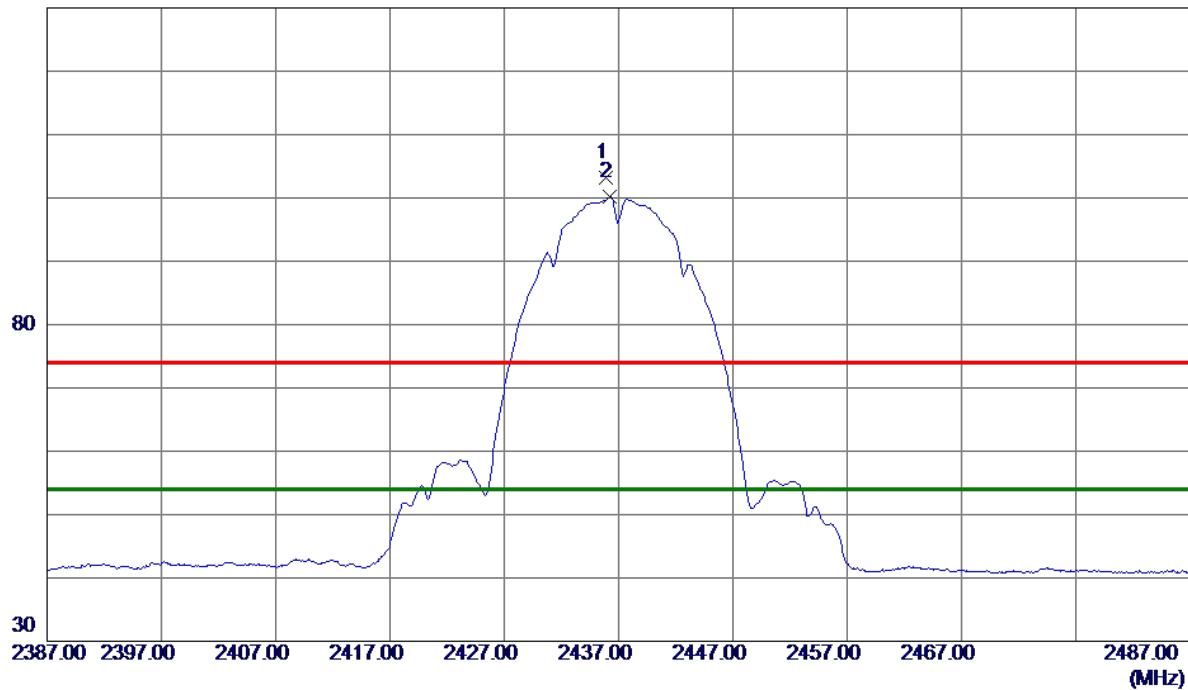
Vertical

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4873.8910	32.22	5.00	37.22	54.00	-16.78	AVG	
2	4874.2040	41.71	5.00	46.71	74.00	-27.29	Peak	

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

Horizontal

130 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2435.8500	93.93	9.23	103.16	74.00	29.16	Peak	No Limit
2 *	2436.2000	90.91	9.23	100.14	54.00	46.14	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

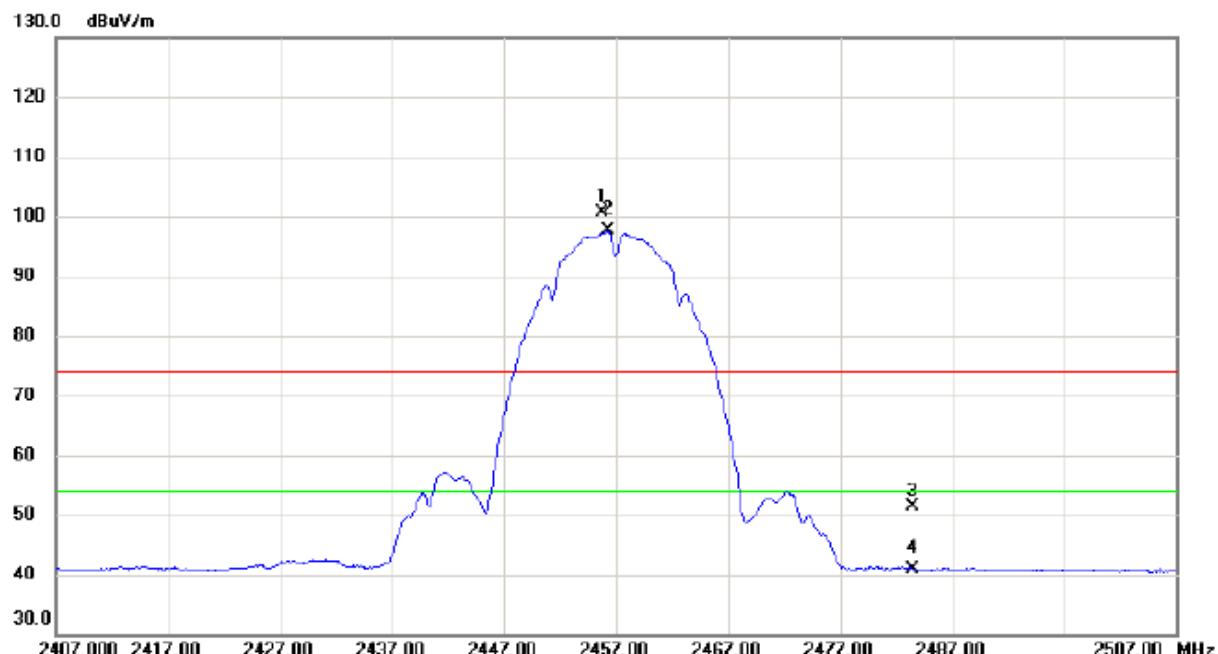
Horizontal

No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4873.6450	40.32	5.00	45.32	74.00	-28.68	Peak	
2 *	4873.9560	30.79	5.00	35.79	54.00	-18.21	AVG	

Orthogonal Axis : X

Test Mode : TX B Mode 2457MHz

Vertical

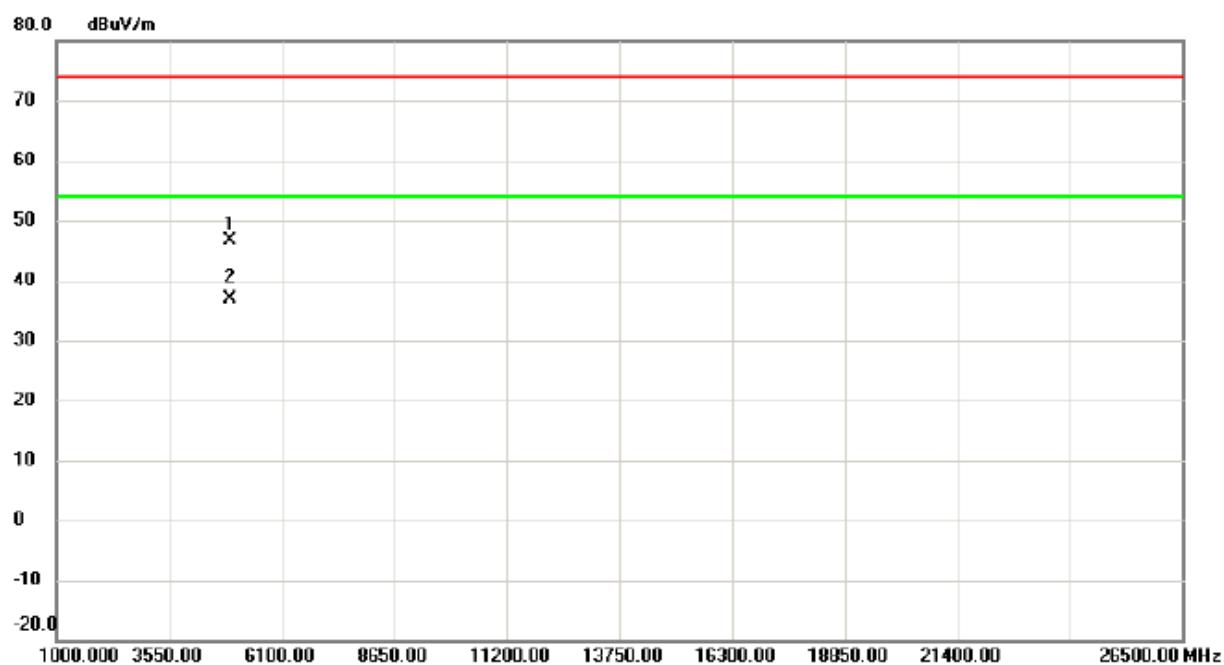


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2455.750	91.26	9.28	100.54	74.00	26.54	peak	No Limit
2	*	2456.250	88.26	9.28	97.54	54.00	43.54	AVG	No Limit
3		2483.500	41.96	9.35	51.31	74.00	-22.69	peak	
4		2483.500	31.50	9.35	40.85	54.00	-13.15	AVG	

Orthogonal Axis : X

Test Mode : TX B Mode 2457MHz

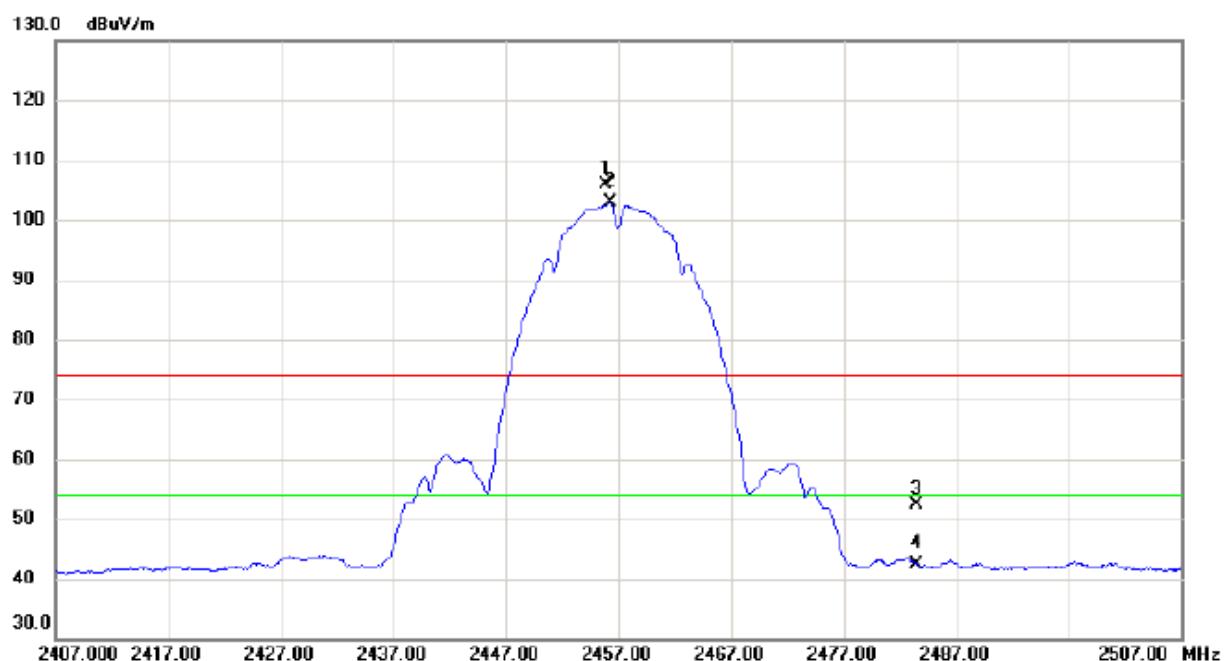
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		4913.984	41.59	5.14	46.73	74.00	-27.27	peak
2 *		4914.051	31.74	5.14	36.88	54.00	-17.12	AVG

Orthogonal Axis : X

Test Mode : TX B Mode 2457MHz

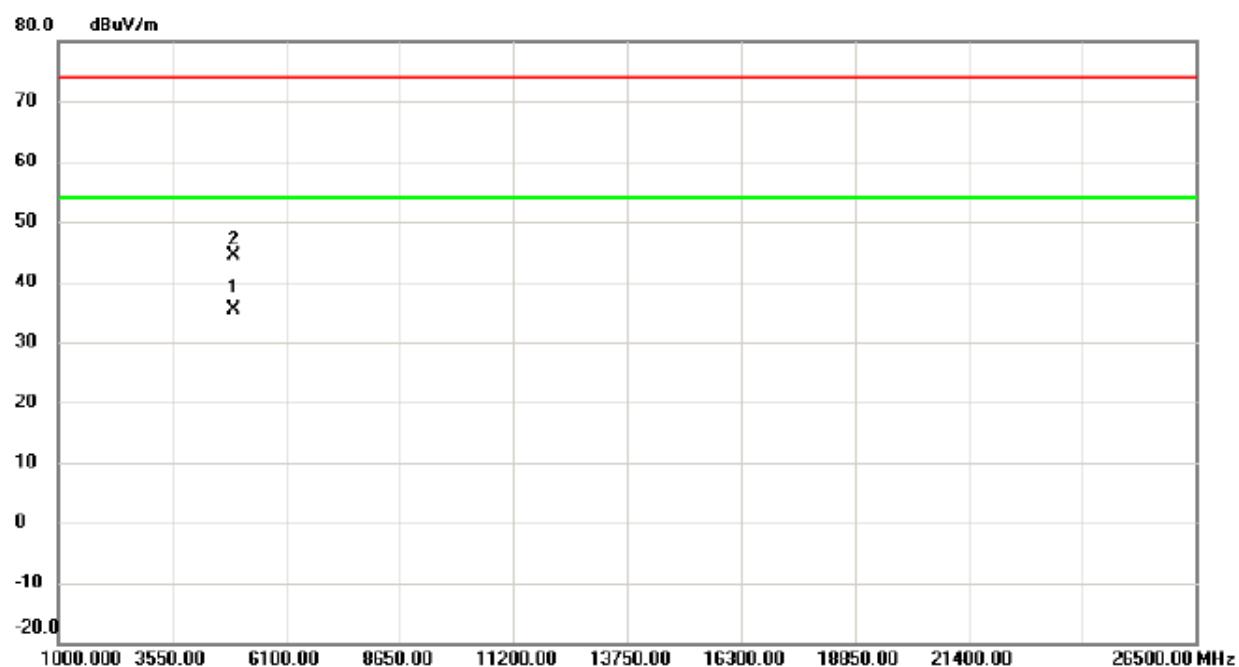
Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	X	2455.800	96.56	9.28	105.84	74.00	31.84	peak No Limit
2	*	2456.250	93.52	9.28	102.80	54.00	48.80	AVG No Limit
3		2483.500	43.12	9.35	52.47	74.00	-21.53	peak
4		2483.500	32.99	9.35	42.34	54.00	-11.66	AVG

Orthogonal Axis : X

Test Mode : TX B Mode 2457MHz

Horizontal

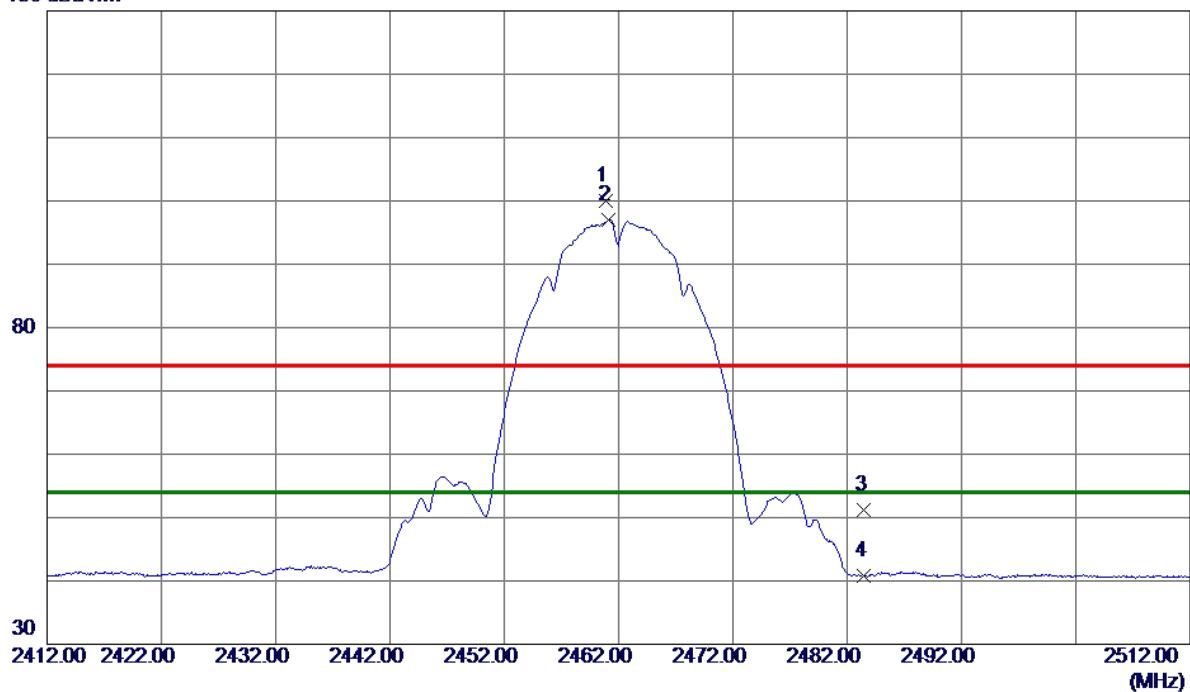


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1	*	4913.999	30.35	5.14	35.49	54.00	-18.51	AVG
2		4914.090	39.35	5.14	44.49	74.00	-29.51	peak

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

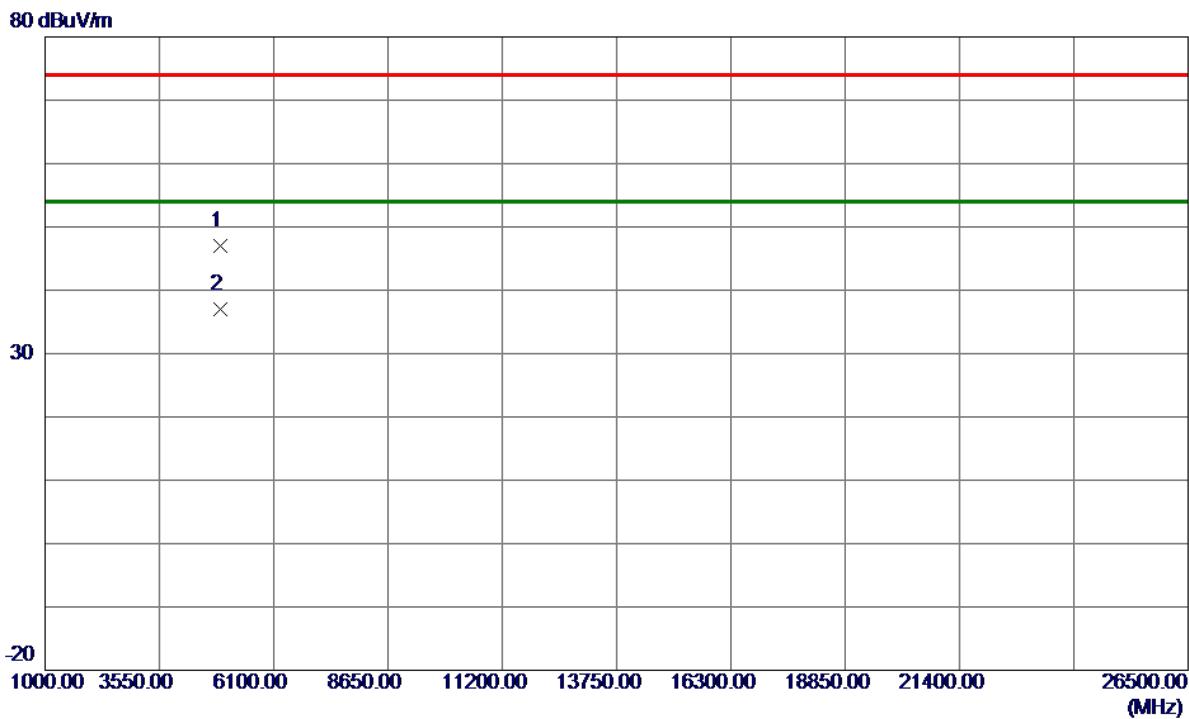
Vertical

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	2460.8500	90.63	9.29	99.92	74.00	25.92	Peak	No Limit
2 *	2461.1500	87.72	9.29	97.01	54.00	43.01	AVG	No Limit
3	2483.5000	41.79	9.35	51.14	74.00	-22.86	Peak	
4	2483.5000	31.45	9.35	40.80	54.00	-13.20	AVG	

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

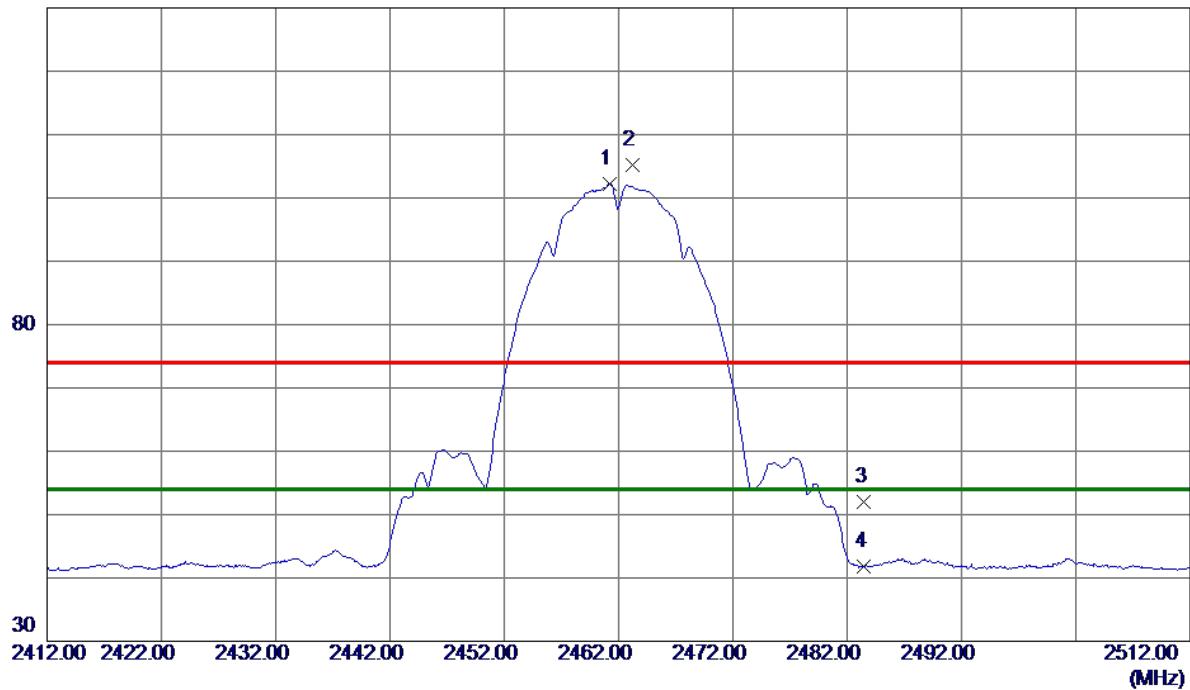
Vertical

No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4923.8760	41.85	5.17	47.02	74.00	-26.98	Peak	
2 *	4923.9570	31.79	5.18	36.97	54.00	-17.03	AVG	

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

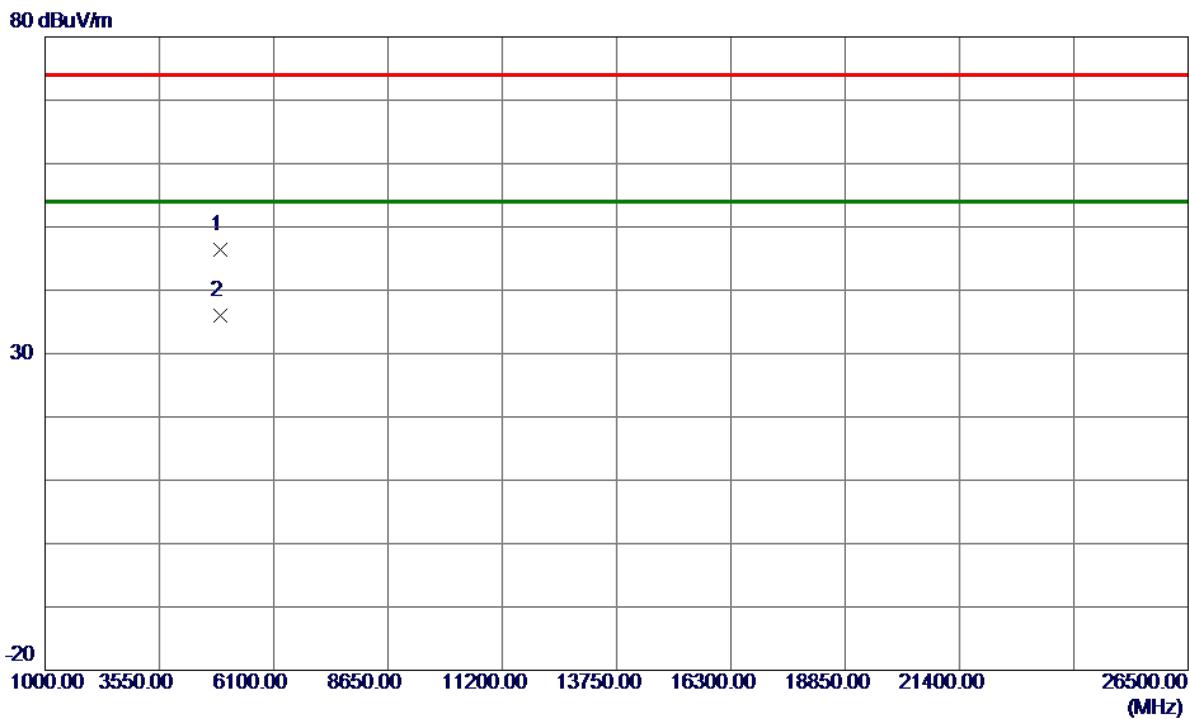
Horizontal

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 *	2461.2500	92.88	9.29	102.17	54.00	48.17	AVG	No Limit
2	2463.2000	95.94	9.30	105.24	74.00	31.24	Peak	No Limit
3	2483.5000	42.69	9.35	52.04	74.00	-21.96	Peak	
4	2483.5000	32.51	9.35	41.86	54.00	-12.14	AVG	

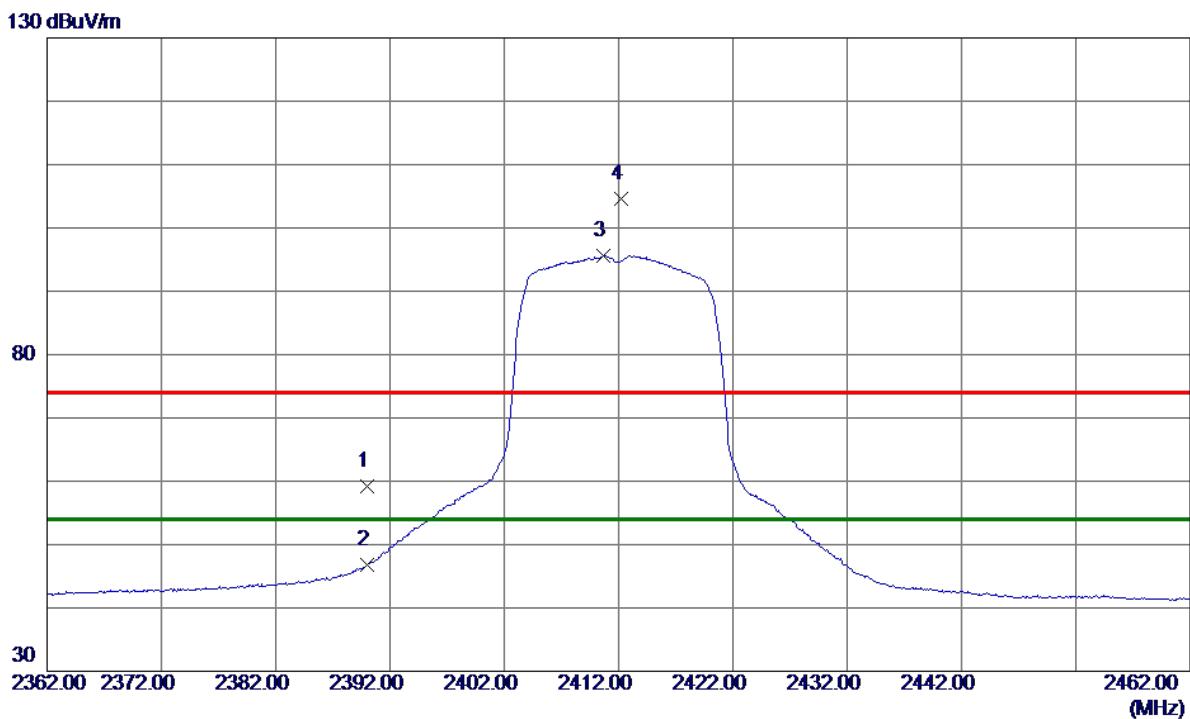
Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4923.1380	41.14	5.17	46.31	74.00	-27.69	Peak	
2 *	4923.8360	30.84	5.17	36.01	54.00	-17.99	AVG	

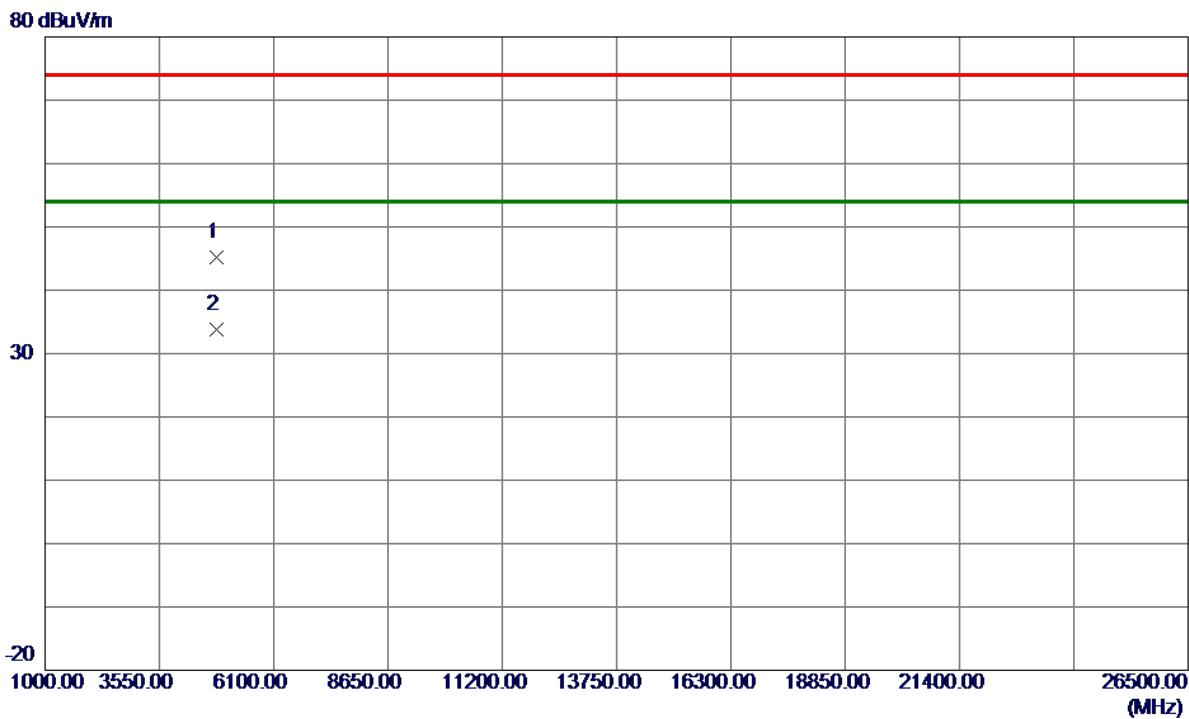
Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure	Limit	Margin		Detector	Comment
						MHz	dBuV/m	dB	dBuV/m
1	2390.0000	50.03	9.11	59.14	74.00	-14.86		Peak	
2	2390.0000	37.77	9.11	46.88	54.00	-7.12		AVG	
3 *	2410.7000	86.49	9.16	95.65	54.00	41.65		AVG	No Limit
4	2412.2500	95.51	9.17	104.68	74.00	30.68		Peak	No Limit

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

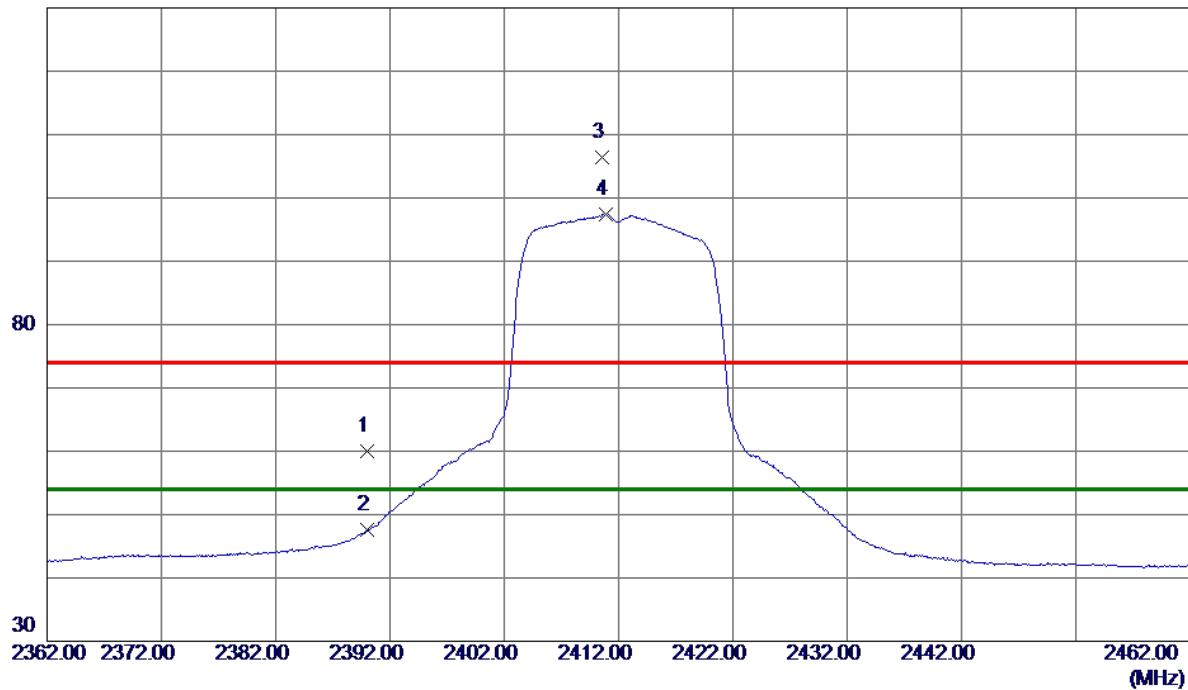
Vertical

No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4823.4730	41.64	3.57	45.21	74.00	-28.79	Peak	
2 *	4824.9910	30.25	3.57	33.82	54.00	-20.18	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

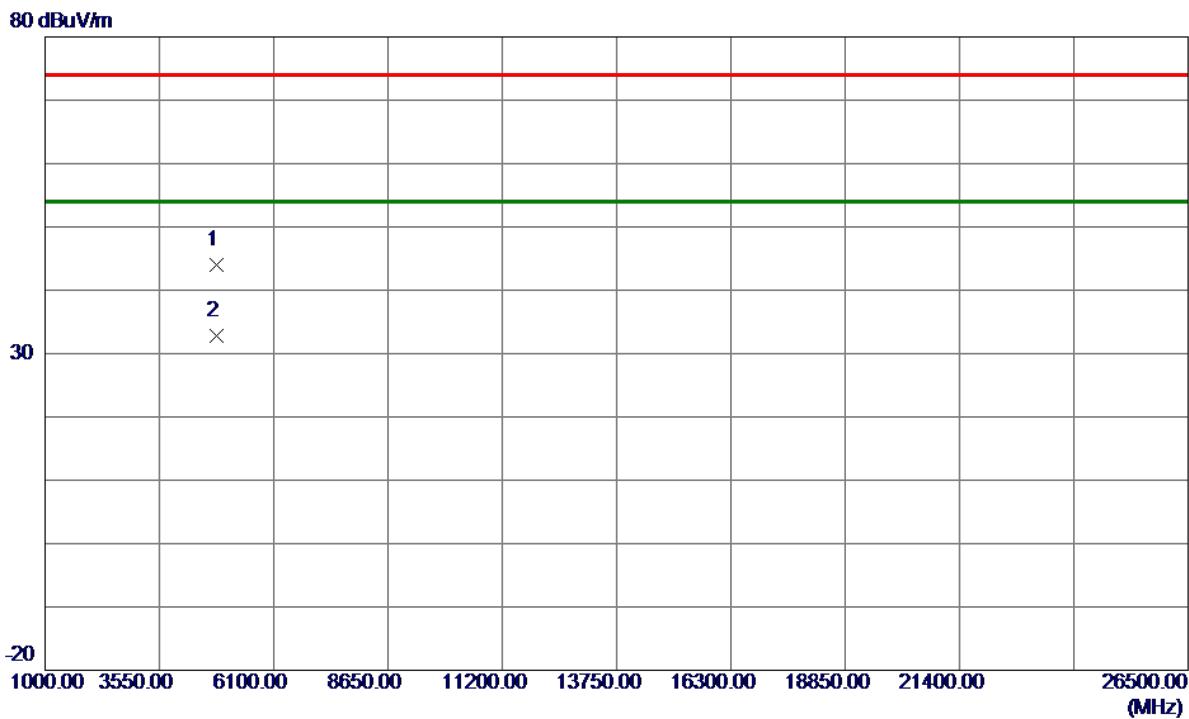
Horizontal

130 dBuV/m



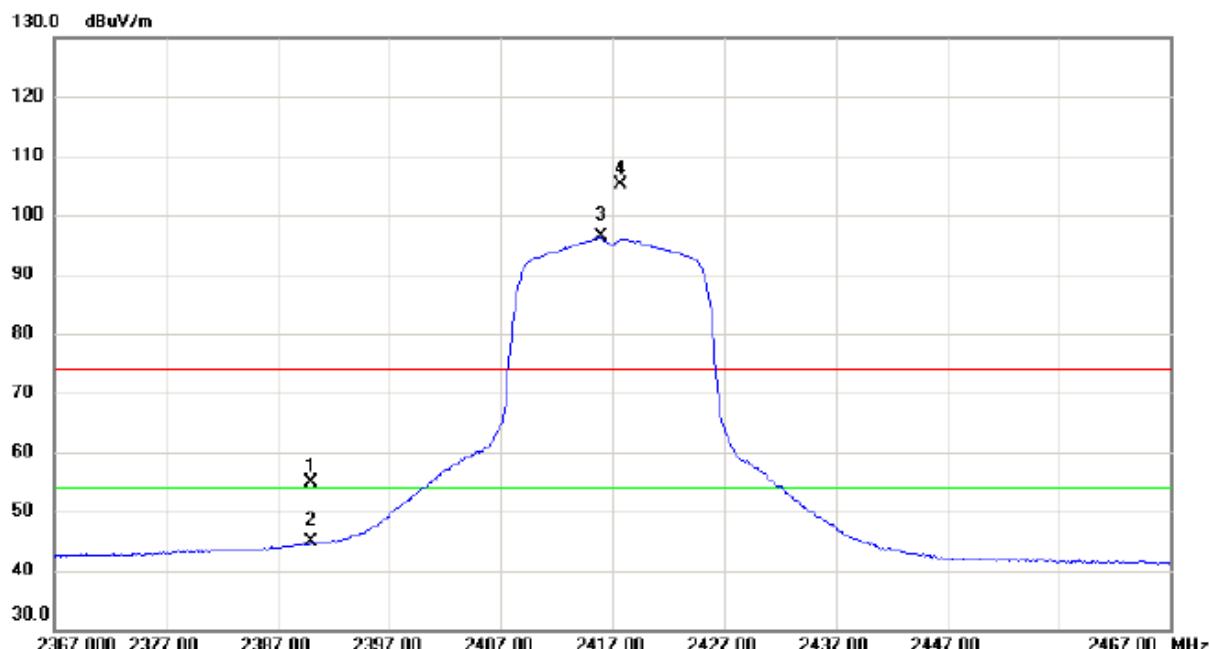
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.000	50.83	9.11	59.94	74.00	-14.06	Peak	
2	2390.000	38.48	9.11	47.59	54.00	-6.41	AVG	
3	2410.600	97.25	9.16	106.41	74.00	32.41	Peak	No Limit
4 *	2410.900	88.23	9.16	97.39	54.00	43.39	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX G 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	4823.3800	40.47	3.57	44.04	74.00	-29.96	Peak	
2 *	4824.9670	29.21	3.57	32.78	54.00	-21.22	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2417MHz

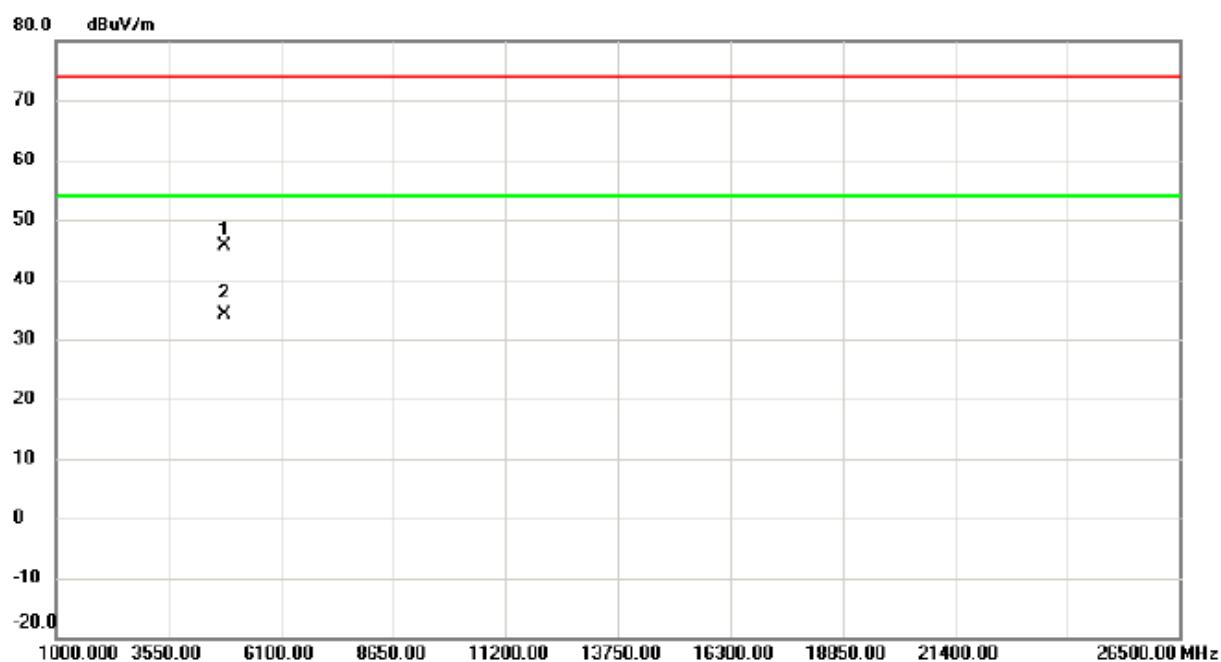
Vertical

No.	Mk.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	2390.000	45.84	9.11	54.95	74.00	-19.05	peak	
2	2390.000	35.78	9.11	44.89	54.00	-9.11	AVG	
3	*	87.09	9.18	96.27	54.00	42.27	AVG	No Limit
4	X	96.03	9.18	105.21	74.00	31.21	peak	No Limit

Orthogonal Axis : X

Test Mode : TX G Mode 2417MHz

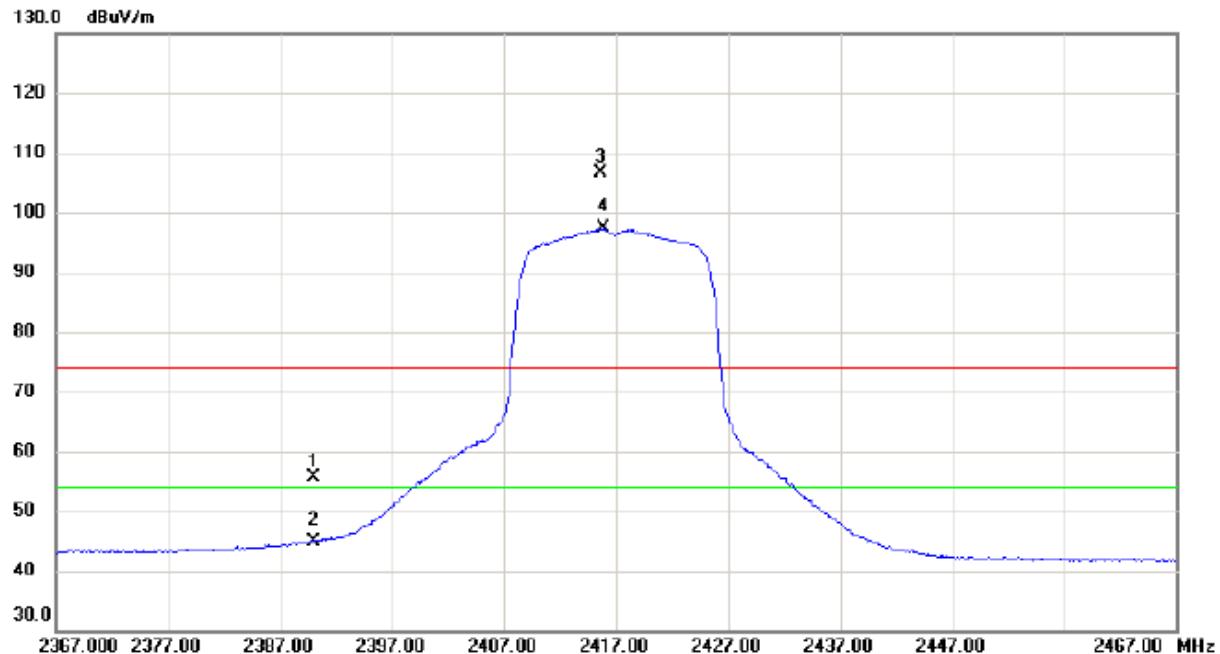
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		4834.297	42.13	3.59	45.72	74.00	-28.28	peak
2	*	4834.784	30.63	3.59	34.22	54.00	-19.78	AVG

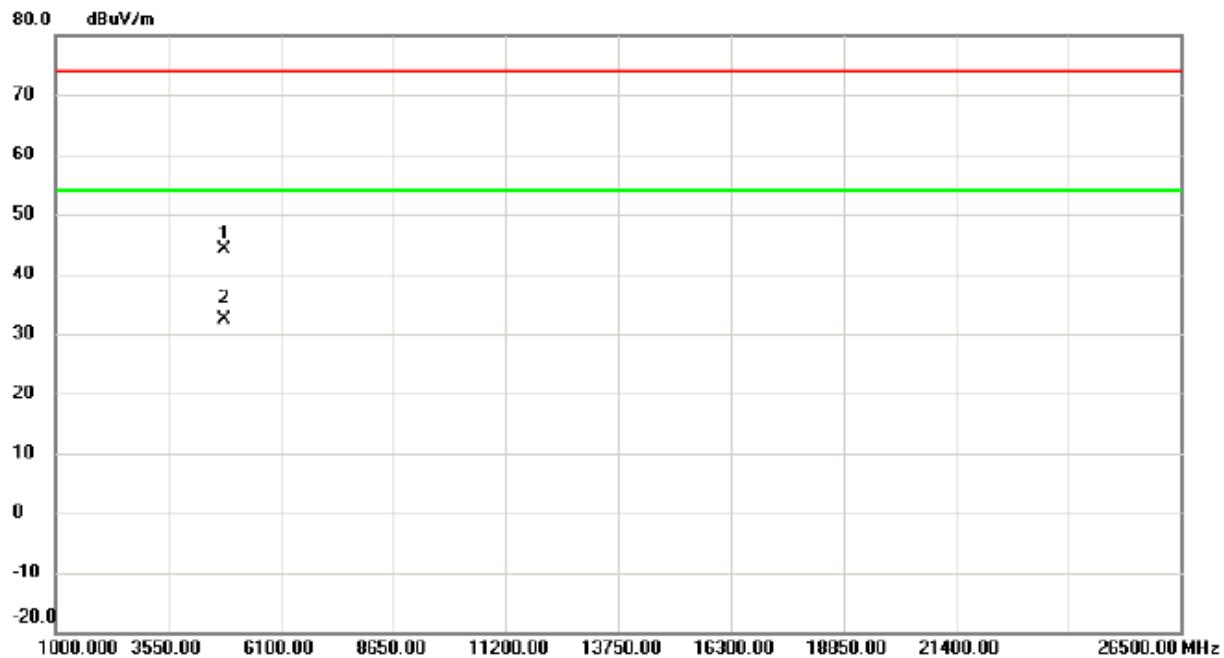
Orthogonal Axis :	X
Test Mode :	TX G Mode 2417MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment		Limit	Margin			
					MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2390.000	46.55	9.11	55.66	74.00	-18.34	peak			
2		2390.000	35.81	9.11	44.92	54.00	-9.08	AVG			
3	X	2415.550	97.54	9.18	106.72	74.00	32.72	peak	No Limit		
4	*	2415.850	88.11	9.18	97.29	54.00	43.29	AVG	No Limit		

Orthogonal Axis :	X
Test Mode :	TX G Mode 2417MHz

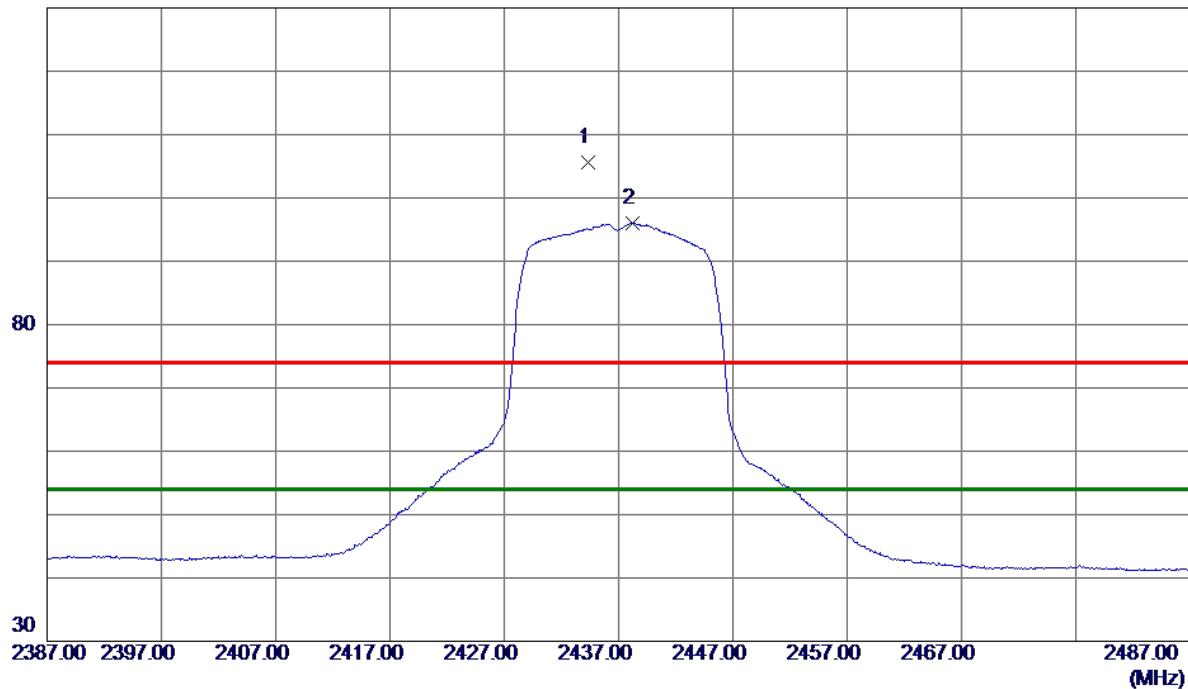
Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4834.727	40.53	3.59	44.12	74.00	-29.88	peak	
2	*	4834.981	28.86	3.59	32.45	54.00	-21.55	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

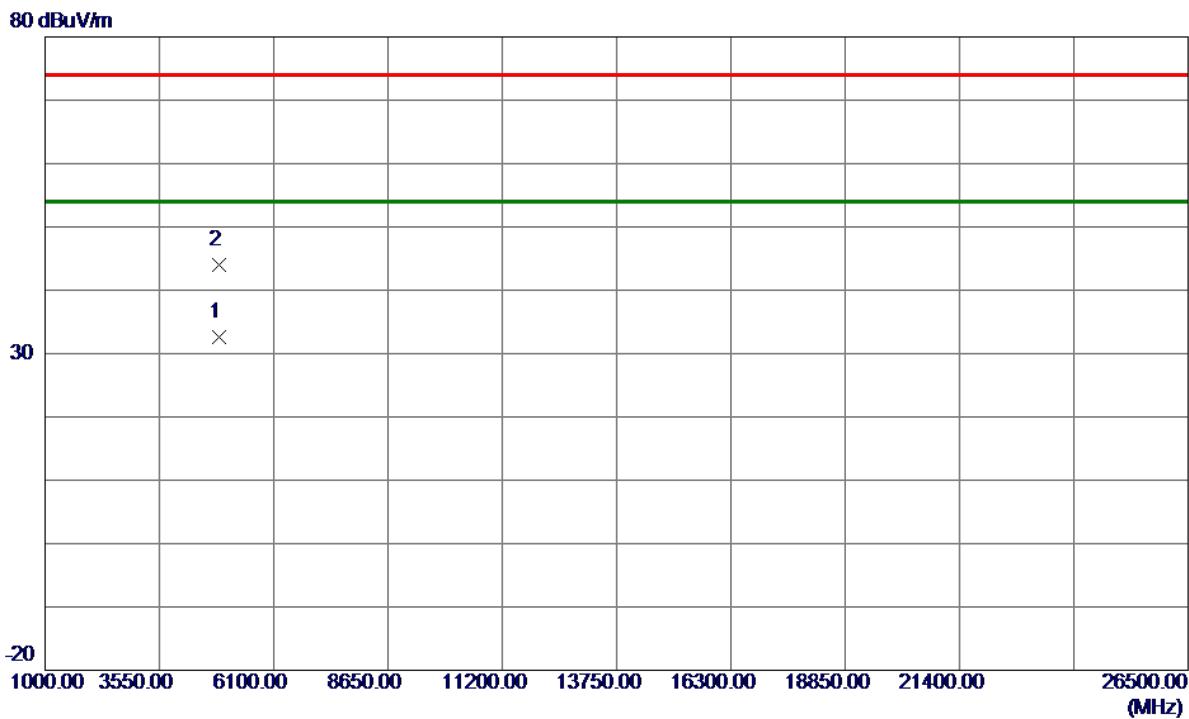
Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector		Comment
							Peak	AVG	
1	2434.3000	96.31	9.22	105.53	74.00	31.53	Peak	No Limit	
2 *	2438.2000	86.78	9.23	96.01	54.00	42.01	AVG	No Limit	

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

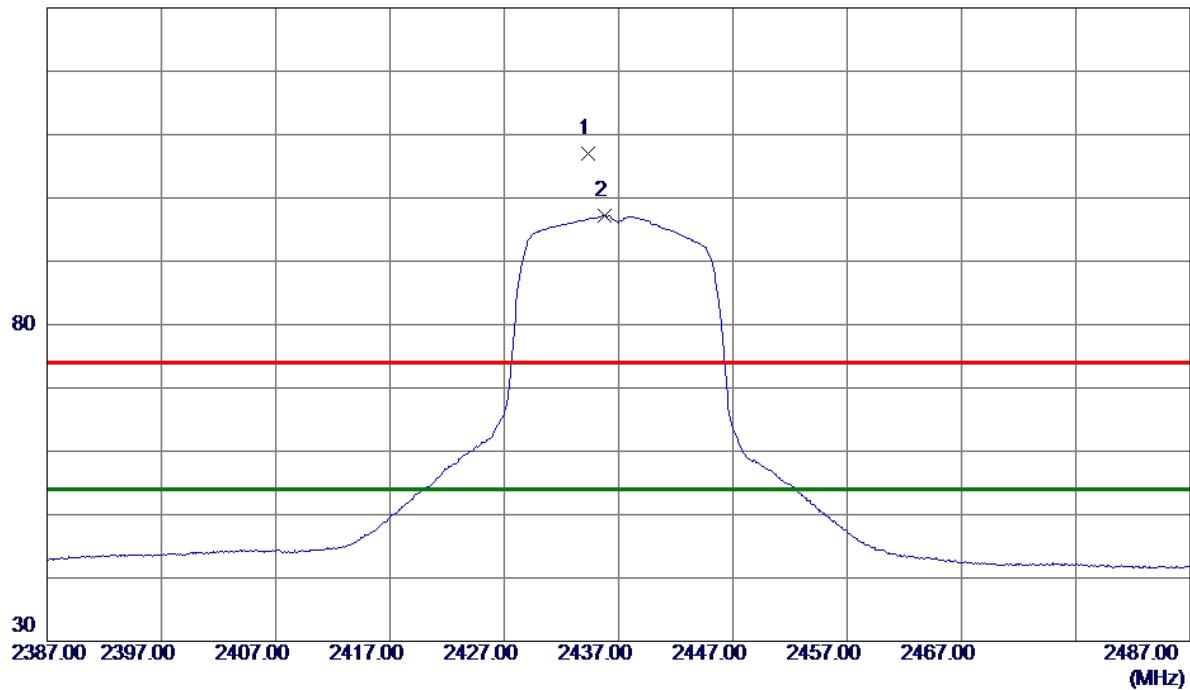
Vertical

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4873.0210	28.96	3.68	32.64	54.00	-21.36	AVG	
2	4873.1309	40.33	3.68	44.01	74.00	-29.99	Peak	

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

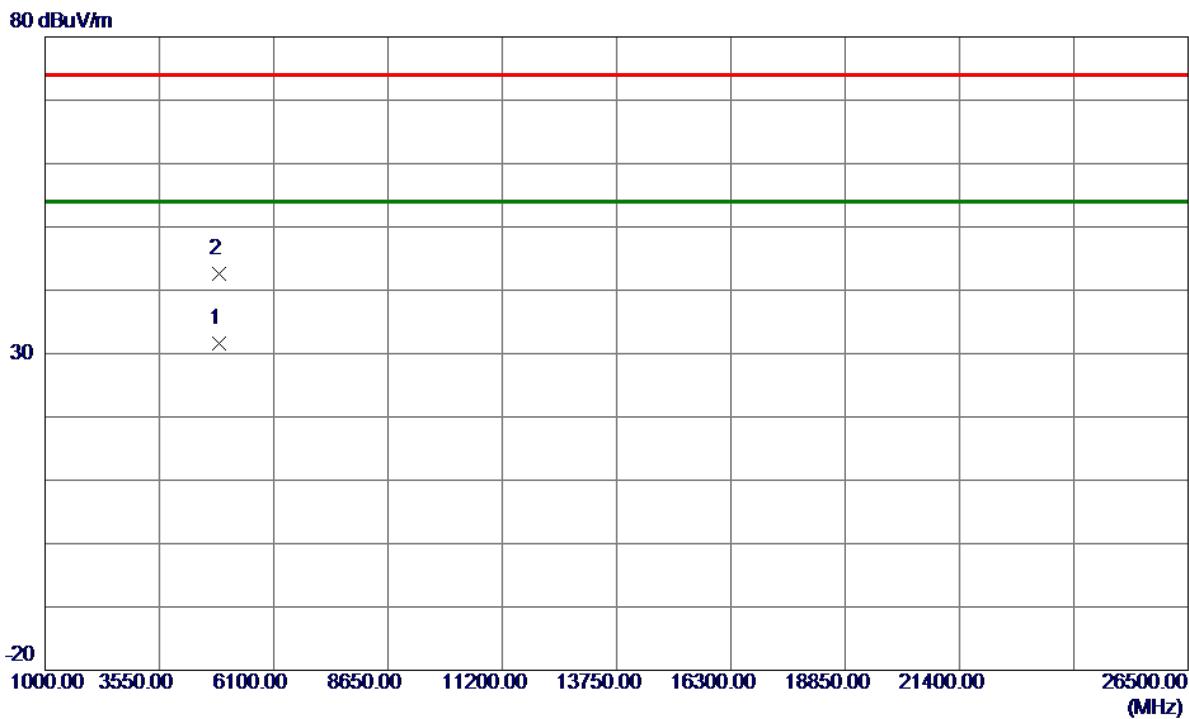
Horizontal

130 dBuV/m



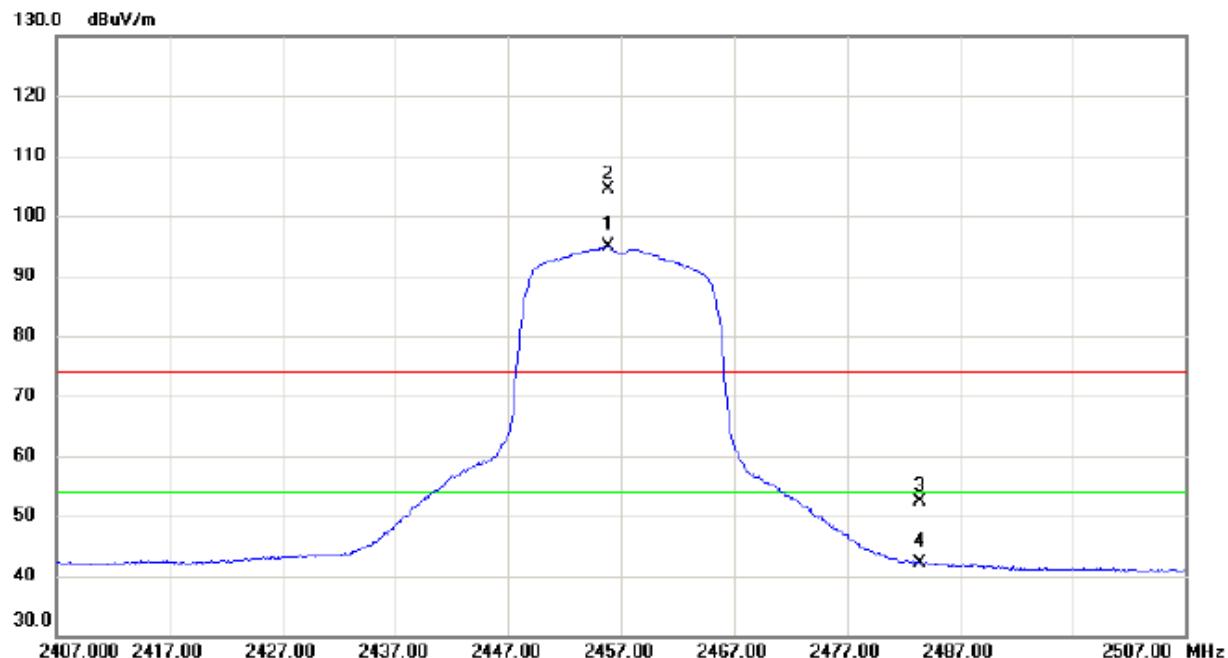
No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2434.3500	97.88	9.22	107.10	74.00	33.10	Peak	No Limit
2 *	2435.8000	88.00	9.23	97.23	54.00	43.23	AVG	No Limit

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4873.0930	27.96	3.68	31.64	54.00	-22.36	AVG	
2	4873.2180	38.90	3.68	42.58	74.00	-31.42	Peak	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2457MHz

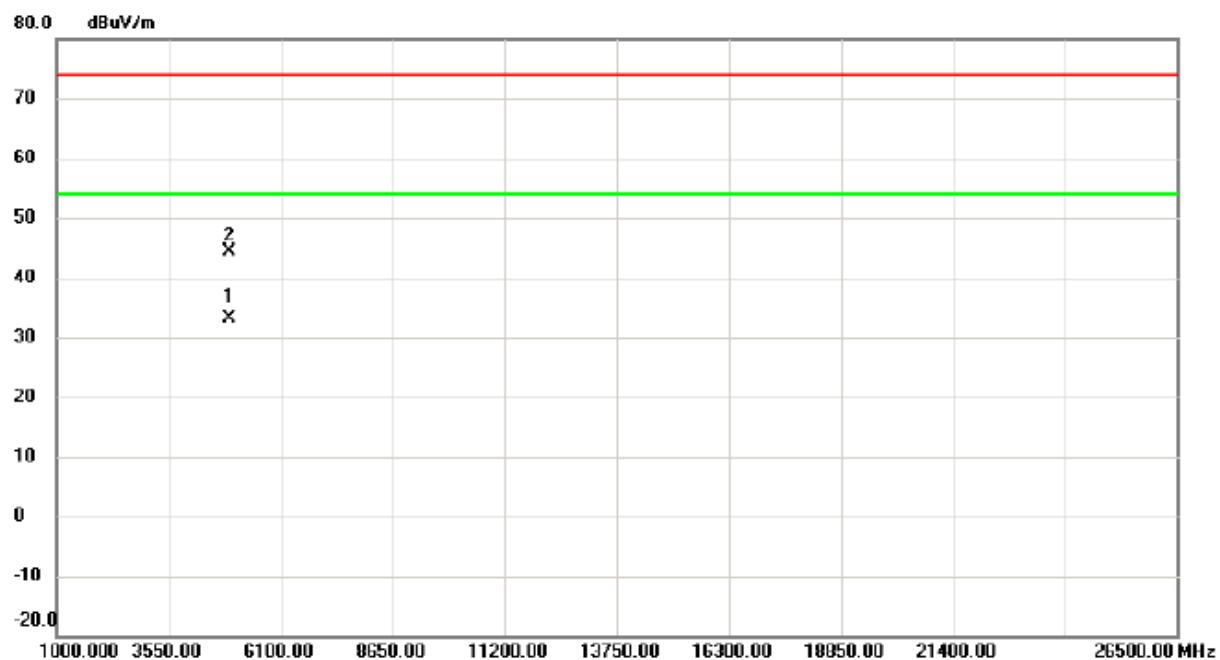
Vertical

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2455.800	85.61	9.28	94.89	54.00	40.89	AVG	No Limit
2	X	2455.900	95.21	9.28	104.49	74.00	30.49	peak	No Limit
3		2483.500	43.07	9.35	52.42	74.00	-21.58	peak	
4		2483.500	32.70	9.35	42.05	54.00	-11.95	AVG	

Orthogonal Axis : X

Test Mode : TX G Mode 2457MHz

Vertical

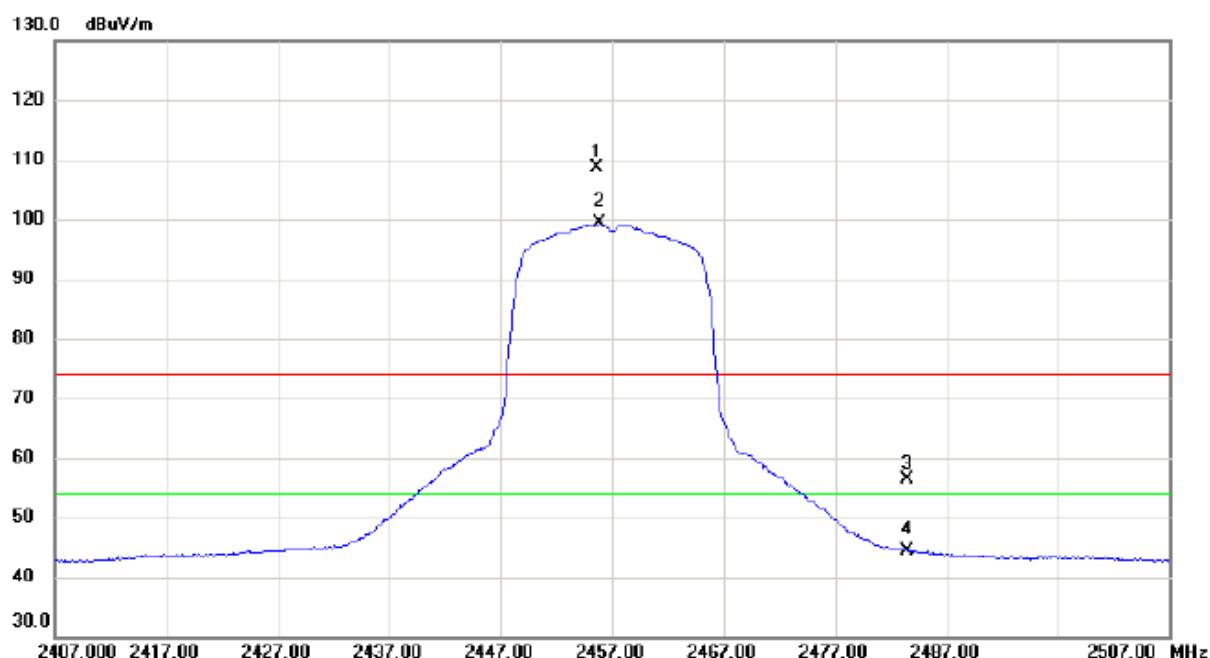


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	*	4913.314	29.47	3.76	33.23	54.00	-20.77	AVG
2		4913.558	40.63	3.76	44.39	74.00	-29.61	peak

Orthogonal Axis : X

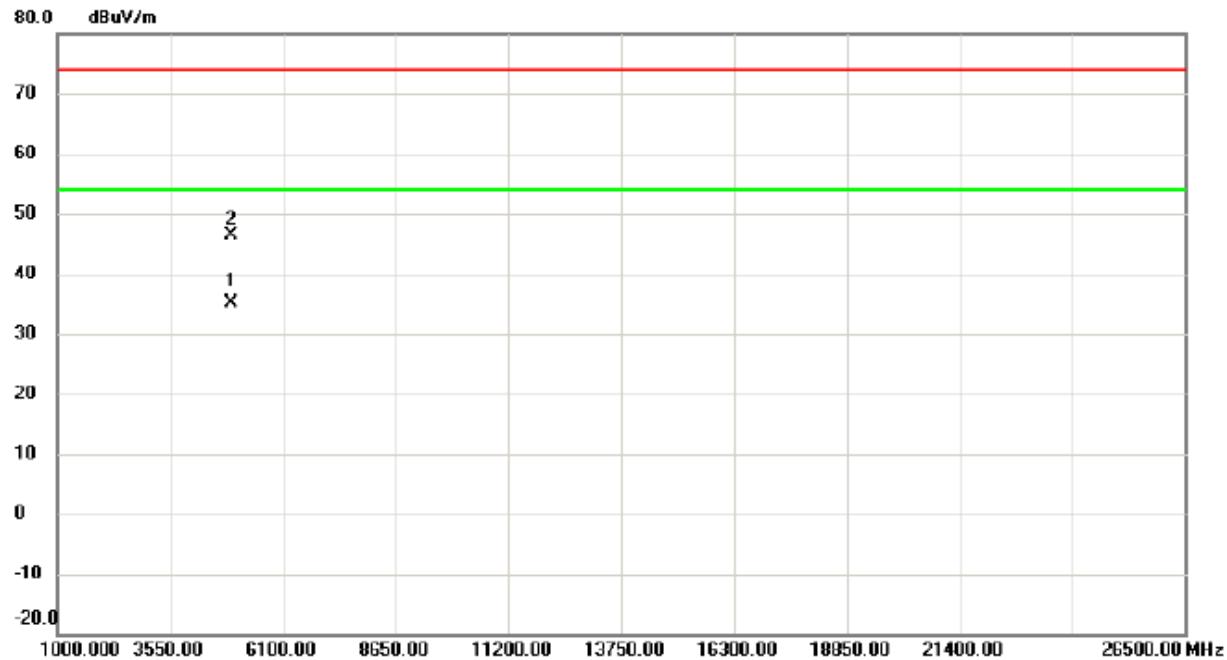
Test Mode : TX G Mode 2457MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	X	2455.600	99.41	9.28	108.69	74.00	34.69	peak No Limit
2	*	2455.800	90.00	9.28	99.28	54.00	45.28	AVG No Limit
3		2483.500	46.93	9.35	56.28	74.00	-17.72	peak
4		2483.500	35.14	9.35	44.49	54.00	-9.51	AVG

Orthogonal Axis :	X
Test Mode :	TX G Mode 2457MHz

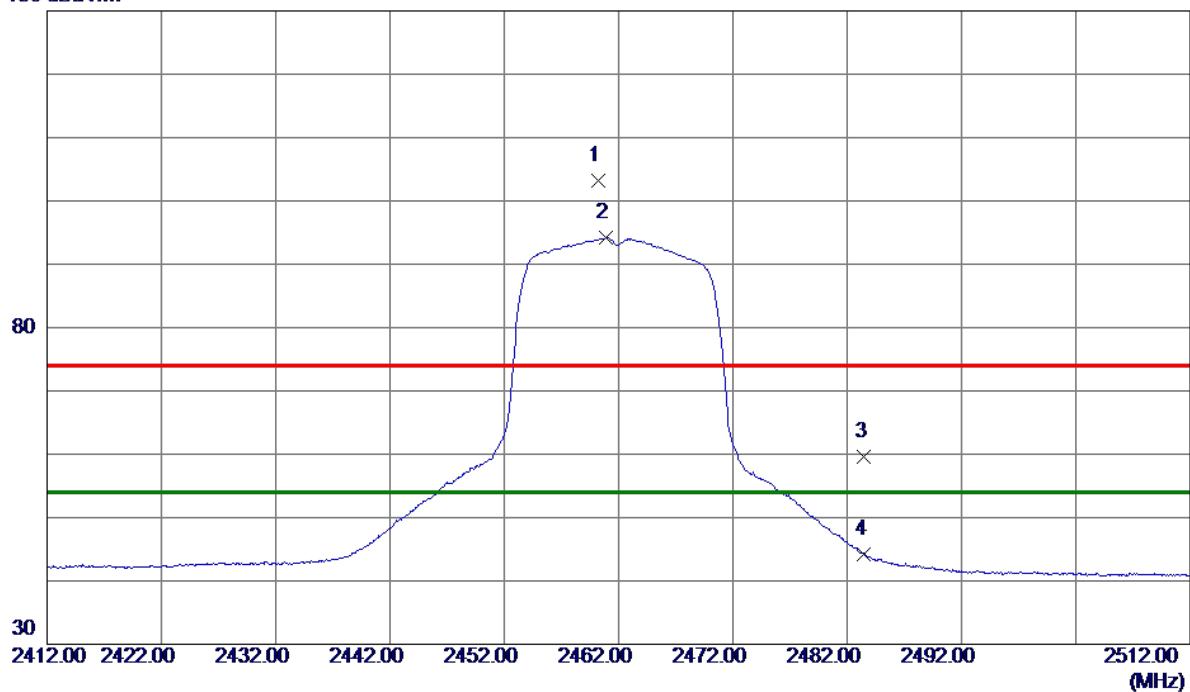
Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4913.001	31.49	3.76	35.25	54.00	-18.75	AVG	
2		4913.784	42.61	3.76	46.37	74.00	-27.63	peak	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

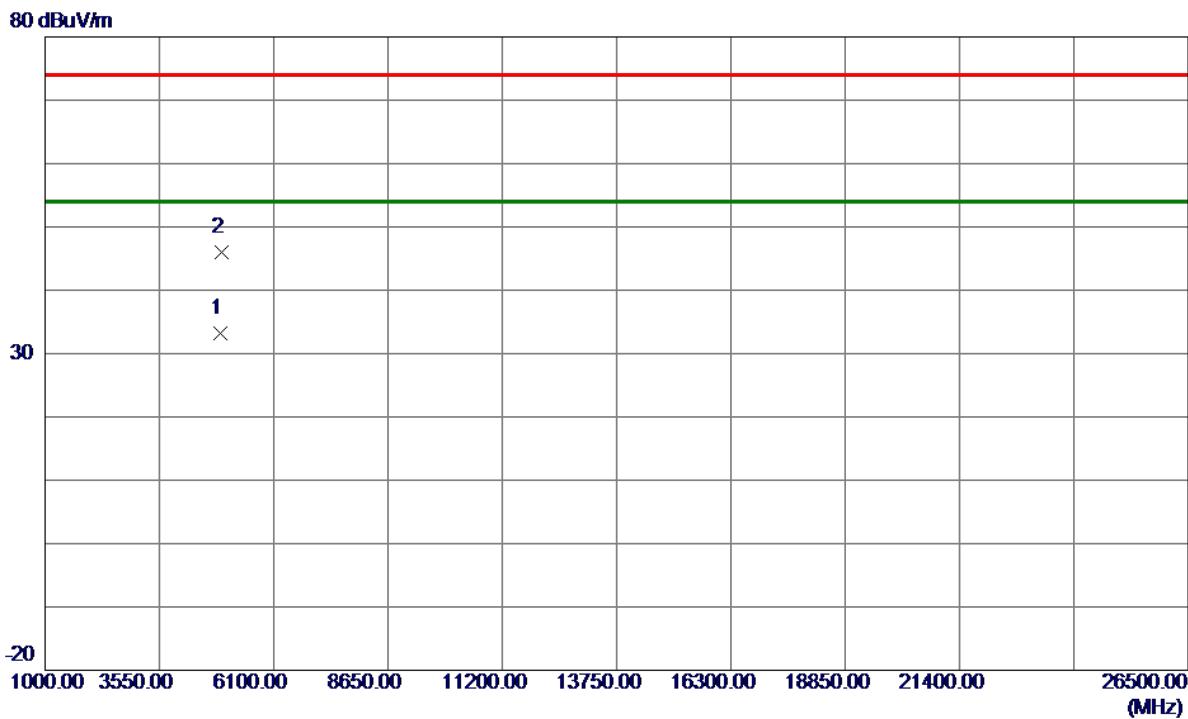
Vertical

130 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2460.2500	93.89	9.29	103.18	74.00	29.18	Peak	No Limit
2 *	2460.9000	85.00	9.29	94.29	54.00	40.29	AVG	No Limit
3	2483.5000	50.20	9.35	59.55	74.00	-14.45	Peak	
4	2483.5000	34.94	9.35	44.29	54.00	-9.71	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

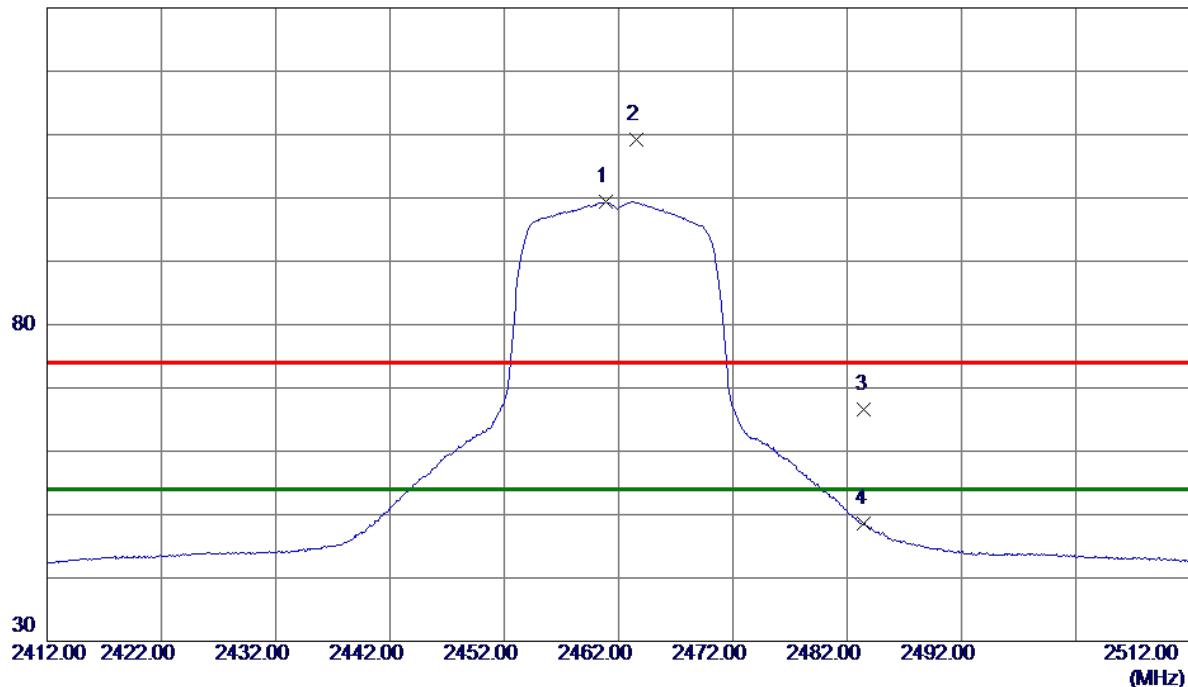
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4923.3690	29.49	3.79	33.28	54.00	-20.72	AVG	
2	4924.6530	42.13	3.79	45.92	74.00	-28.08	Peak	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

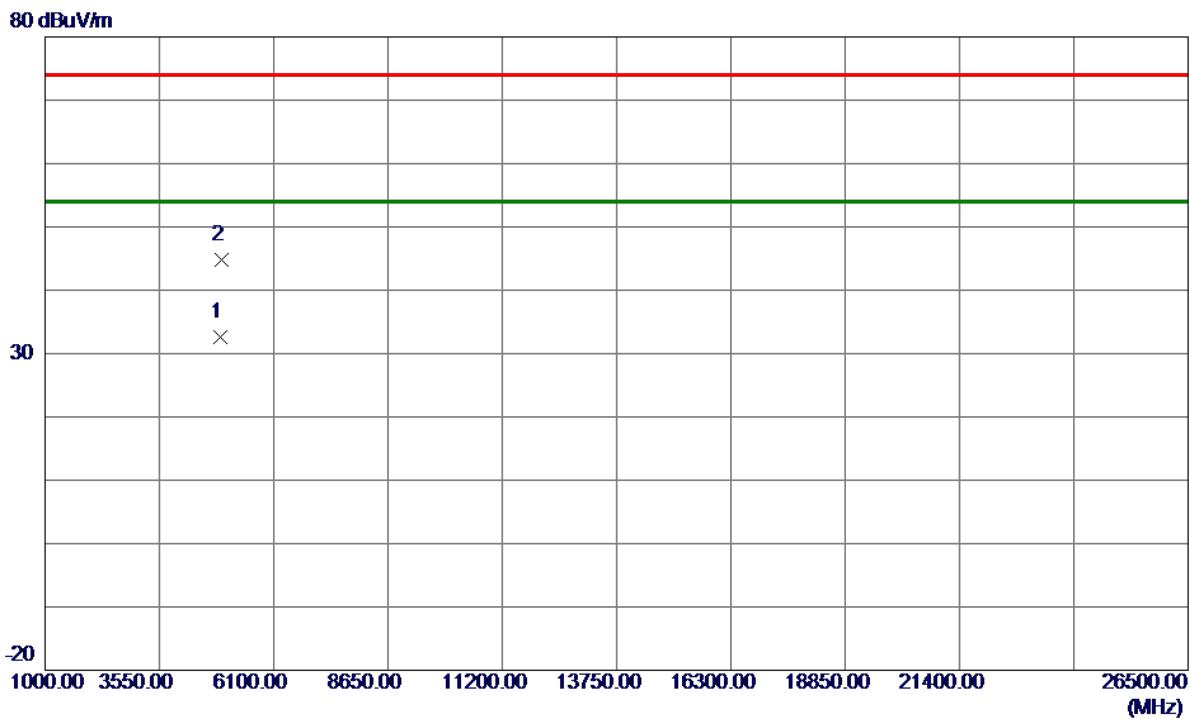
Horizontal

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 *	2460.8500	90.09	9.29	99.38	54.00	45.38	AVG	No Limit
2	2463.5500	99.83	9.30	109.13	74.00	35.13	Peak	No Limit
3	2483.5000	57.16	9.35	66.51	74.00	-7.49	Peak	
4	2483.5000	39.20	9.35	48.55	54.00	-5.45	AVG	

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

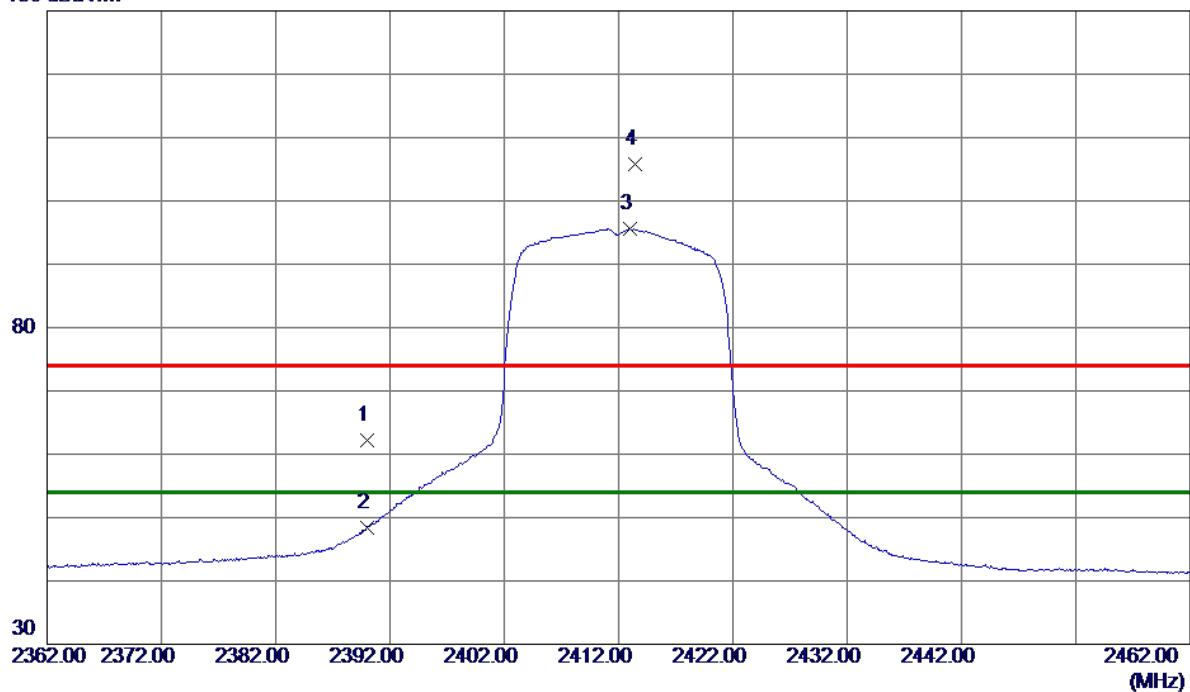
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4923.6549	28.76	3.79	32.55	54.00	-21.45	AVG	
2	4924.7790	41.04	3.79	44.83	74.00	-29.17	Peak	

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

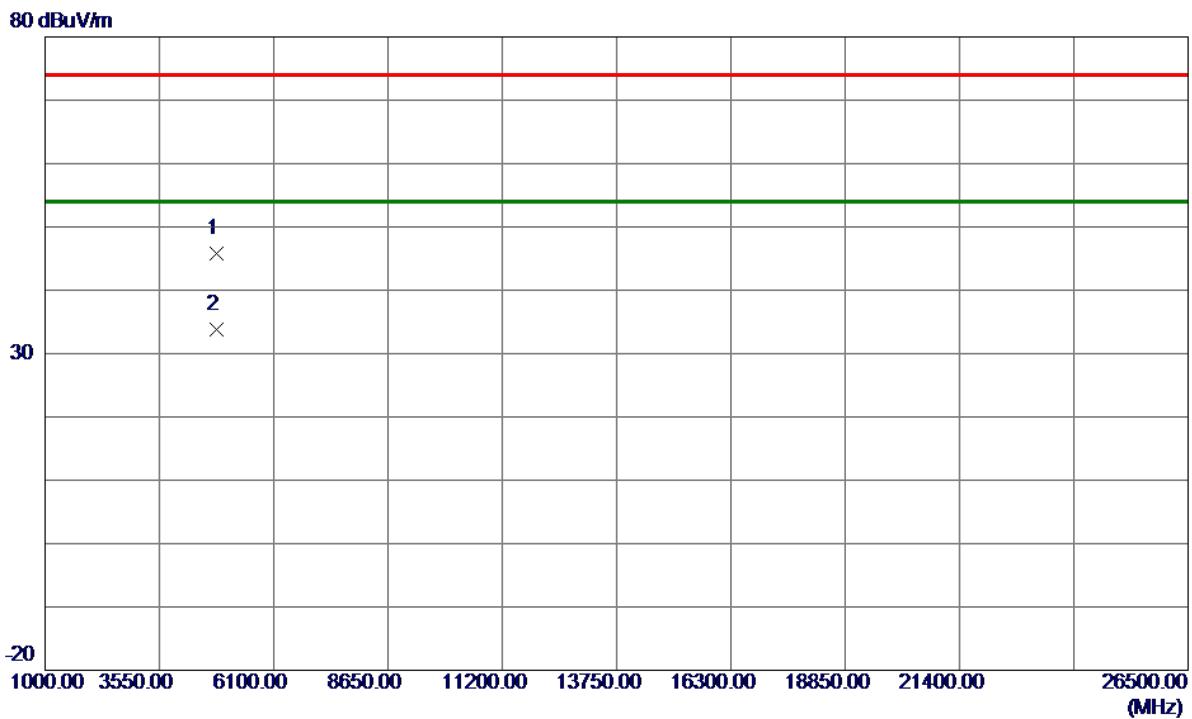
Vertical

130 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2390.0000	53.14	9.11	62.25	74.00	-11.75	Peak	
2	2390.0000	39.37	9.11	48.48	54.00	-5.52	AVG	
3 *	2413.0000	86.41	9.17	95.58	54.00	41.58	AVG	No Limit
4	2413.4000	96.60	9.17	105.77	74.00	31.77	Peak	No Limit

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

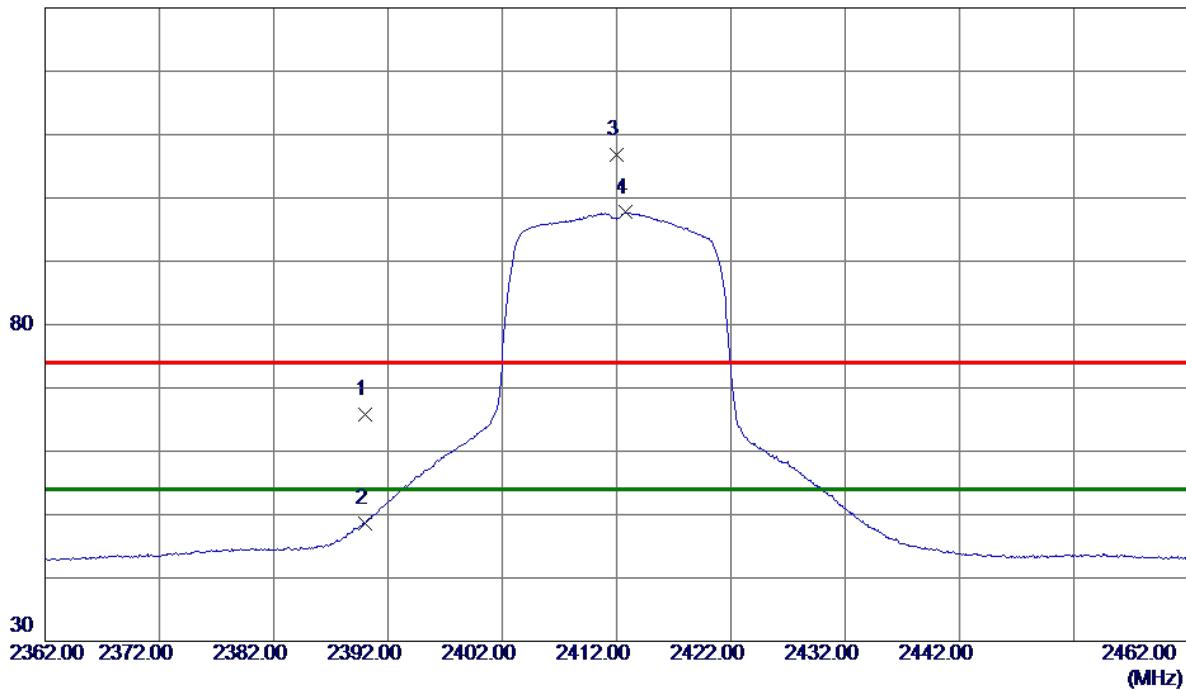
Vertical

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4824.2320	42.24	3.57	45.81	74.00	-28.19	Peak	
2 *	4824.9810	30.14	3.57	33.71	54.00	-20.29	AVG	

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

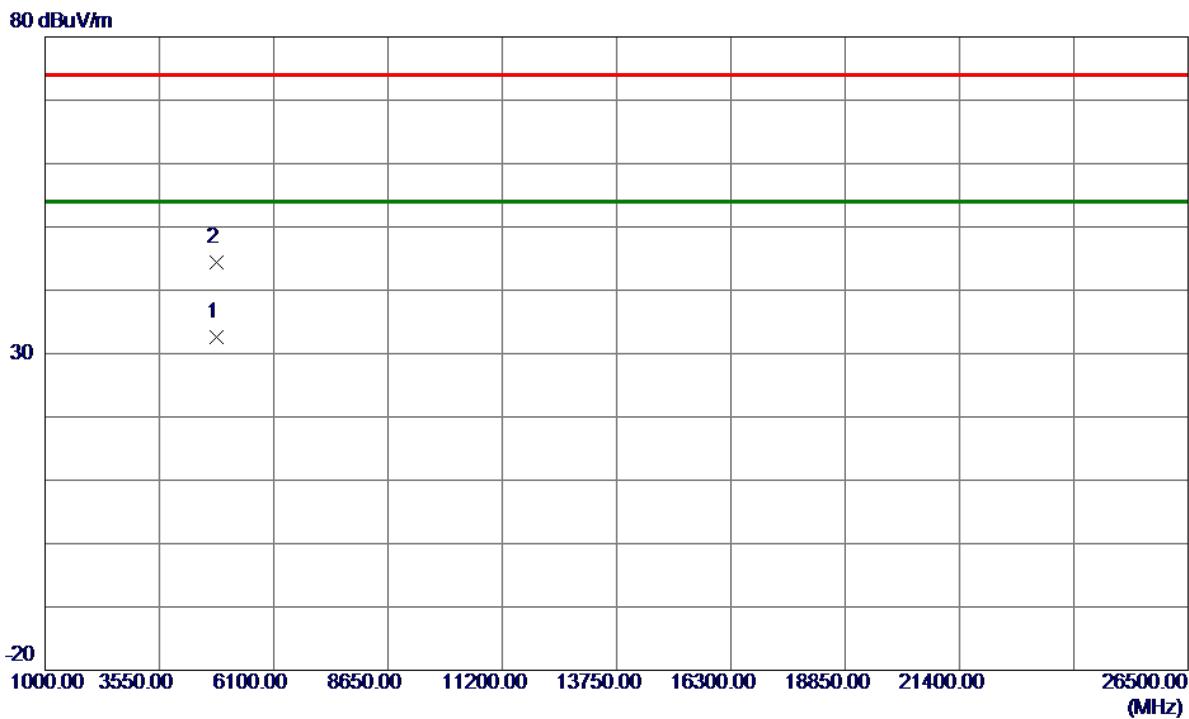
Horizontal

130 dBuV/m



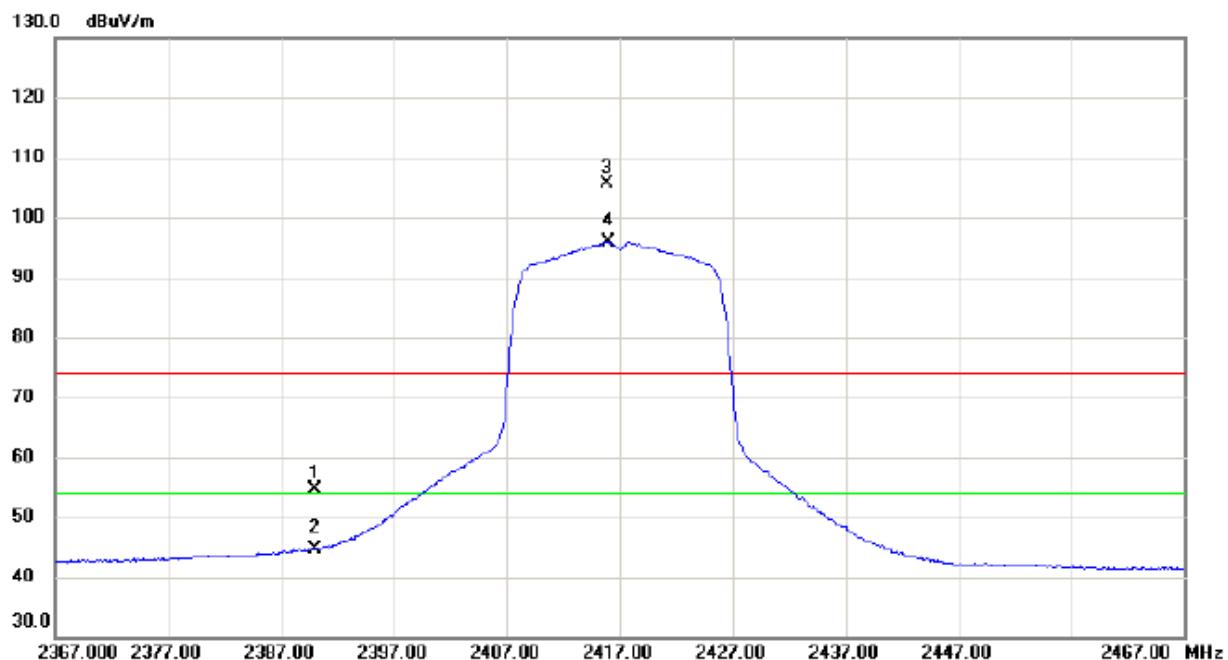
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	56.78	9.11	65.89	74.00	-8.11	Peak	
2	2390.0000	39.56	9.11	48.67	54.00	-5.33	AVG	
3	2412.0000	97.70	9.16	106.86	74.00	32.86	Peak	No Limit
4 *	2412.7500	88.53	9.17	97.70	54.00	43.70	AVG	No Limit

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

Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4824.8740	29.06	3.57	32.63	54.00	-21.37	AVG	
2	4824.9510	40.91	3.57	44.48	74.00	-29.52	Peak	

Orthogonal Axis :	X
Test Mode :	TX N-20M Mode 2417MHz

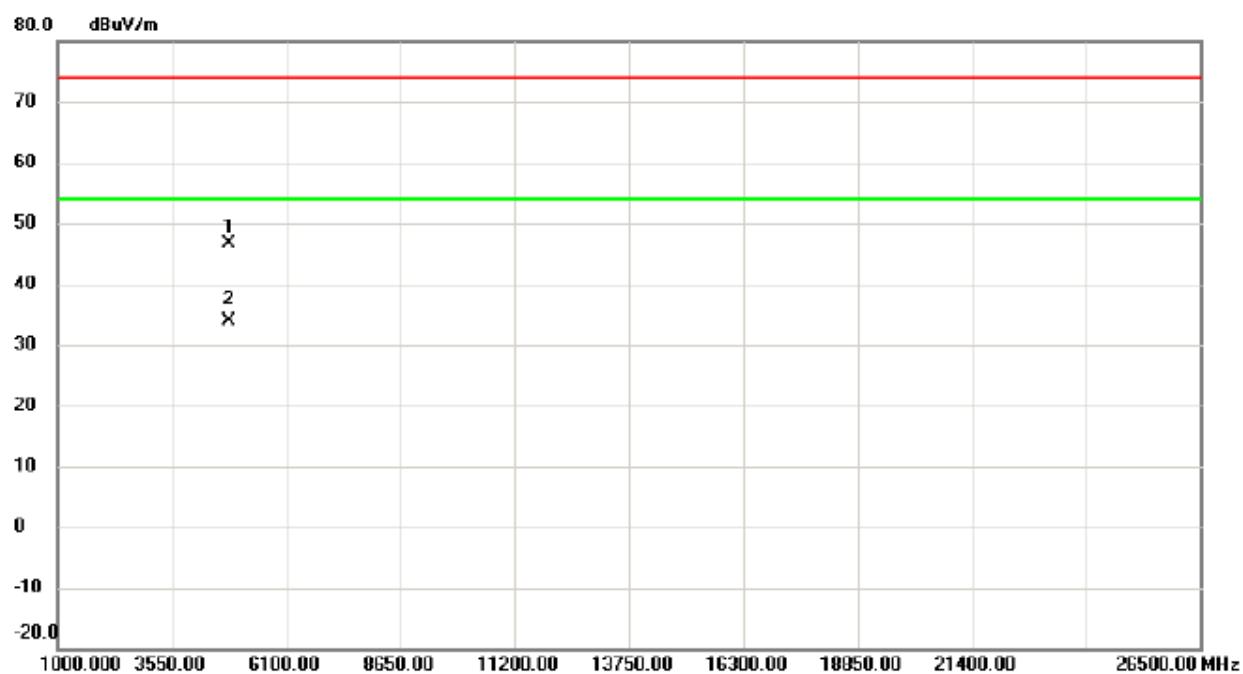
Vertical

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
1		2390.000	45.42	9.11	54.53	74.00	-19.47	peak	
2		2390.000	35.64	9.11	44.75	54.00	-9.25	AVG	
3	X	2415.800	96.37	9.18	105.55	74.00	31.55	peak	No Limit
4	*	2415.950	86.72	9.18	95.90	54.00	41.90	AVG	No Limit

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2417MHz

Vertical

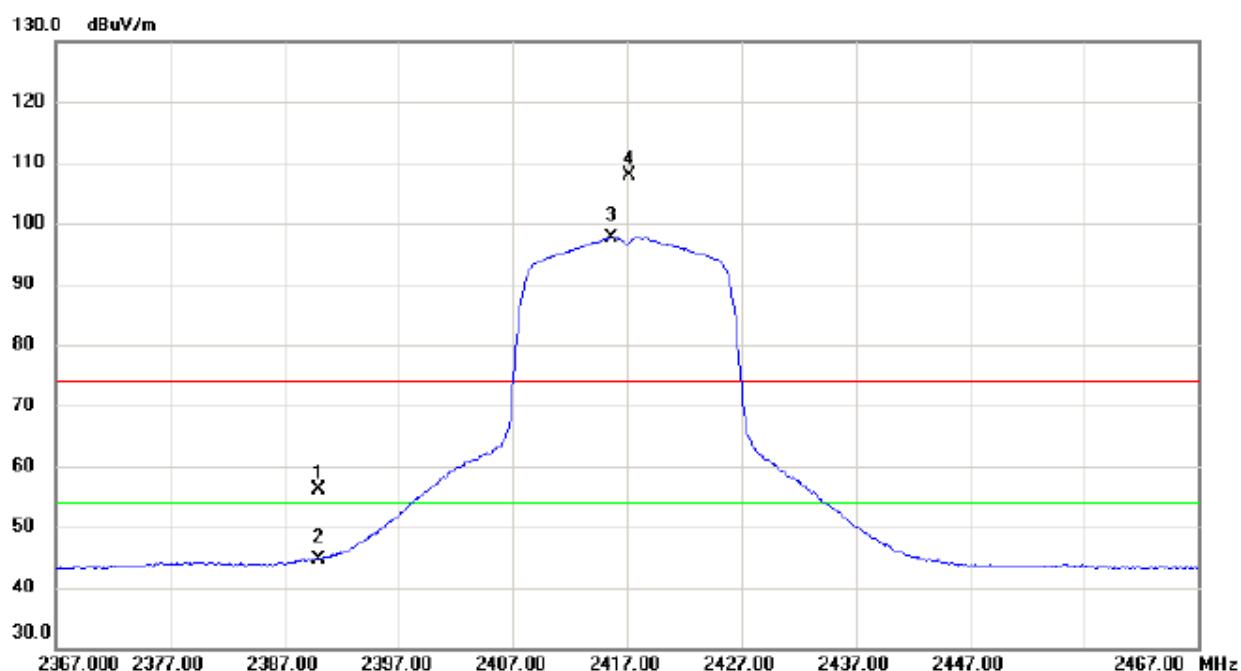


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		4834.852	43.01	3.59	46.60	74.00	-27.40	peak
2 *		4834.947	30.33	3.59	33.92	54.00	-20.08	AVG

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2417MHz

Horizontal

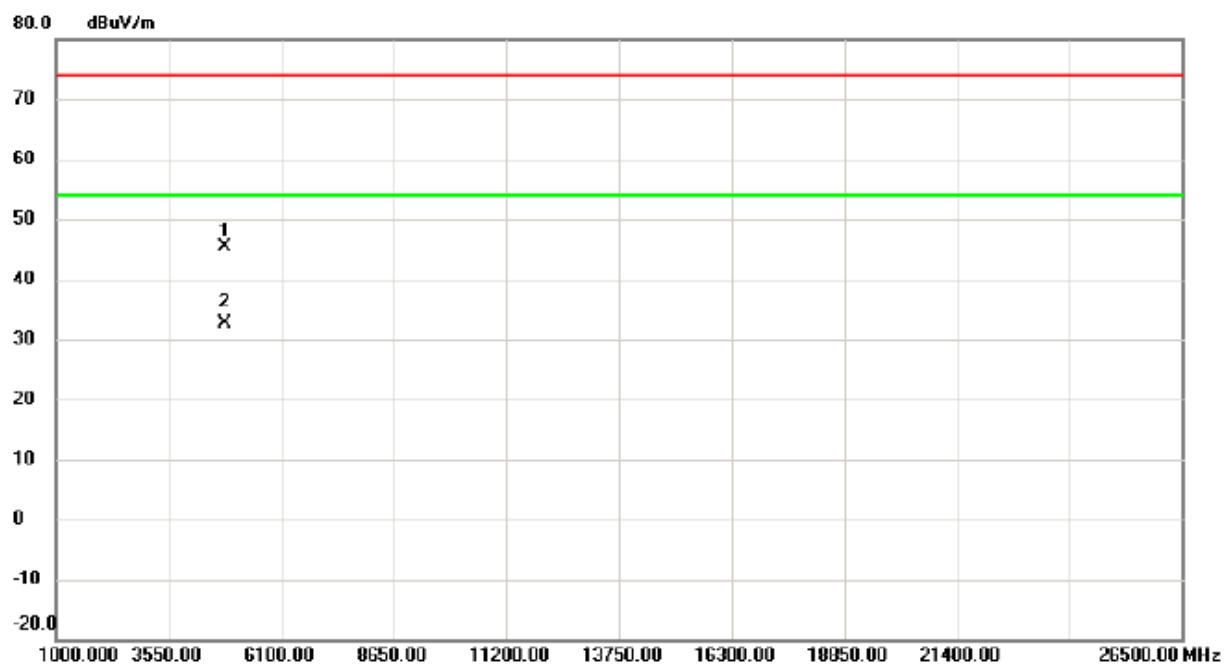


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		2390.000	46.91	9.11	56.02	74.00	-17.98	peak	
2		2390.000	35.63	9.11	44.74	54.00	-9.26	AVG	
3	*	2415.650	88.51	9.18	97.69	54.00	43.69	AVG	No Limit
4	X	2417.200	98.77	9.18	107.95	74.00	33.95	peak	No Limit

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2417MHz

Horizontal



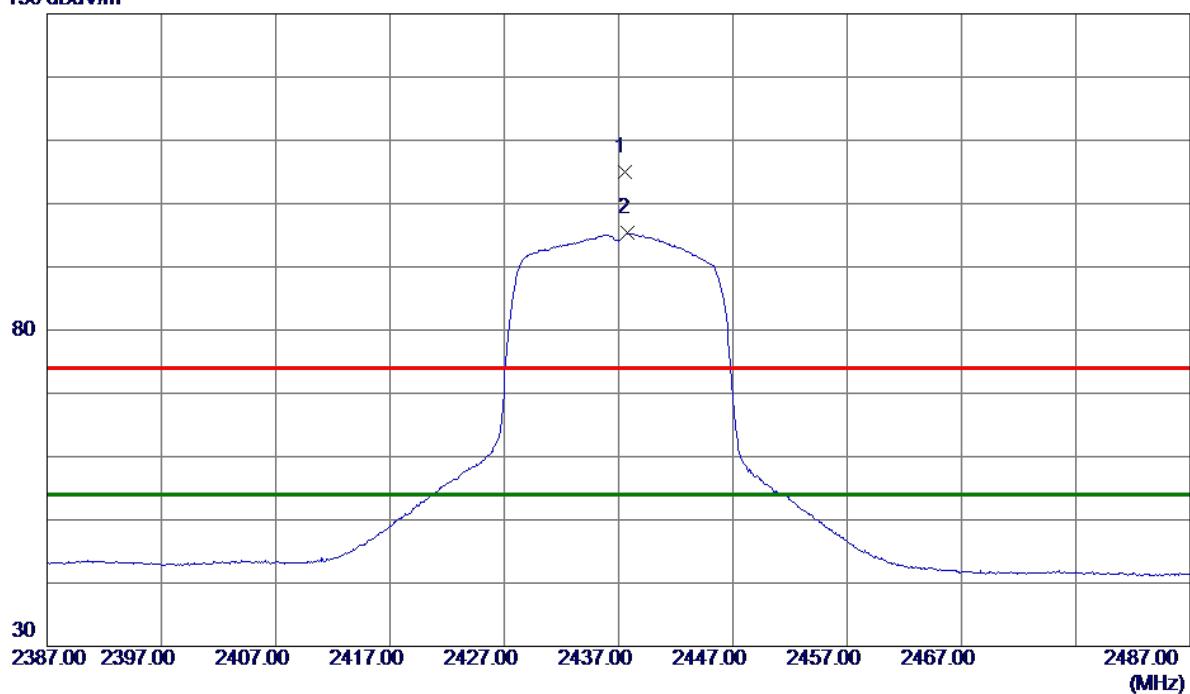
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1		4834.040	41.72	3.59	45.31	74.00	-28.69	peak
2 *		4834.868	28.99	3.59	32.58	54.00	-21.42	AVG

Orthogonal Axis X

Test Mode: TX N-20M Mode 2437 MHz

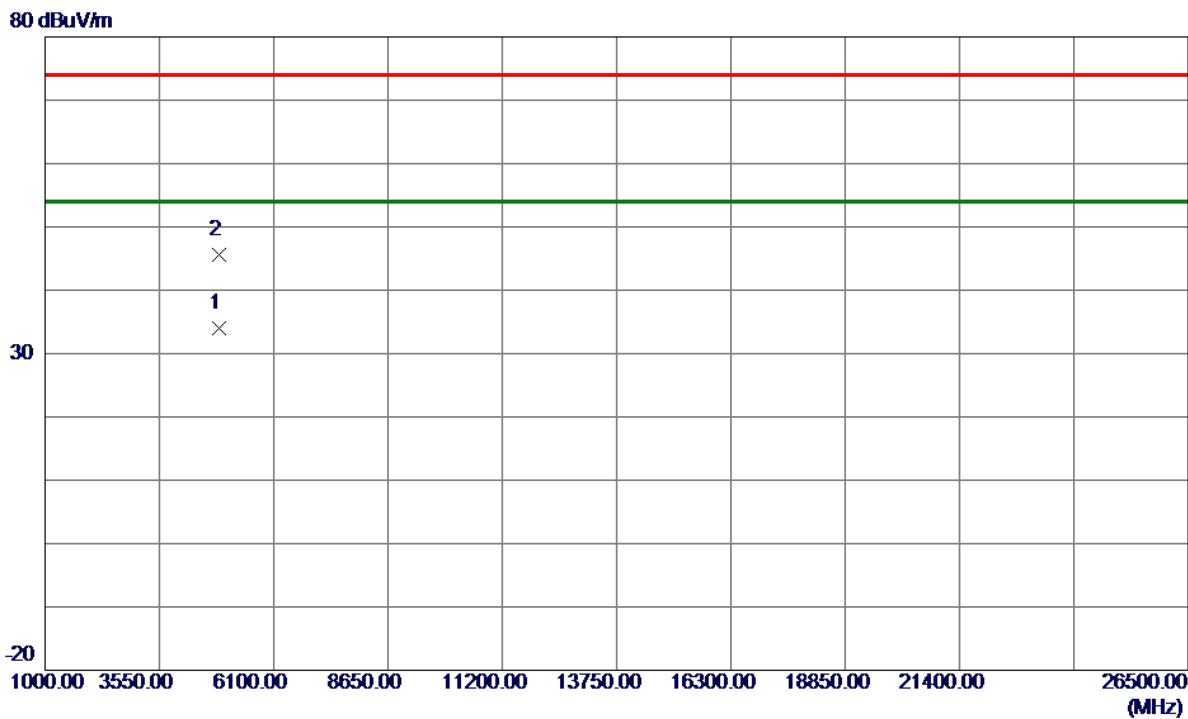
Vertical

130 dBuV/m



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment				
	MHz	dBuV/m	dB	dBuV/m	dB			
1	2437.5000	95.69	9.23	104.92	74.00	30.92	Peak	No Limit
2 *	2437.8000	86.12	9.23	95.35	54.00	41.35	AVG	No Limit

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

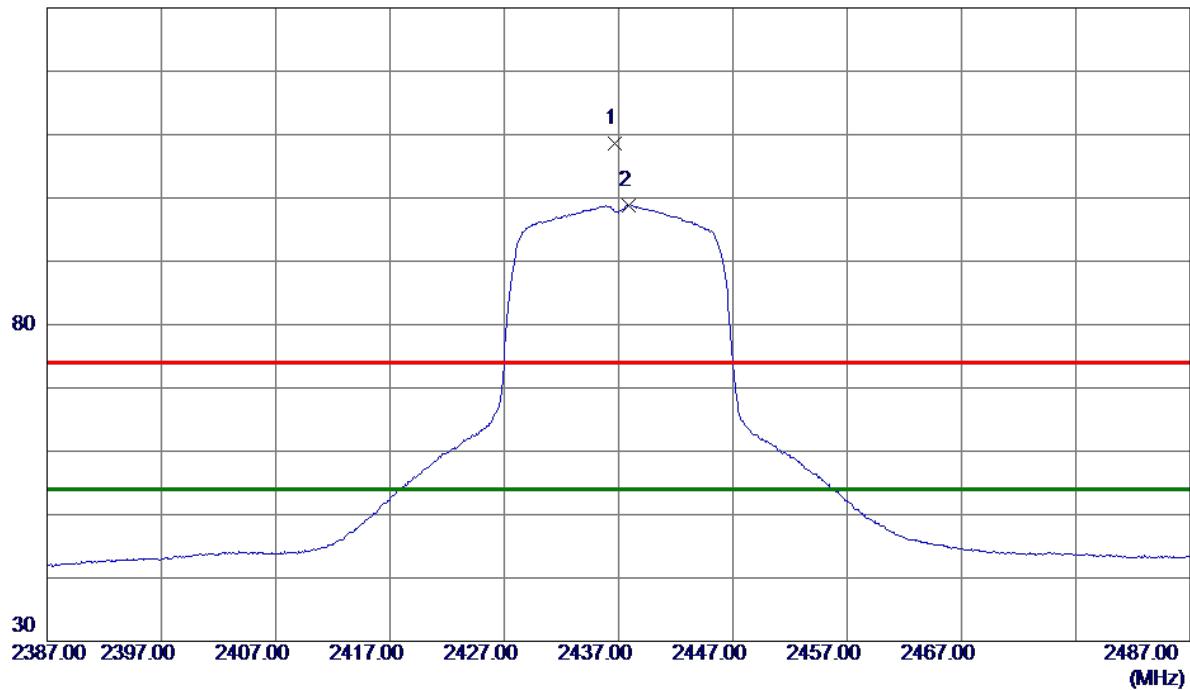
Vertical

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4873.0419	30.29	3.68	33.97	54.00	-20.03	AVG	
2	4873.9690	41.97	3.68	45.65	74.00	-28.35	Peak	

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

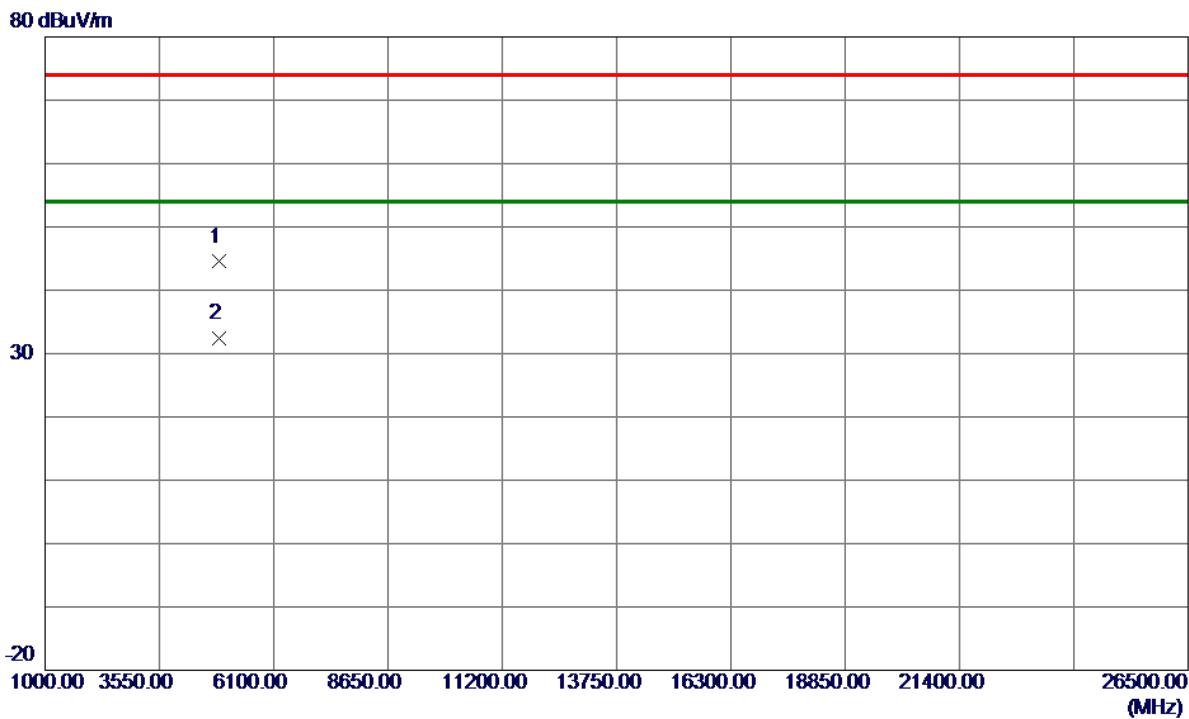
Horizontal

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	2436.7000	99.38	9.23	108.61	74.00	34.61	Peak	No Limit
2 *	2437.9000	89.66	9.23	98.89	54.00	44.89	AVG	No Limit

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

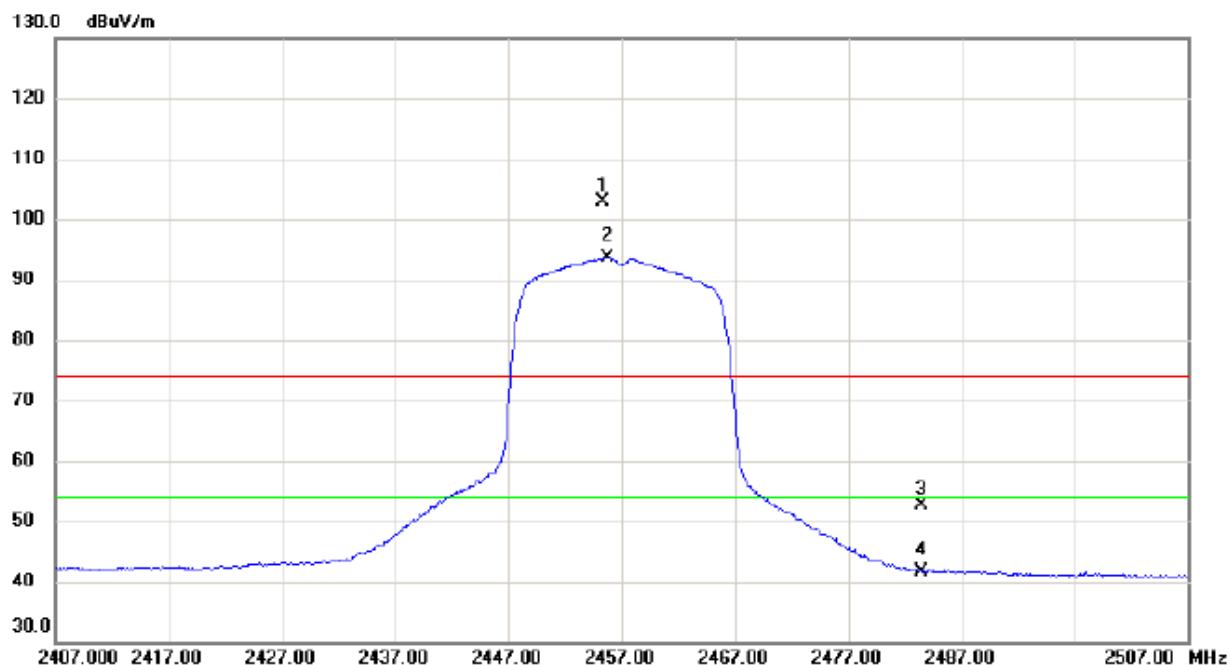
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4873.1940	40.82	3.68	44.50	74.00	-29.50	Peak	
2 *	4874.4410	28.80	3.68	32.48	54.00	-21.52	AVG	

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2457MHz

Vertical

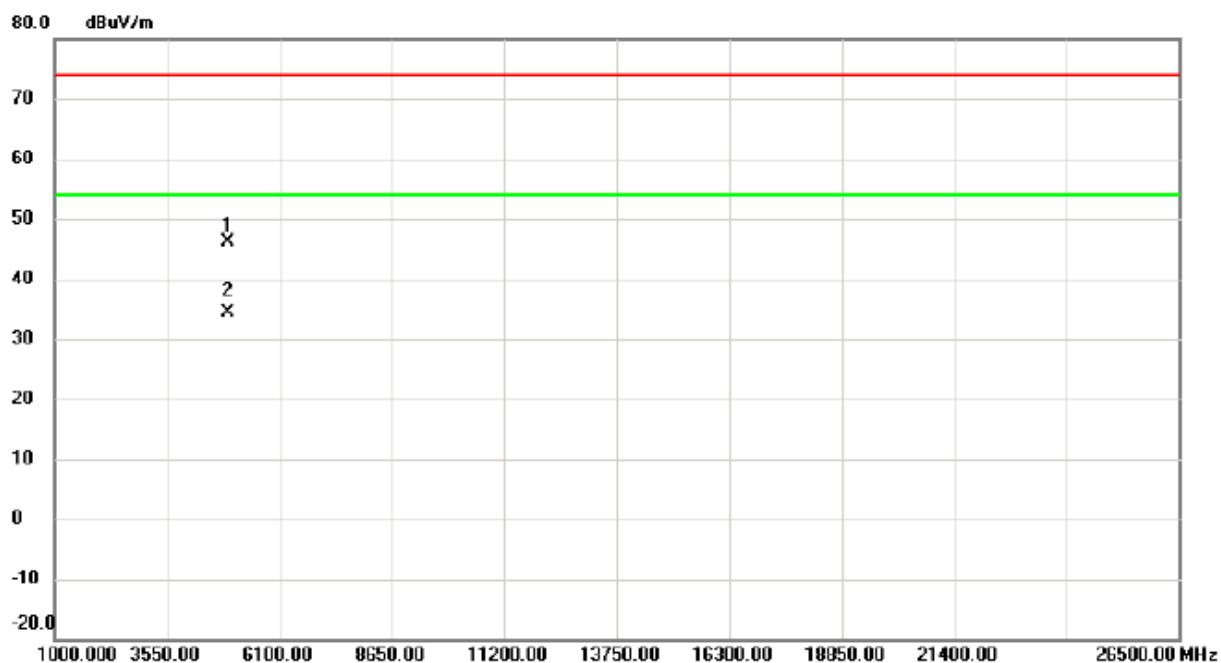


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2455.350	93.67	9.28	102.95	74.00	28.95	peak	No Limit
2	*	2455.700	84.38	9.28	93.66	54.00	39.66	AVG	No Limit
3		2483.500	43.33	9.35	52.68	74.00	-21.32	peak	
4		2483.500	32.33	9.35	41.68	54.00	-12.32	AVG	

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2457MHz

Vertical

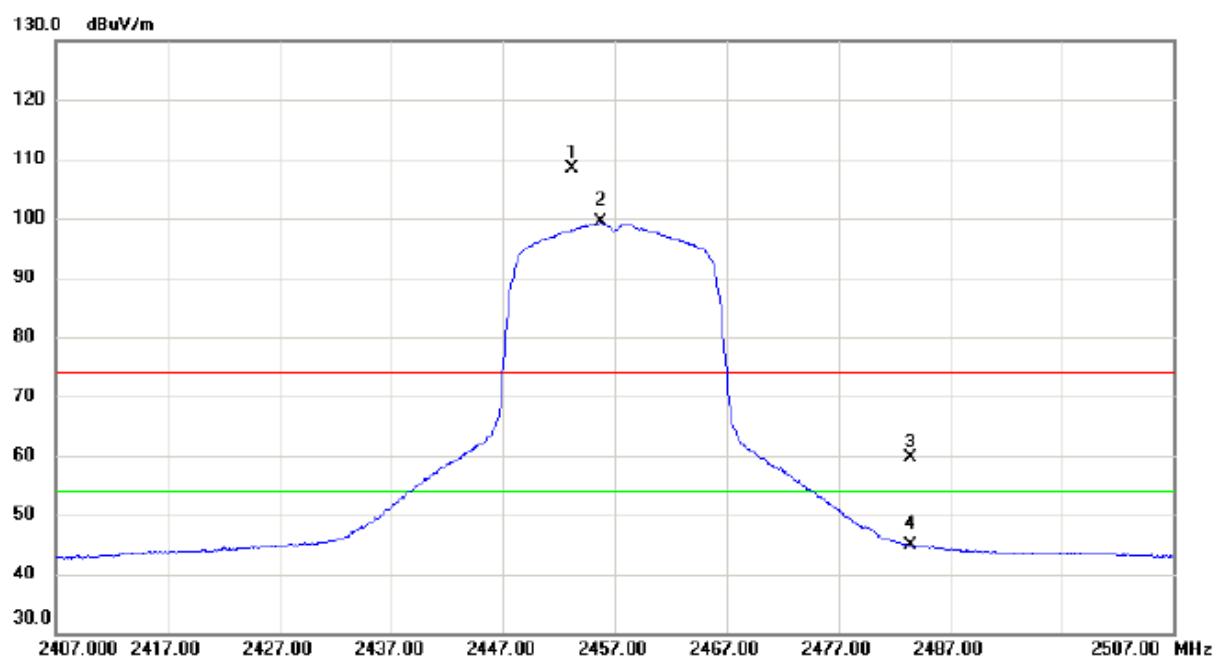


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4913.298	42.40	3.76	46.16	74.00	-27.84	peak	
2	*	4913.379	30.70	3.76	34.46	54.00	-19.54	AVG	

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2457MHz

Horizontal

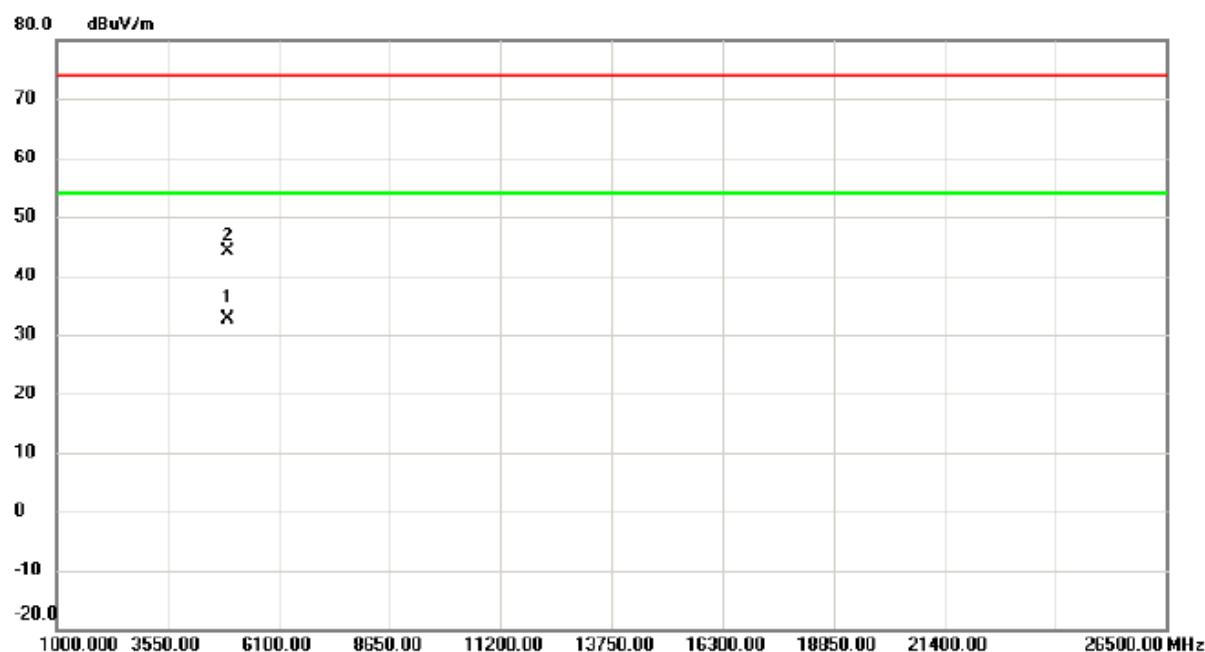


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dB			
1	X	2453.250	99.22	9.27	108.49	74.00	34.49	peak	No Limit
2	*	2455.750	89.99	9.28	99.27	54.00	45.27	AVG	No Limit
3		2483.500	50.37	9.35	59.72	74.00	-14.28	peak	
4		2483.500	35.61	9.35	44.96	54.00	-9.04	AVG	

Orthogonal Axis : X

Test Mode : TX N-20M Mode 2457MHz

Horizontal



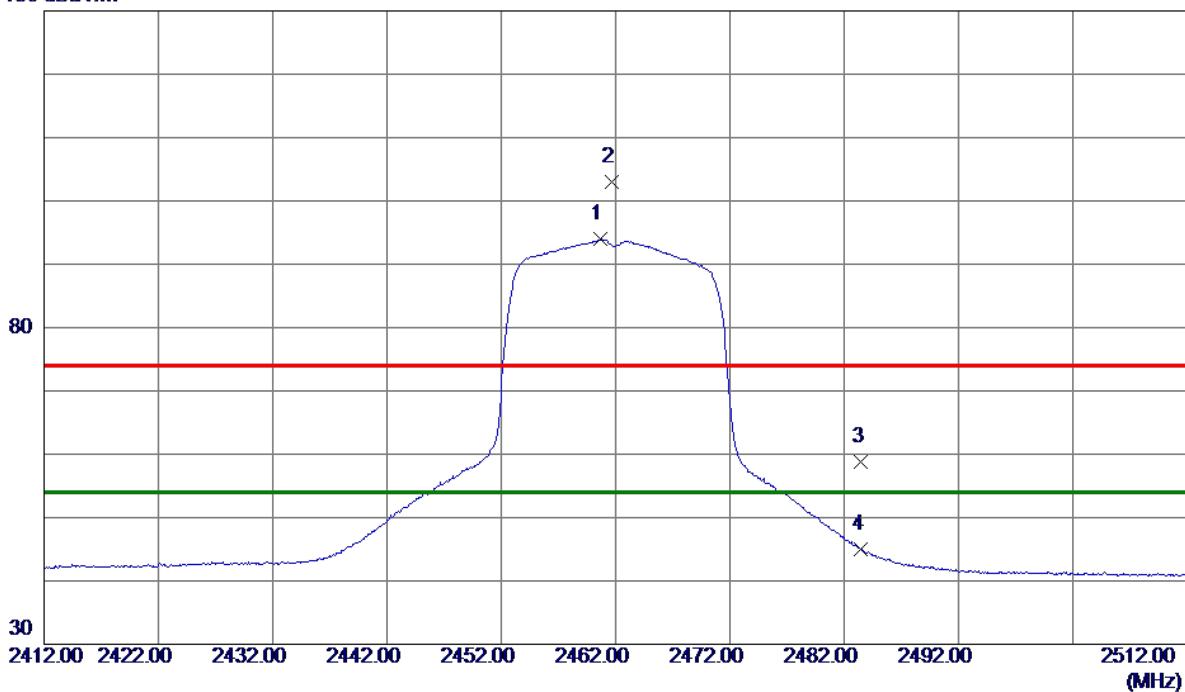
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	*	4913.388	28.91	3.76	32.67	54.00	-21.33	AVG
2		4913.812	40.37	3.76	44.13	74.00	-29.87	peak

Orthogonal Axis X

Test Mode: TX N-20M Mode 2462 MHz

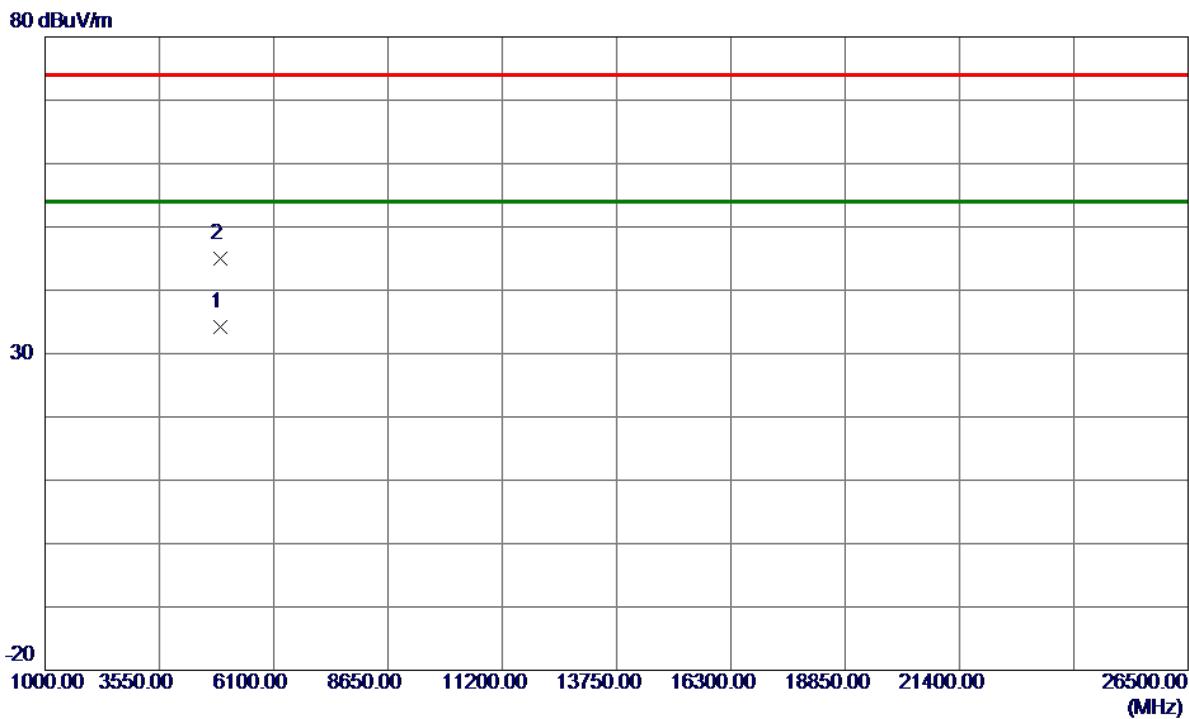
Vertical

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 *	2460.7000	84.69	9.29	93.98	54.00	39.98	AVG	No Limit
2	2461.7000	93.79	9.29	103.08	74.00	29.08	Peak	No Limit
3	2483.5000	49.47	9.35	58.82	74.00	-15.18	Peak	
4	2483.5000	35.64	9.35	44.99	54.00	-9.01	AVG	

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

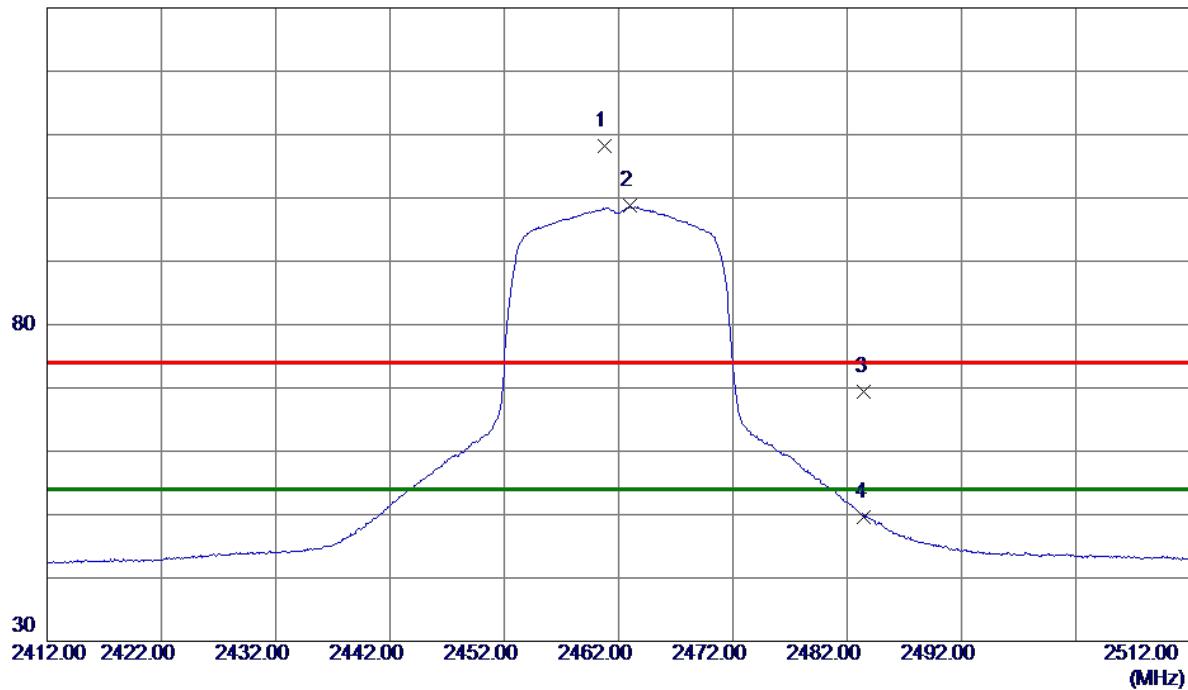
Vertical

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4923.0460	30.40	3.79	34.19	54.00	-19.81	AVG	
2	4923.9480	41.30	3.79	45.09	74.00	-28.91	Peak	

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

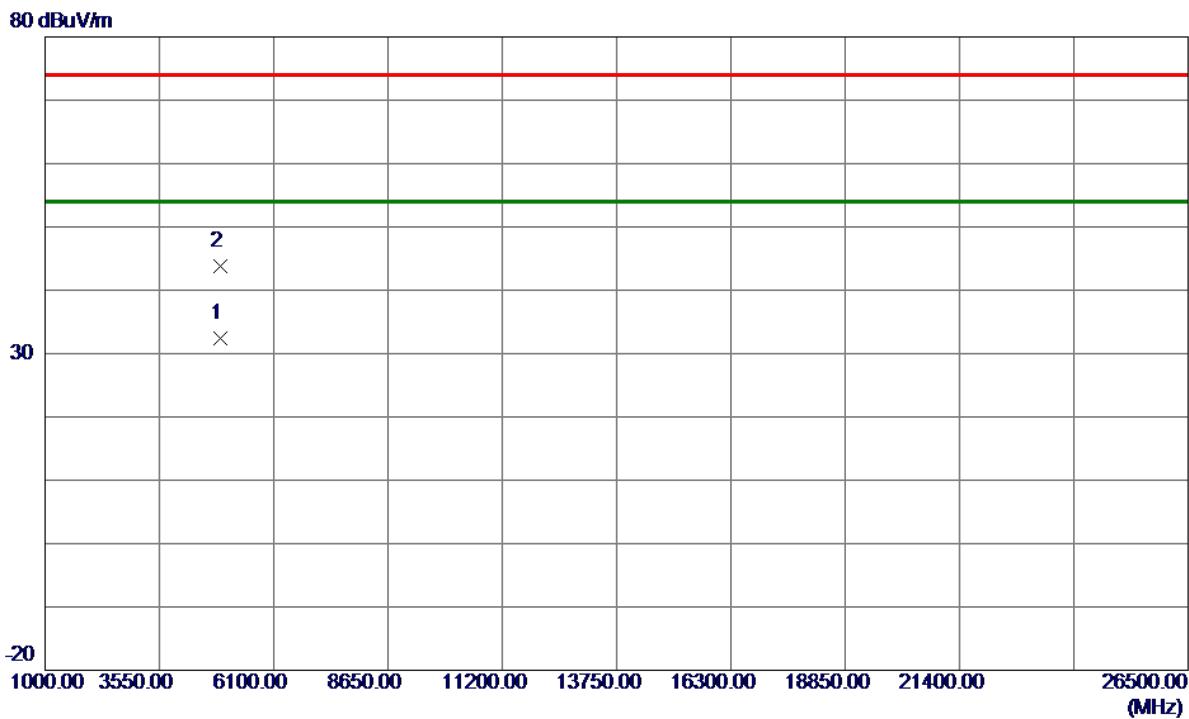
Horizontal

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	2460.8000	98.86	9.29	108.15	74.00	34.15	Peak	No Limit
2 *	2462.9500	89.48	9.30	98.78	54.00	44.78	AVG	No Limit
3	2483.5000	59.96	9.35	69.31	74.00	-4.69	Peak	
4	2483.5000	40.34	9.35	49.69	54.00	-4.31	AVG	

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

Horizontal

No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1 *	4923.3410	28.55	3.79	32.34	54.00	-21.66	AVG	
2	4923.9300	40.06	3.79	43.85	74.00	-30.15	Peak	

TX B Mode_DUTY CYCLE

Duty cycle: TX 2412 MHz

$$\text{Duty cycle} = T_{\text{ON}} / T_{\text{Total}}$$

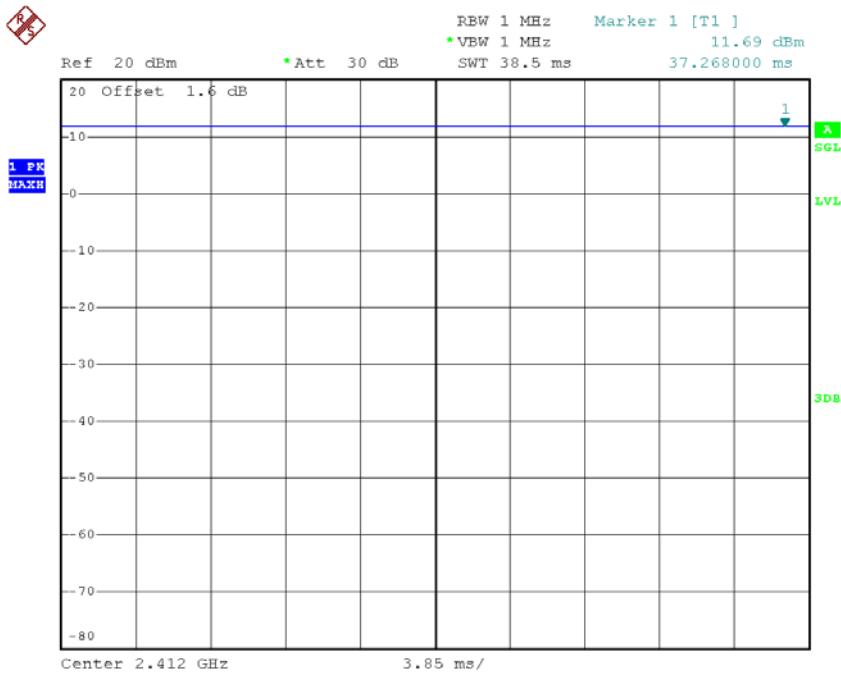
T_{ON} : 1.000 msec

T_{Total} : 1.000 msec

Duty cycle: 100.00%

$$\text{Duty Factor} = 10 \log(1/\text{Duty cycle})$$

Duty Factor = 0.00



Date: 19.DEC.2018 08:28:57

Note: The duty cycle is $\geq 98\%$ no need to calculate as Duty Factor.

TX G Mode_DUTY CYCLE

Duty cycle: TX 2412 MHz

$$\text{Duty cycle} = T_{\text{ON}} / T_{\text{Total}}$$

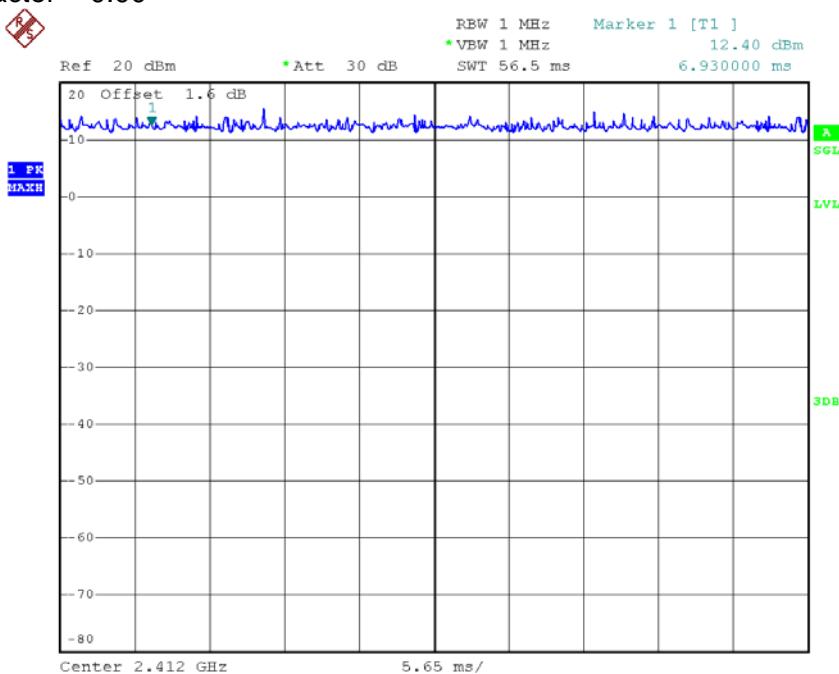
T_{ON} : 1.000 msec

T_{Total} : 1.000 msec

Duty cycle: 100.00%

$$\text{Duty Factor} = 10 \log(1/\text{Duty cycle})$$

Duty Factor = 0.00



Date: 19.DEC.2018 08:35:40

Note: The duty cycle is $\geq 98\%$ no need to calculate as Duty Factor.

TX N20 Mode_DUTY CYCLE

Duty cycle: TX 2412 MHz

$$\text{Duty cycle} = T_{\text{ON}} / T_{\text{Total}}$$

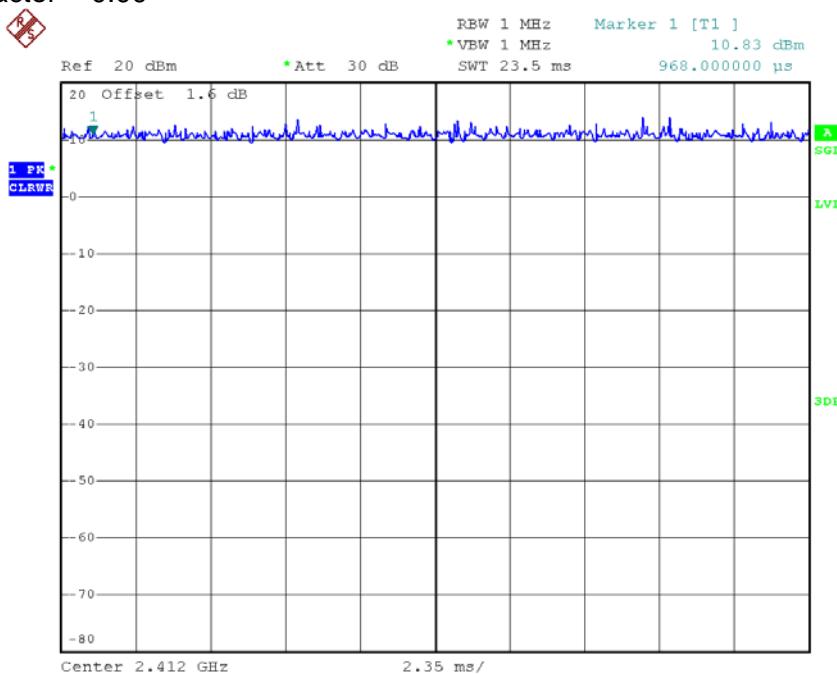
T_{ON} : 1.000 msec

T_{Total} : 1.000 msec

Duty cycle: 100.00%

$$\text{Duty Factor} = 10 \log(1/\text{Duty cycle})$$

Duty Factor = 0.00



Date: 19.DEC.2018 08:37:27

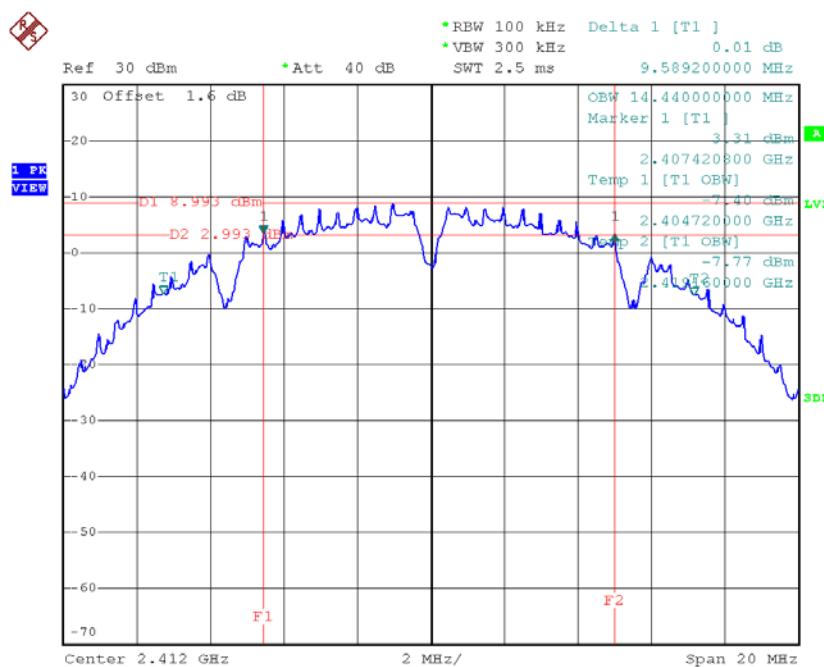
Note: The duty cycle is $\geq 98\%$ no need to calculate as Duty Factor.

APPENDIX E - BANDWIDTH

Test Mode: TX B Mode_CH01/06/11

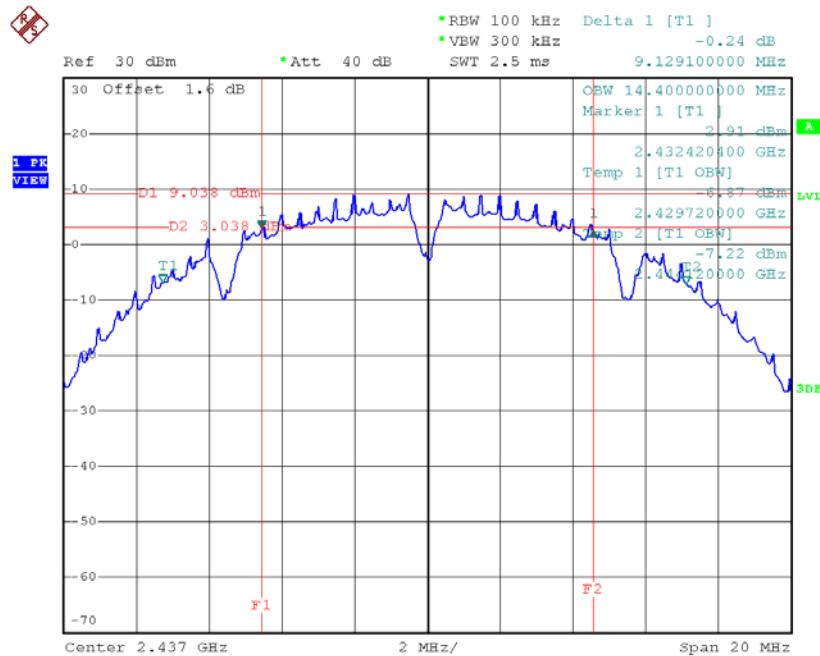
Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
2412	9.59	500	Complies
2437	9.13	500	Complies
2462	9.10	500	Complies

TX CH01



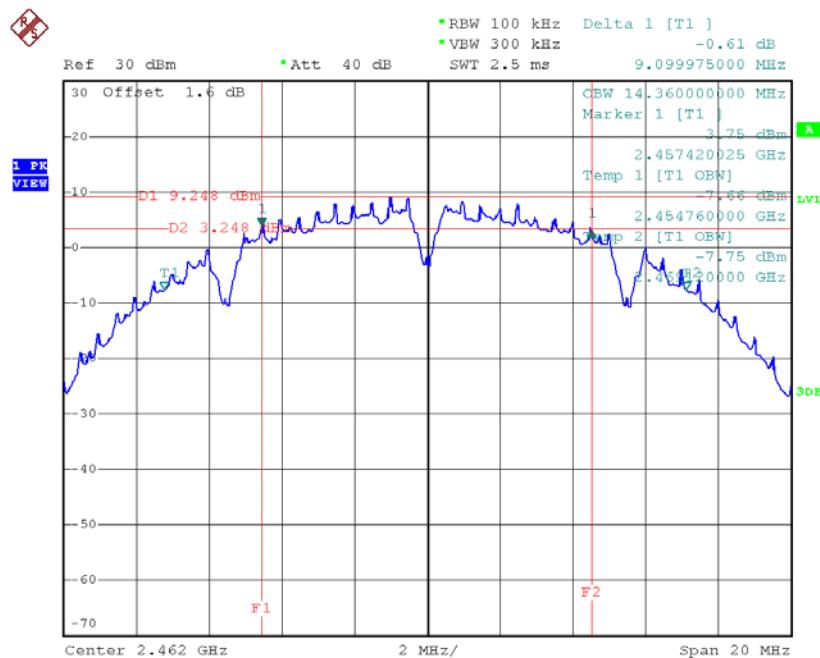
Date: 19.DEC.2018 08:46:35

TX CH06



Date: 19.DEC.2018 08:49:23

TX CH11

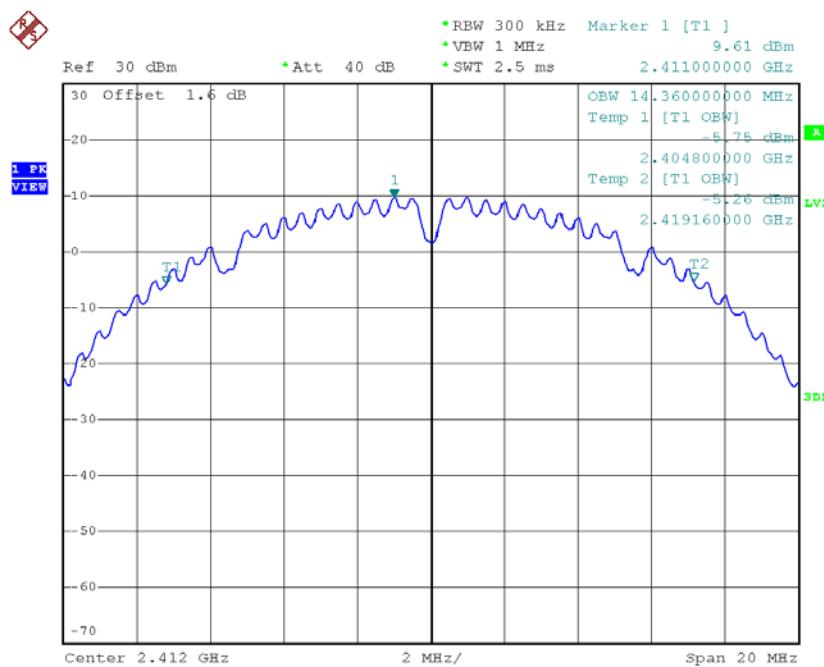


Date: 19.DEC.2018 08:52:47

Test Mode : TX B Mode_CH01/06/11

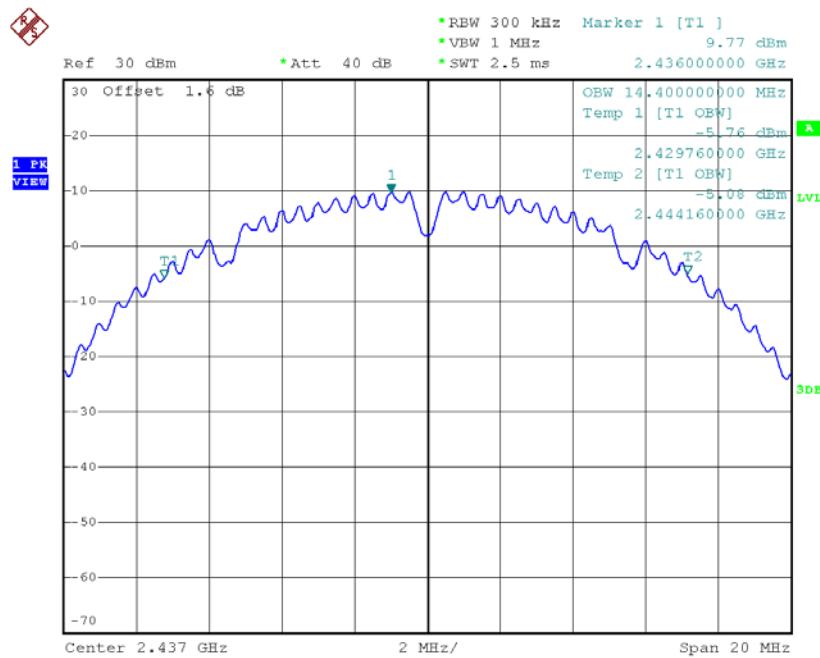
Frequency (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	14.36	No Restriction	Complies
2437	14.40	No Restriction	Complies
2462	14.32	No Restriction	Complies

TX CH01



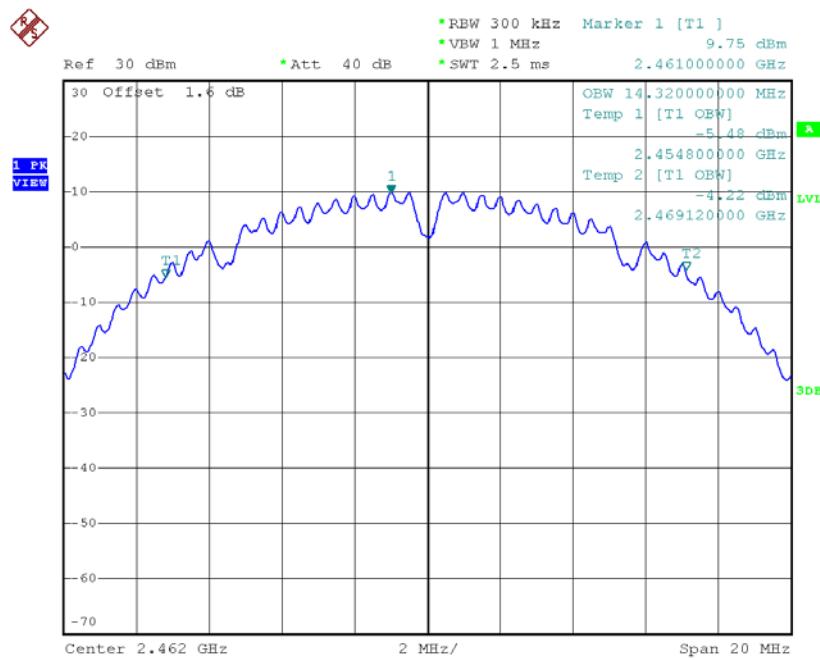
Date: 19.DEC.2018 10:09:23

TX CH06



Date: 19.DEC.2018 10:10:54

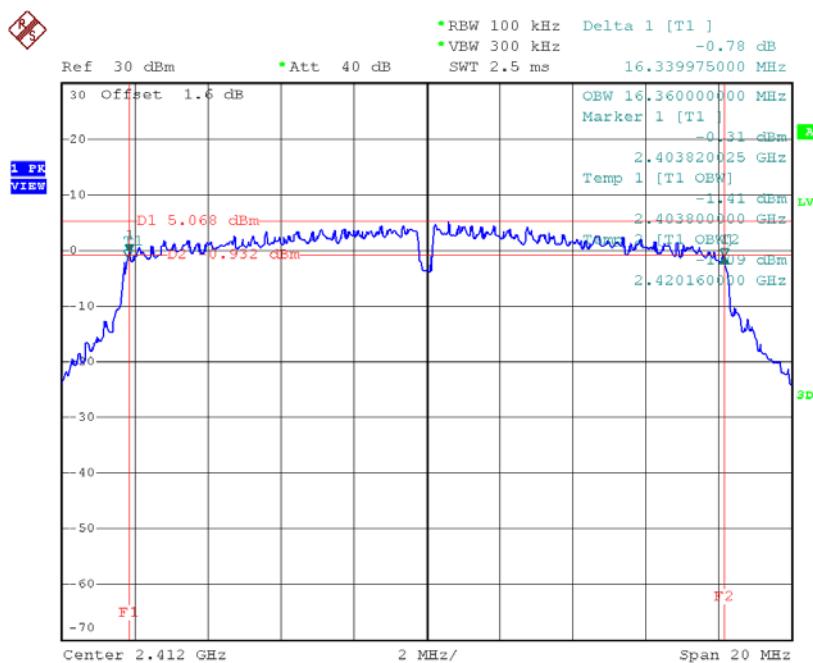
TX CH11



Date: 19.DEC.2018 10:12:01

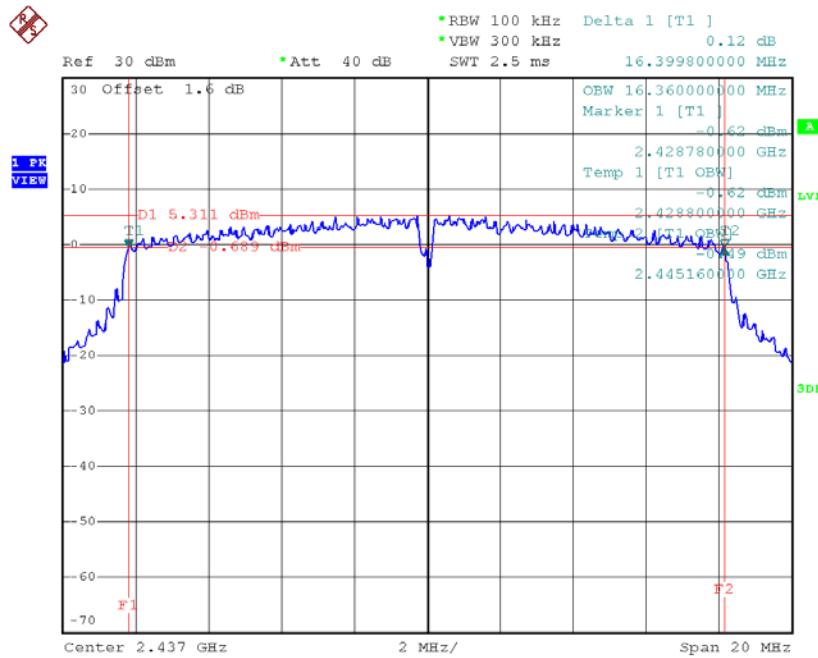
Test Mode: TX G Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
2412	16.34	500	Complies
2437	16.40	500	Complies
2462	16.38	500	Complies

TX CH01


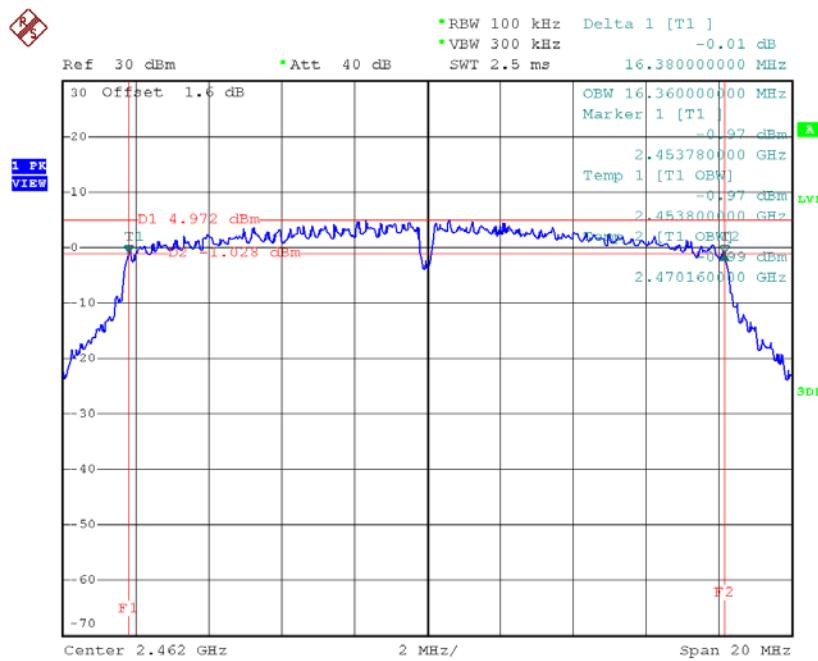
Date: 19.DEC.2018 09:00:01

TX CH06



Date: 19.DEC.2018 09:02:25

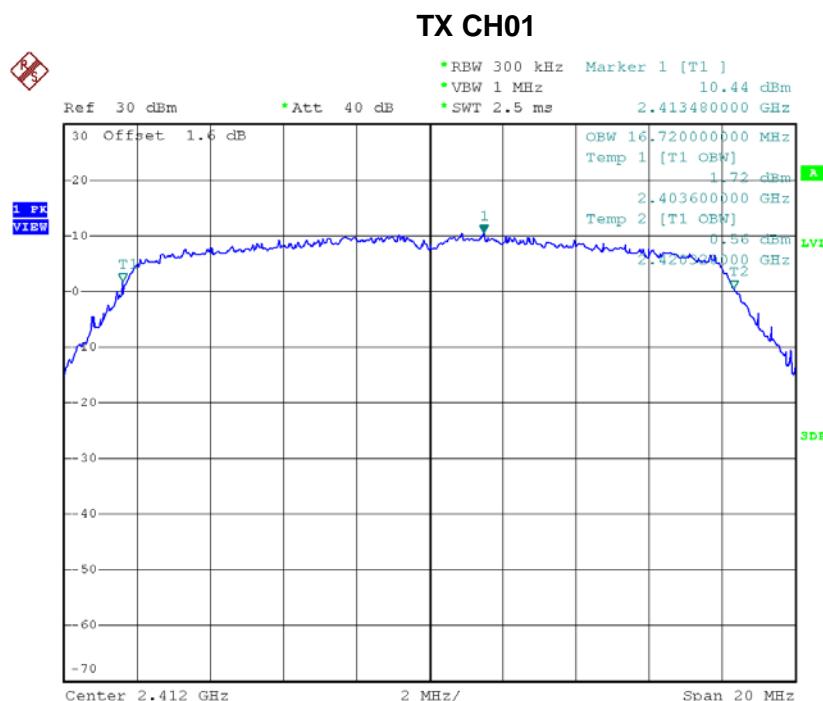
TX CH11



Date: 19.DEC.2018 09:04:05

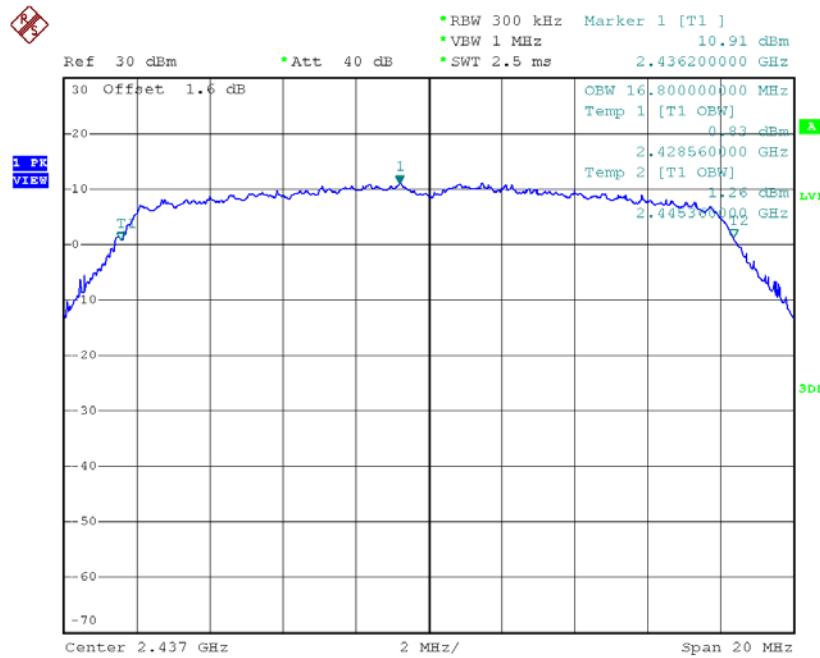
Test Mode: TX G Mode CH01/06/11

Frequency (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	16.72	No Restriction	Complies
2437	16.80	No Restriction	Complies
2462	16.72	No Restriction	Complies



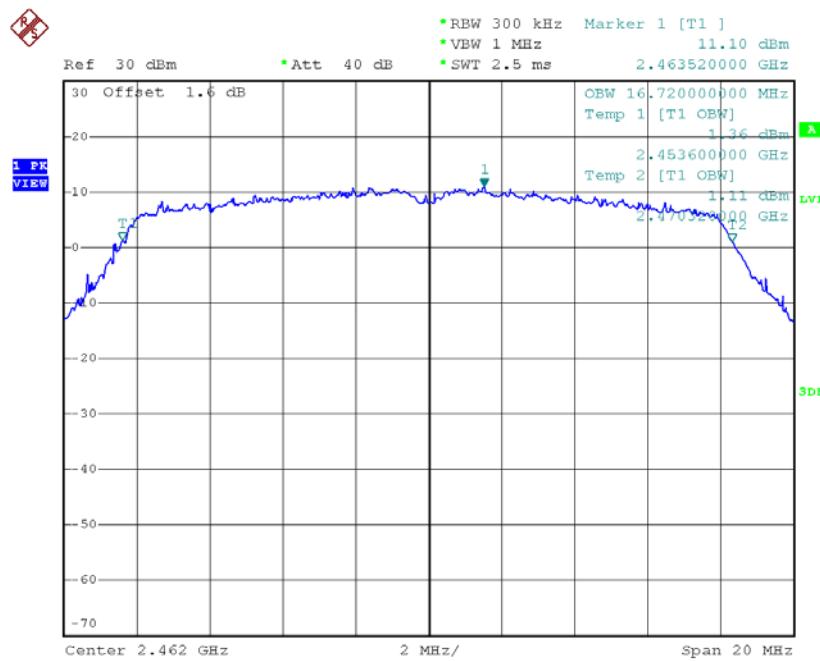
Date: 19.DEC.2018 09:40:51

TX CH06



Date: 19.DEC.2018 09:46:25

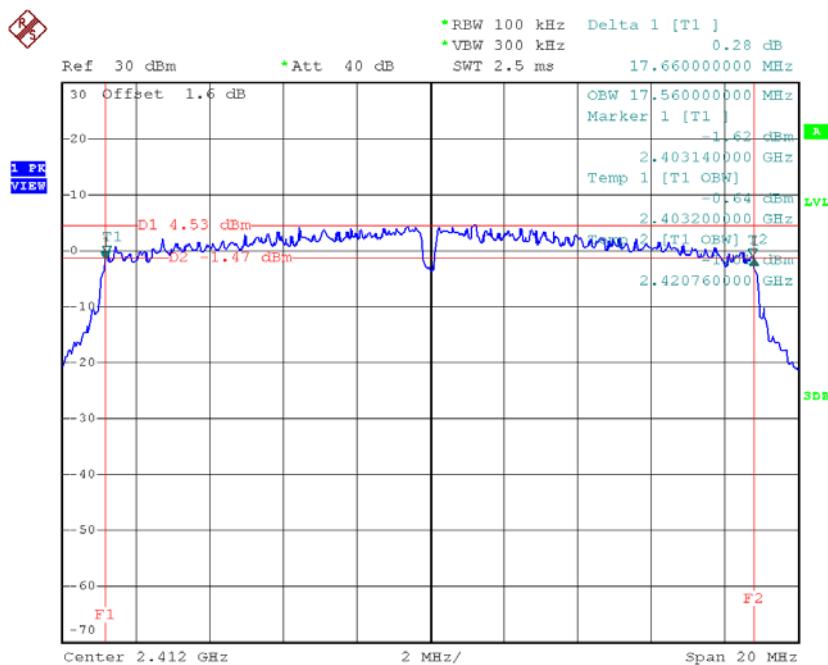
TX CH11



Date: 19.DEC.2018 09:48:46

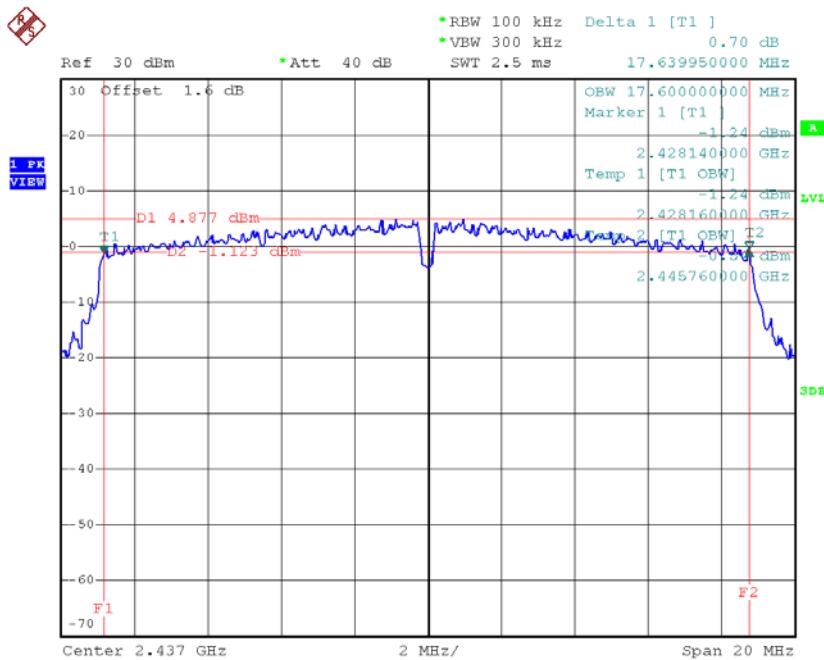
Test Mode: TX N-20MHz Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
2412	17.66	500	Complies
2437	17.64	500	Complies
2462	17.62	500	Complies

TX CH01


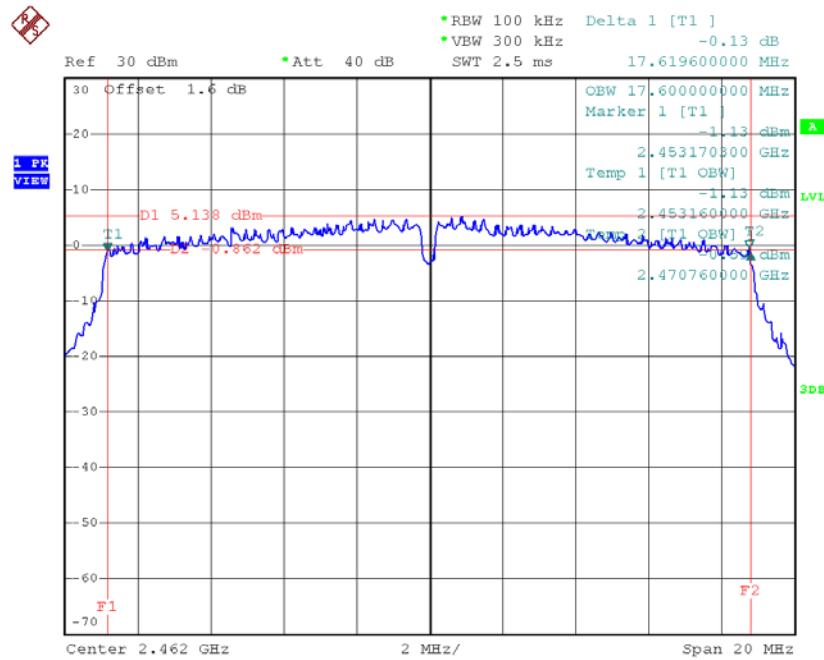
Date: 19.DEC.2018 09:10:44

TX CH06



Date: 19.DEC.2018 09:14:02

TX CH11

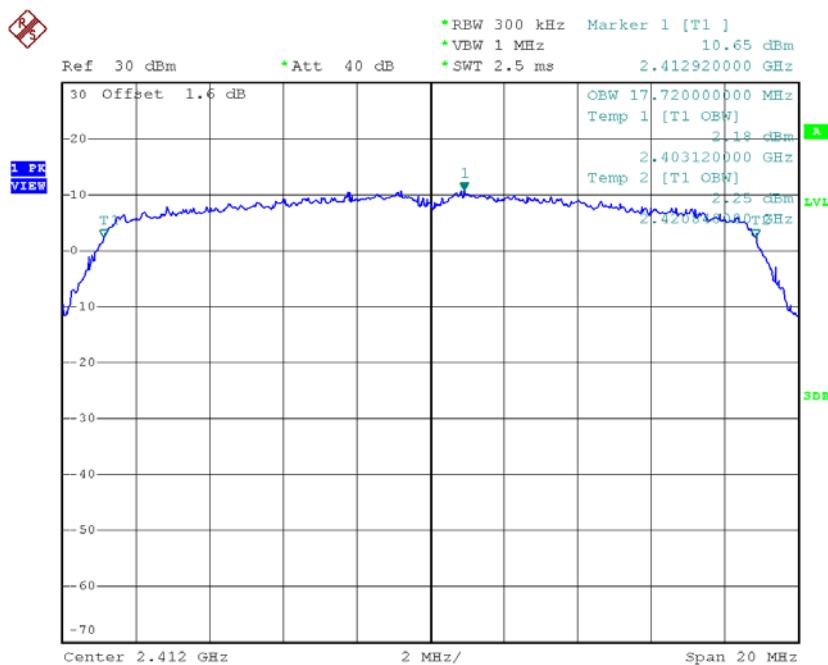


Date: 19.DEC.2018 09:15:45

Test Mode: TX N-20MHz Mode_CH01/06/11

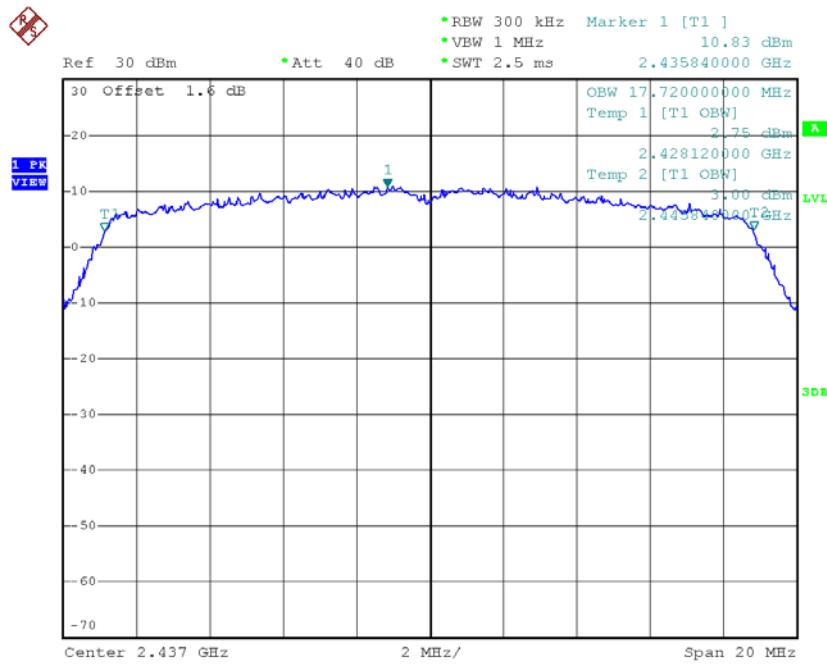
Frequency (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	17.72	No Restriction	Complies
2437	17.72	No Restriction	Complies
2462	17.64	No Restriction	Complies

TX CH01



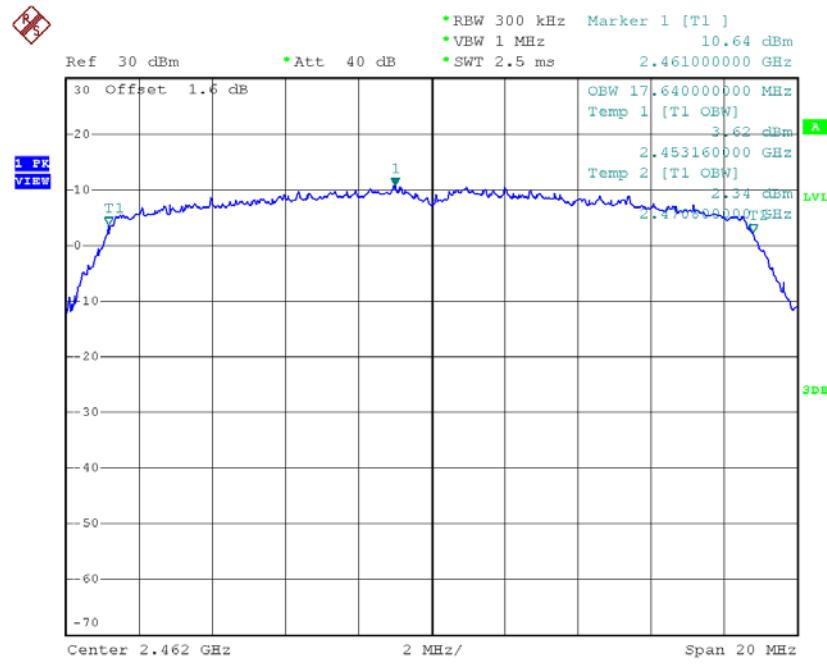
Date: 19.DEC.2018 09:58:20

TX CH06



Date: 19.DEC.2018 10:00:21

TX CH11



Date: 19.DEC.2018 10:02:04

APPENDIX F - AVERAGE OUTPUT POWER

Test Mode: TX B Mode_CH01/06/11						
Frequency (MHz)	Average Output Power (dBm)	Duty Factor	Average Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	17.85	0.00	17.85	30.00	1.00	Complies
2437	17.86	0.00	17.86	30.00	1.00	Complies
2462	17.81	0.00	17.81	30.00	1.00	Complies

Test Mode: TX G Mode_CH01/06/11						
Frequency (MHz)	Average Output Power (dBm)	Duty Factor	Average Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	17.74	0.00	17.74	30.00	1.00	Complies
2437	17.81	0.00	17.81	30.00	1.00	Complies
2462	17.79	0.00	17.79	30.00	1.00	Complies

Test Mode: TX N-20M Mode_CH01/06/11						
Frequency (MHz)	Average Output Power (dBm)	Duty Factor	Average Output Power + Duty Factor (dBm)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	17.67	0.00	17.67	30.00	1.00	Complies
2437	17.96	0.00	17.96	30.00	1.00	Complies
2462	17.74	0.00	17.74	30.00	1.00	Complies

APPENDIX G - ANTENNA CONDUCTED SPURIOUS EMISSION