FCC Radio Test Report

FCC ID: R7RDWS1113

This report concerns (check one): ☒**Original Grant** ☐**Class II Change**

Project No.	:	1407011
Equipment	:	WIFI STATION
Model Name	:	DWS-1113
Applicant	:	VAST TECHNOLOGIES INC.
Address	:	7F, NO.80,SEC.1,KUANG FU RD.SANCHUNG, TAIPEI,TAIWAN,R.O.C.

Date of Receipt	:	Jul. 03, 2014
Date of Test	:	Jul. 03, 2014 ~ Aug. 08, 2014
Issued Date	:	Aug. 11, 2014
Tested by	:	BTL Inc.

Testing Engineer: _____
(Josh Lin)

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Authorized Signatory: _____
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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

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-1-1407011	Original Issue.	Aug. 11, 2014

1. CERTIFICATION

Equipment	:	WIFI STATION
Brand Name	:	VAST
Model Name	:	DWS-1113
Applicant	:	VAST TECHNOLOGIES INC.
Date of Test	:	Jul. 03, 2014 ~ Aug. 08, 2014
Test Sample	:	ENGINEERING SAMPLE
Standard(s)	:	FCC Part15, Subpart C: 2013 (15.247) / ANSI C63.4-2009

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-1-1407011) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-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: 2013			
Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(b)(3)	Peak Output Power	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	
15.209/15.205	Transmitter Radiated Emissions	PASS	

NOTE:

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

(2) The test follows FCC KDB Publication No. 558074 D01 DTS Meas Guidance v03r02 (Measurement Guidelines of DTS)

2.1TEST FACILITY

The test facilities used to collect the test data in this report:

Conducted emission Test:

C02: 1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

Radiated emission Test (Below 1 GHz):

CB08: 1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

Radiated emission Test (Above 1 GHz):

CB08: 1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

2.2MEASUREMENT UNCERTAINTY

The measurement uncertainty is not specified by FCC/Industry Canada rules and for reference only.

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95**%.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

A. Conducted emission test:

Test Site	Measurement Frequency Range	U，(dB)	NOTE
C02	150 kHz ~ 30 MHz	2.59	

B. Radiated emission test:

Test Site	Item	Measurement Frequency Range		Uncertainty	NOTE
CB08	Radiated emission at 3m	Horizontal Polarization	30 - 200MHz	3.35 dB	
			200 - 1000MHz	3.11 dB	
			1 - 18GHz	3.97 dB	
			18 - 40GHz	4.01 dB	
		Vertical Polarization	30 - 200MHz	3.22 dB	
			200 - 1000MHz	3.24 dB	
			1 - 18GHz	4.05 dB	
			18 - 40GHz	4.04 dB	

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR}, as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz: 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz: 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR}.

If U_{lab} is less than or equal to U_{CISPR}, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{CISPR}, then:

- compliance is deemed to occur if no measured disturbance level, increased by (U_{lab} - U_{CISPR}), exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} - U_{CISPR}), exceeds the disturbance limit.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	WIFI STATION	
Brand Name	VAST	
Model Name	DWS-1113	
Model Difference	N/A	
Product Description	Operation Frequency	2412~2462 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 150 Mbps
	Output Power (Max.)	802.11b: 16.22dBm (0.0419W) 802.11g: 23.53dBm (0.2254W) 802.11n(20MHz): 20.90dBm (0.1230W) 802.11n(40MHz): 20.81dBm (0.1205W)
Power Source	1# DC voltage supplied from USB adapter Model: PS10A050K2000UU 2# DC voltage supplied from Li-Polymer battery	
Power Rating	1# I/P: AC100-240V, 50/60Hz, 0.35A O/P: DC 5.0V, 2000mA 2# DC 3.7V,370mA (Li-Polymer battery 3000mA)	

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(20MHz) CH03 – CH09 for 802.11n(40MHz)							
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)	Note
1	Cortec	NB0159-A100BX	printed	N/A	3.0	

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 N-40MHZ 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-20MHZ MODE CHANNEL 01/06/11
Mode 4	TX N-40MHZ MODE CHANNEL 03/06/09

Note:

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

(2) 802.11b mode: DBPSK (1Mbps)
802.11g mode: OFDM (6Mbps)
802.11n HT20 mode : BPSK (6.5Mbps)
802.11n HT40 mode : BPSK (13.5Mbps)
For radiated emission tests, the highest output powers were set for final test.

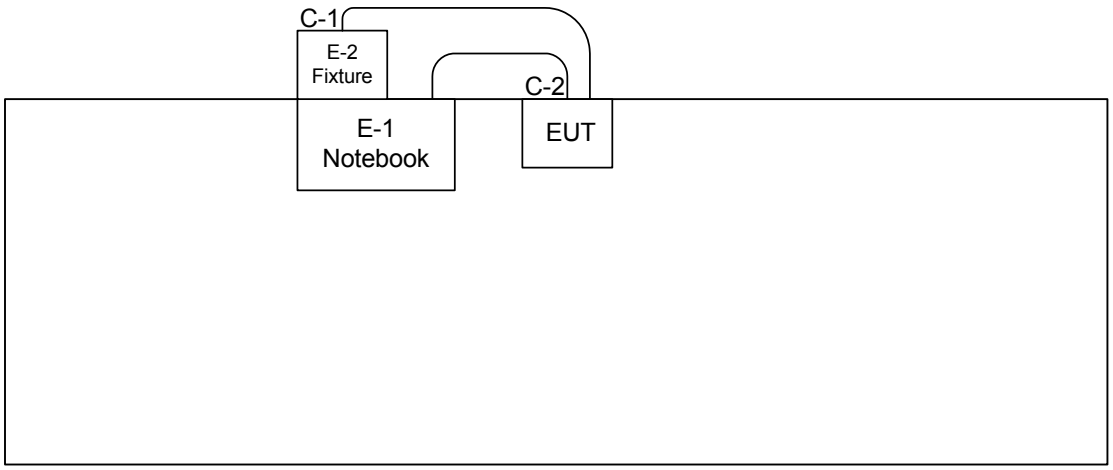
(3) For radiated below 1G test, the 802.11b is found to be the worst case and recorded.

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

Test software version	MP_TEST		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b DSSS	35	35	35
IEEE 802.11g OFDM	49	49	49
IEEE 802.11n (20MHz)	42	42	42
Frequency	2422 MHz	2437 MHz	2452 MHz
IEEE 802.11n (40MHz)	42	42	42

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



C-1 DATA Cable
C-2 RJ-45 Cable

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/IC	Series No.	Note
E-2	Notebook PC	DELL	PP18L	DOC	PF329 A01	
E-3	Fixture	N/A	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.6m	
C-2	NO	NO	1m	

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 -0.5	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

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

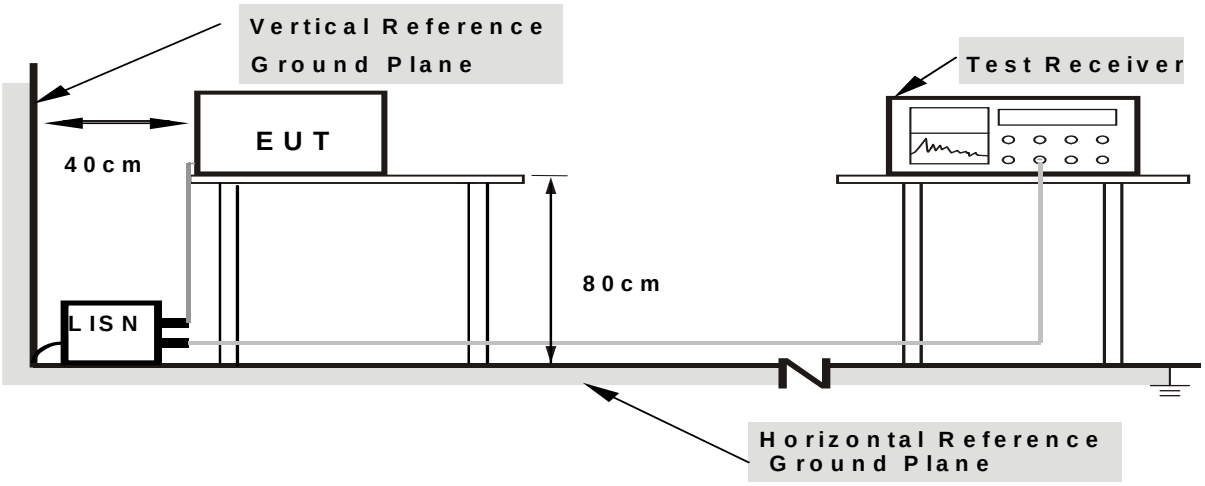
4.1.2 TEST PROCEDURE

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 equipments 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



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

4.1.7 TEST RESULTS

Please refer to the Attachment A.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS

20dB in any 100 KHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) & RSS-210 section 2.2& Annex 8 (A8.5), then the 15.209(a)& RSS-Gen limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9KHz-1000MHz)

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 1000MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

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

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

4.2.2 TEST PROCEDURE

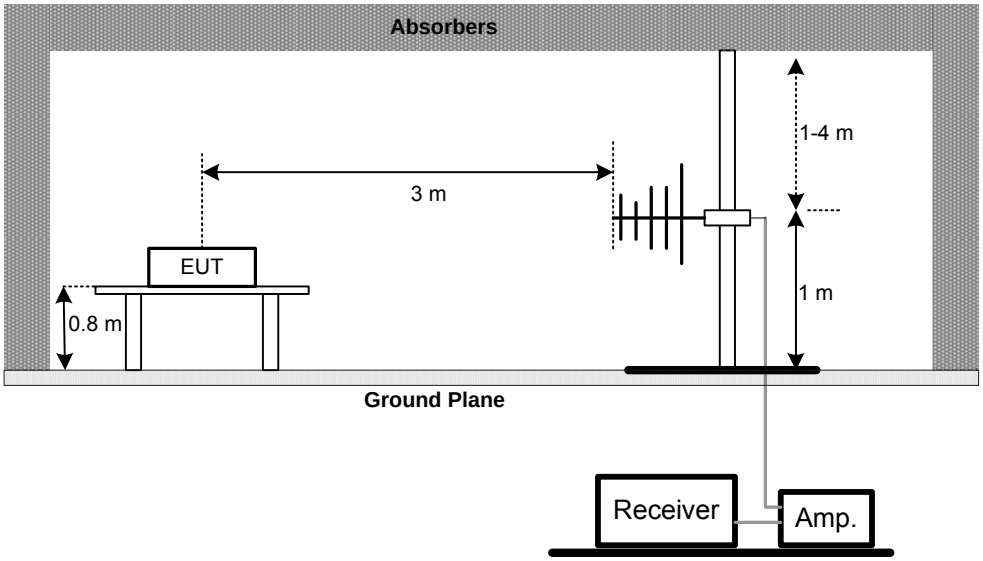
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m; 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. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

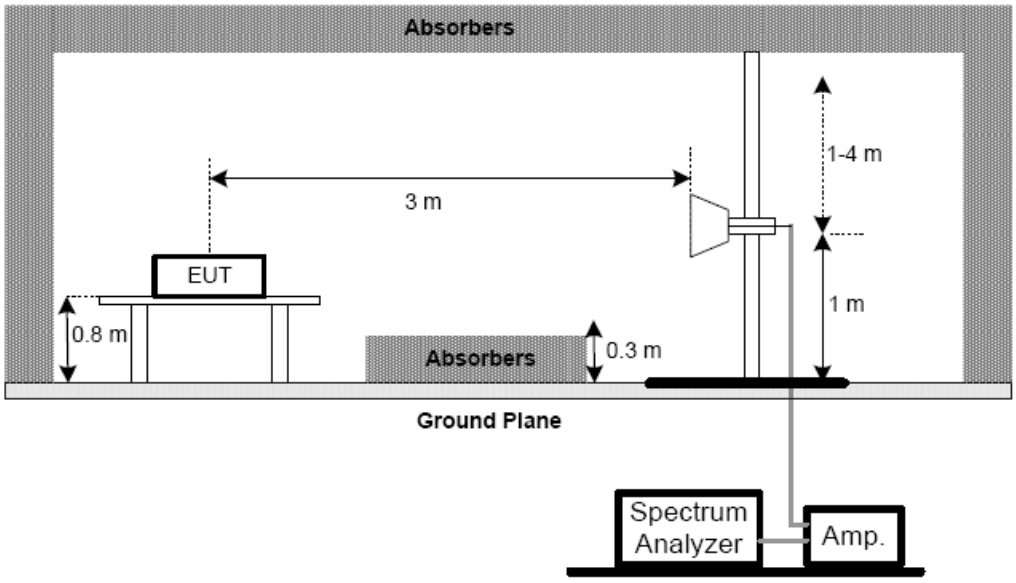
No deviation

4.2.4 TEST SETUP

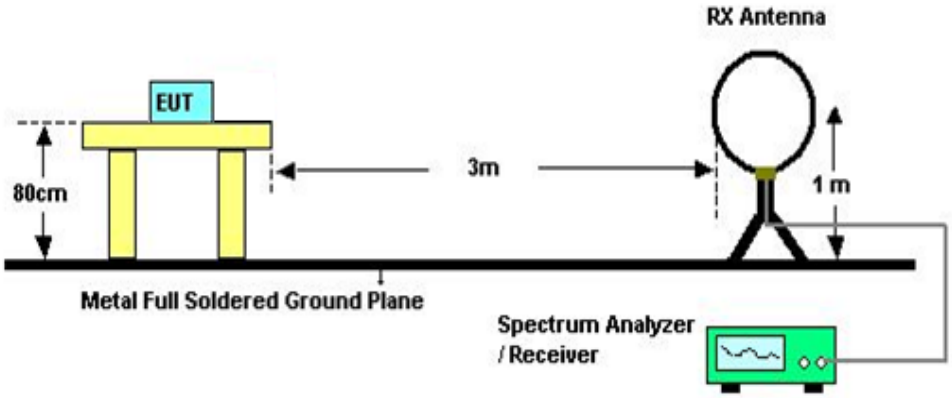
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Attachment 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 (specific distance / test distance) (dB).
(3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.8 TEST RESULTS (BETWEEN 30MHZ TO 1000 MHZ)

Please refer to the Attachment C.

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Attachment D.

5. BANDWIDTH TEST

5.1 Applied procedures

FCC Part15 (15.247) , Subpart C/ RSS-GEN and RSS-210			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(2) RSS-GEN section 4.6.1 RSS-210 Annex 8 (A8.2(a))	Bandwidth	2400-2483.5	PASS

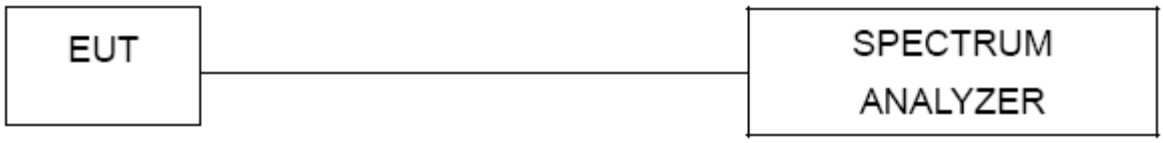
5.1.1 TEST PROCEDURE

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= 100KHz, VBW=300KHz, 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 tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

5.1.6 TEST RESULTS

Please refer to the Attachment E.

6. MAXIMUM OUTPUT POWER TEST

6.1 Applied procedures / limit

FCC Part15 (15.247) , Subpart C/ RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3) RSS-210 Annex 8.4(4)	Maximum Output Power	1 Watt or 30dBm	2400-2483.5	PASS

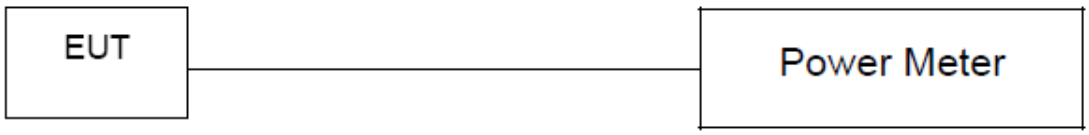
6.1.1 TEST PROCEDURE

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 9.1.3 of FCC KDB 558074 D01 DTS Meas Guidance v03r01.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.
Transmit output power was measured while the host equipment supply voltage was varied from 85 % to 115 % of the nominal rated supply voltage. No change in transmit output power was observed.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

6.1.6 TEST RESULTS

Please refer to the Attachment 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

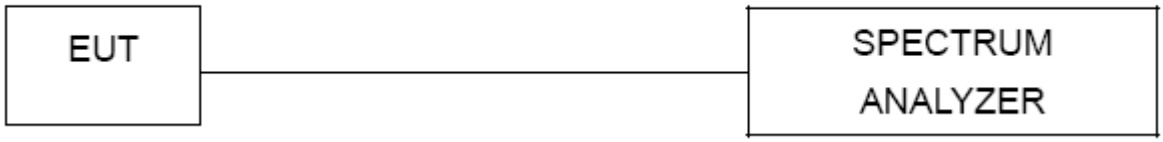
7.1.1 TEST PROCEDURE

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= 100KHz, VBW=300KHz, Sweep time = Auto.

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

7.1.6 TEST RESULTS

Please refer to the Attachment G.

8. POWER SPECTRAL DENSITY TEST

8.1 Applied procedures / limit

FCC Part15 (15.247) , Subpart C / RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e) RSS-210 Annex 8(A8.2(b))	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

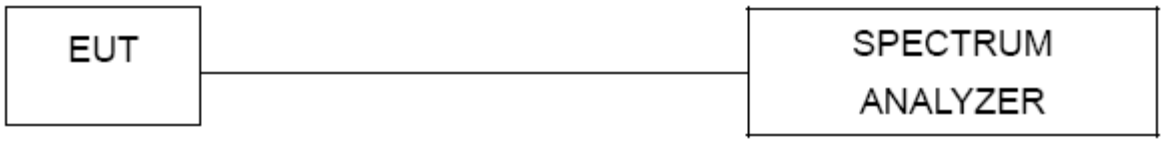
8.1.1 TEST PROCEDURE

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=3KHz, VBW=10KHz, Sweep time = Auto.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

8.1.6 TEST RESULTS

Please refer to the Attachment H.

9. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	Schwarzbeck	NSLK 8127	8127685	Jan. 08, 2015
2	Test Cable	TIMES	CFD300-NL	C01	Jun. 15, 2015
3	EMI Test Receiver	R&S	ESCI	100082	Apr. 13, 2015
4	Measurement Software	EZ	EZ_EMC (Version NB-02A)	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-30	100854	Sep. 08, 2014
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Apr. 14, 2015
3	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Apr. 15, 2015
4	Microflex Cable	Harbour industries	27478LL142	1m	May. 12, 2015
5	Microflex Cable	EMC	S104-SMA	8m	May. 12, 2015
6	Microflex Cable	Harbour industries	27478LL142	3m	May. 12, 2015
7	Test Cable	LMR	LMR-400	12m	May. 13, 2015
8	Test Cable	LMR	LMR-400	3m	May. 13, 2015
9	Pre-Amplifier	Anritsu	MH648A	M92649	Jun. 17, 2015
10	Log-Bicon Antenna	Schwarzbeck	VULB 9161	4049	Sep. 04, 2014

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-30	100854	Sep. 08, 2014

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-30	100854	Sep. 08, 2014

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-30	100854	Sep. 08, 2014

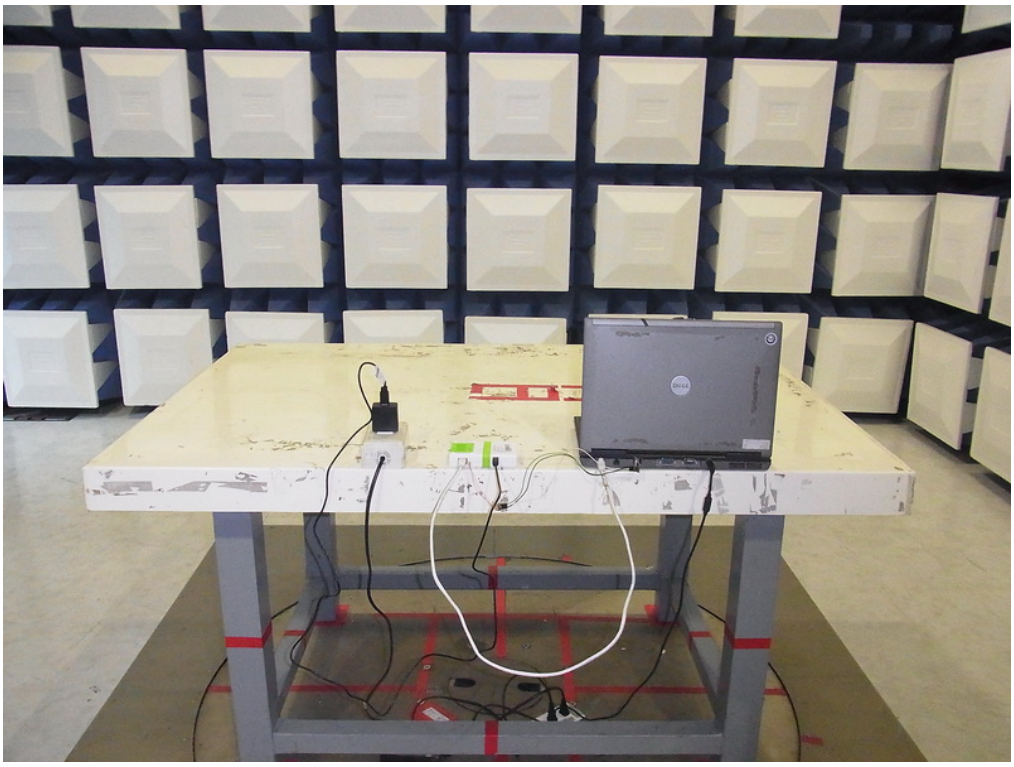
Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-30	100854	Sep. 08, 2014

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

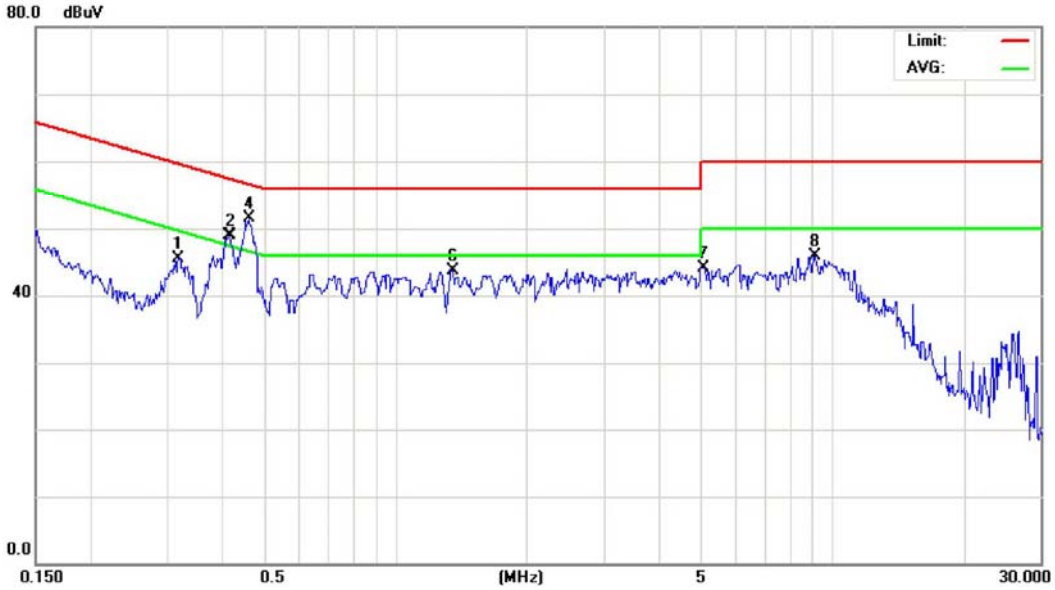
Radiated Measurement Photos



ATTACHMENT A - CONDUCTED EMISSION

Test Mode :	TX MODE

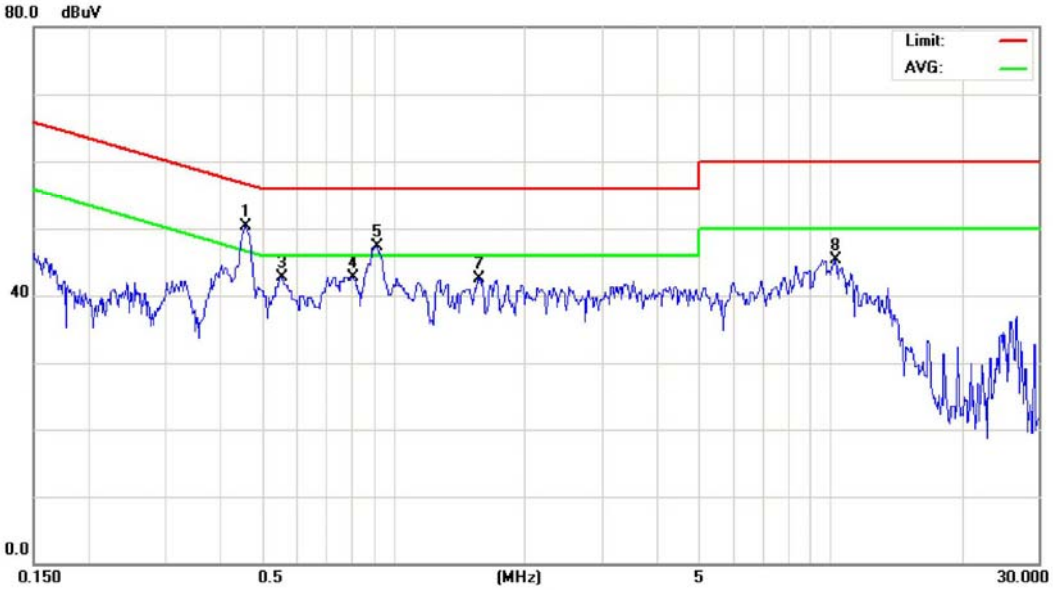
Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3178	36.73	8.69	45.42	59.76	-14.34	peak	
2		0.4173	40.19	8.77	48.96	57.50	-8.54	peak	
3		0.4173	25.60	8.77	34.37	47.50	-13.13	AVG	
4	*	0.4600	42.74	8.78	51.52	56.69	-5.17	peak	
5		0.4600	27.40	8.78	36.18	46.69	-10.51	AVG	
6		1.3459	34.52	9.10	43.62	56.00	-12.38	peak	
7		5.0499	34.16	9.99	44.15	60.00	-15.85	peak	

Test Mode :	TX MODE

Neutral

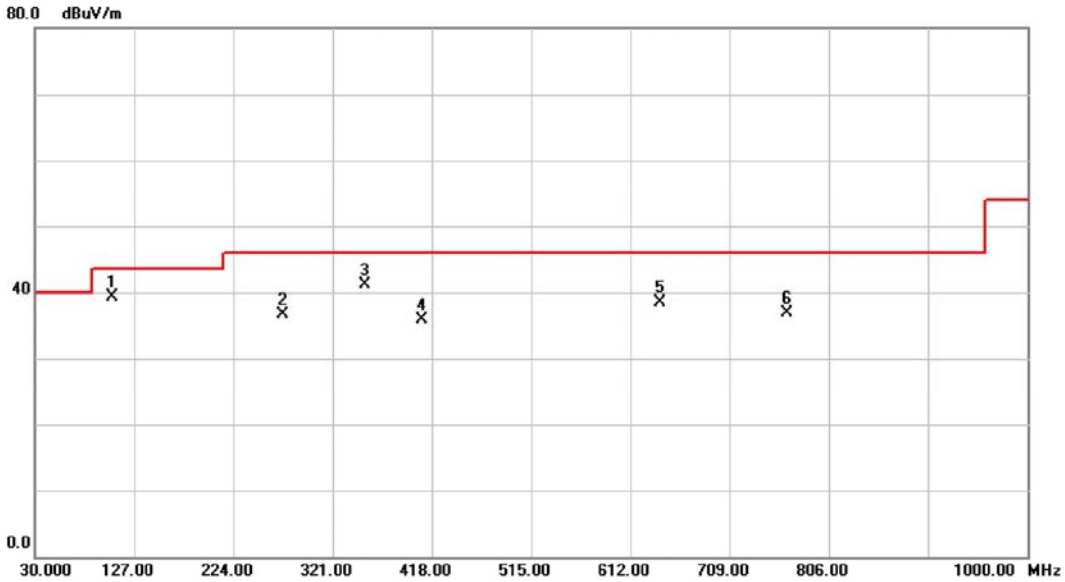


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.4587	41.52	8.78	50.30	56.72	-6.42	peak	
2		0.4587	26.51	8.78	35.29	46.72	-11.43	AVG	
3		0.5540	33.81	8.80	42.61	56.00	-13.39	peak	
4		0.8059	33.85	8.88	42.73	56.00	-13.27	peak	
5		0.9140	38.33	8.92	47.25	56.00	-8.75	peak	
6		0.9140	23.16	8.92	32.08	46.00	-13.92	AVG	
7		1.5620	33.24	9.18	42.42	56.00	-13.58	peak	

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

Test Mode:	TX B MODE CHANNEL 06

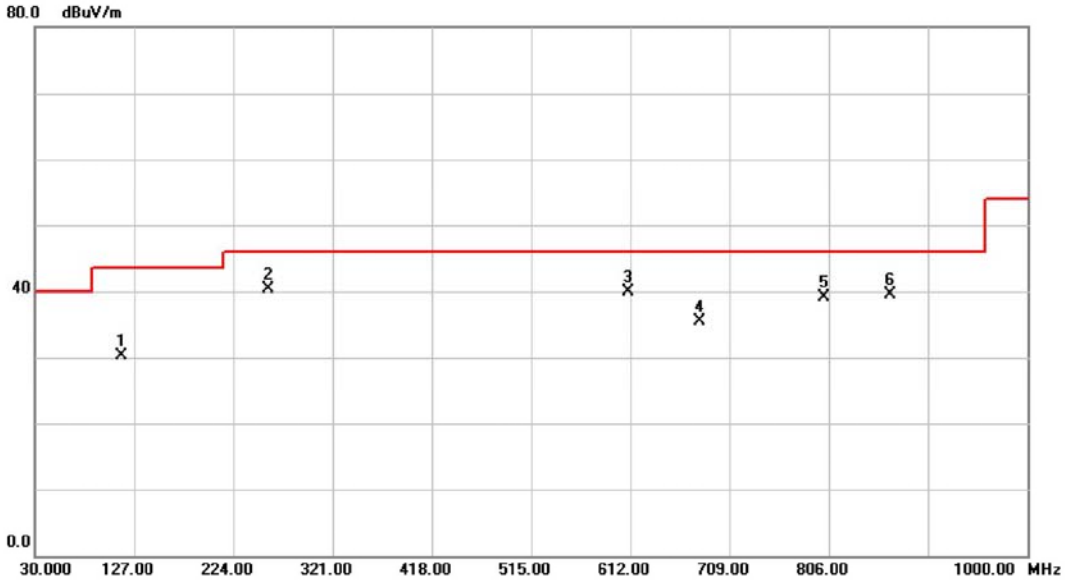
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	105.1750	56.14	-16.88	39.26	43.50	-4.24	peak	
2		272.5000	51.78	-15.02	36.76	46.00	-9.24	peak	
3		352.5250	54.04	-12.90	41.14	46.00	-4.86	peak	
4		408.3000	47.24	-11.32	35.92	46.00	-10.08	peak	
5		641.1000	45.99	-7.54	38.45	46.00	-7.55	peak	
6		764.7750	42.61	-5.67	36.94	46.00	-9.06	peak	

Test Mode:	TX B MODE CHANNEL 06

Horizontal

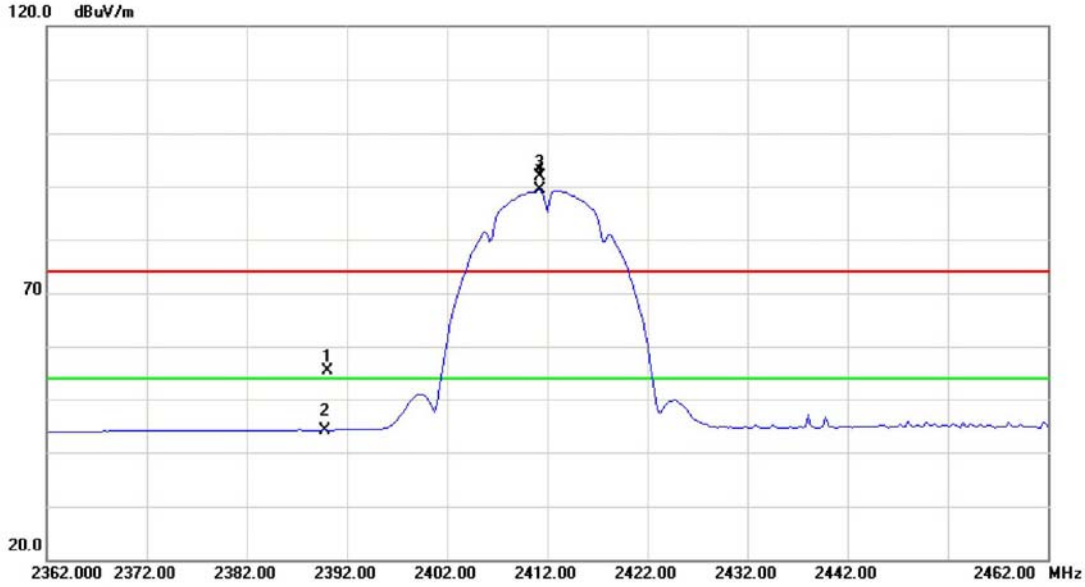


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		114.8750	47.07	-16.78	30.29	43.50	-13.21	peak	
2	*	257.9500	55.64	-15.26	40.38	46.00	-5.62	peak	
3		609.5750	47.97	-8.02	39.95	46.00	-6.05	peak	
4		679.9000	42.10	-6.52	35.58	46.00	-10.42	peak	
5		801.1500	44.47	-5.33	39.14	46.00	-6.86	peak	
6		866.6250	43.82	-4.33	39.49	46.00	-6.51	peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

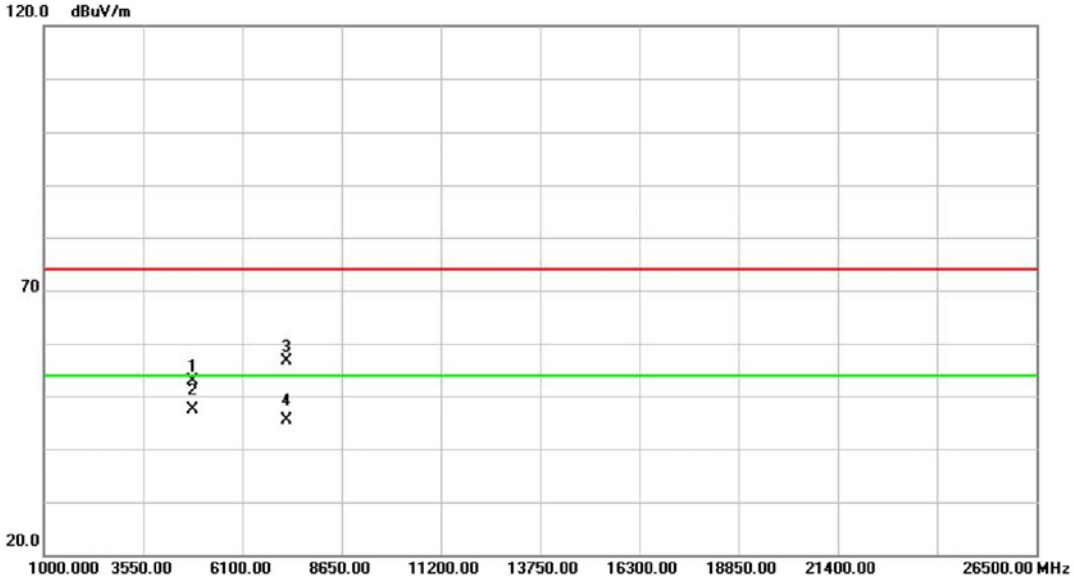
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	24.30	31.02	55.32	74.00	-18.68	peak	
2		2390.000	13.19	31.02	44.21	54.00	-9.79	AVG	
3	X	2411.250	60.80	31.12	91.92	74.00	17.92	peak	no limit
4	*	2411.250	58.15	31.12	89.27	54.00	35.27	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

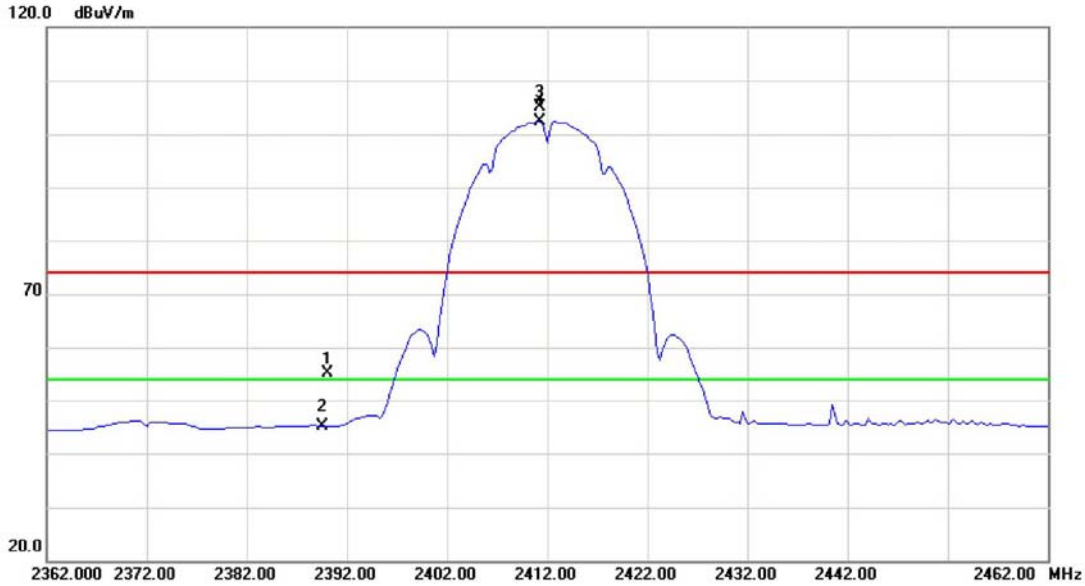
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4823.925	45.58	7.39	52.97	74.00	-21.03	peak	
2	*	4823.925	40.02	7.39	47.41	54.00	-6.59	AVG	
3		7236.137	41.68	14.87	56.55	74.00	-17.45	peak	
4		7236.137	30.57	14.87	45.44	54.00	-8.56	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

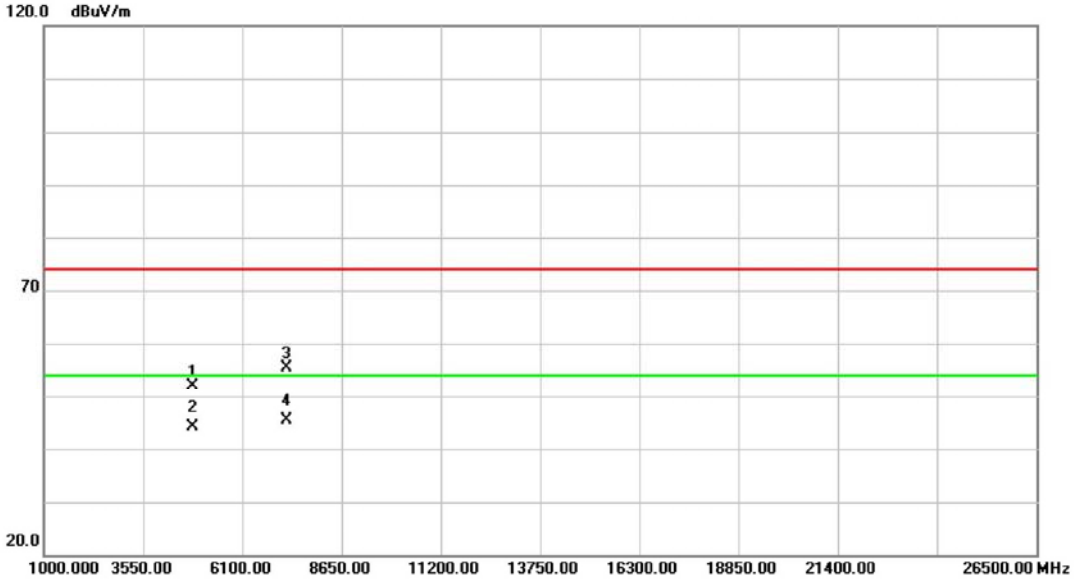
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	24.10	31.02	55.12	74.00	-18.88	peak	
2		2390.000	14.15	31.02	45.17	54.00	-8.83	AVG	
3	X	2411.250	74.06	31.12	105.18	74.00	31.18	peak	no limit
4	*	2411.250	71.33	31.12	102.45	54.00	48.45	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

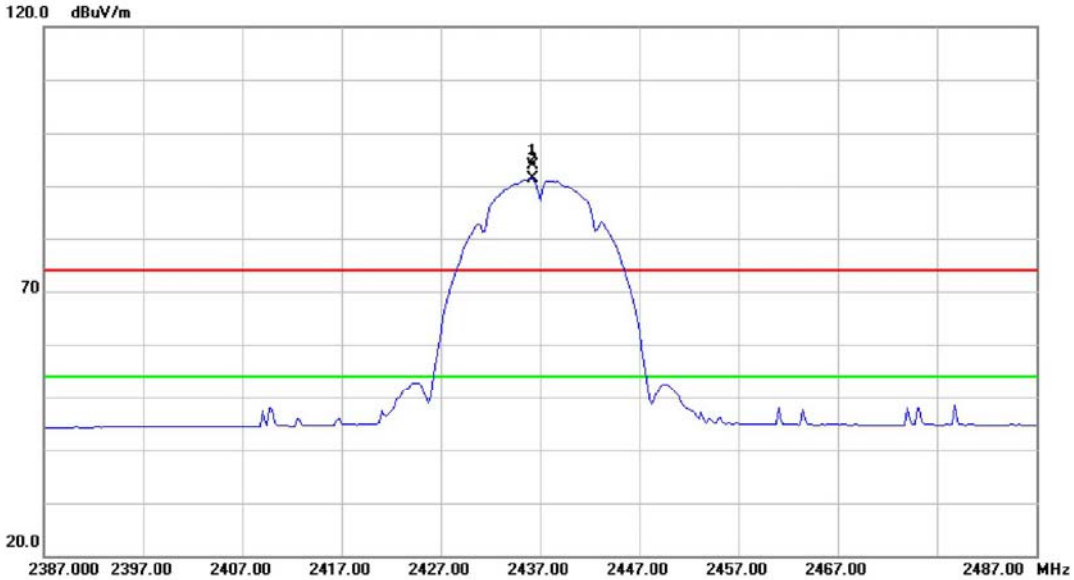
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4823.950	44.46	7.39	51.85	74.00	-22.15	peak	
2		4823.950	36.81	7.39	44.20	54.00	-9.80	AVG	
3		7236.137	40.58	14.87	55.45	74.00	-18.55	peak	
4	*	7236.137	30.53	14.87	45.40	54.00	-8.60	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2436.250	62.70	31.24	93.94	74.00	19.94	peak	
2	*	2436.250	60.08	31.24	91.32	54.00	37.32	AVG	

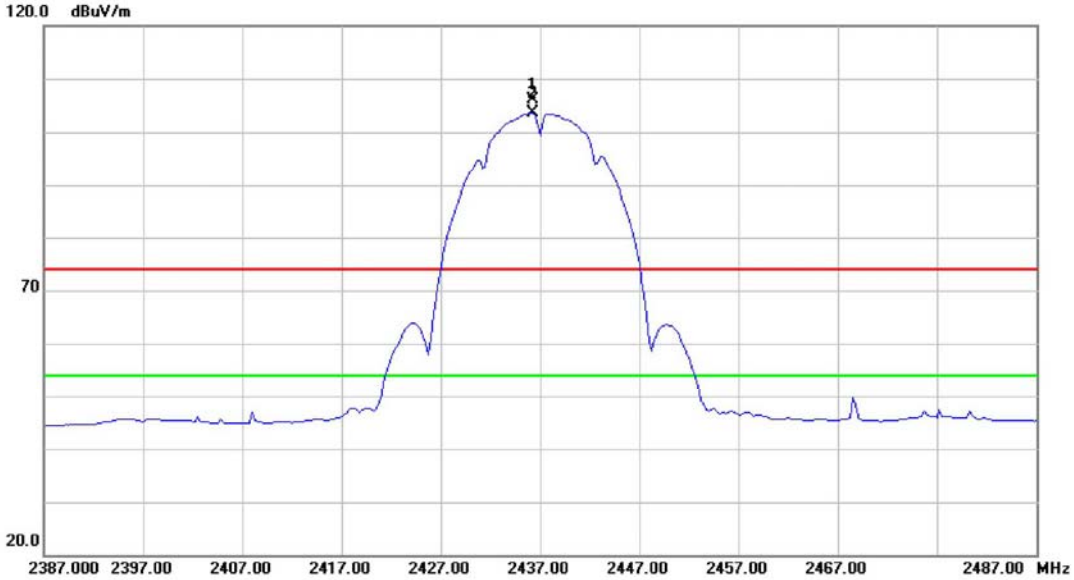
Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4873.960	43.89	7.47	51.36	74.00	-22.64	peak	
2	*	4873.960	39.11	7.47	46.58	54.00	-7.42	AVG	
3		7311.910	41.14	15.19	56.33	74.00	-17.67	peak	
4		7311.910	29.98	15.19	45.17	54.00	-8.83	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2436.250	75.01	31.24	106.25	74.00	32.25	peak	
2	*	2436.250	72.31	31.24	103.55	54.00	49.55	AVG	

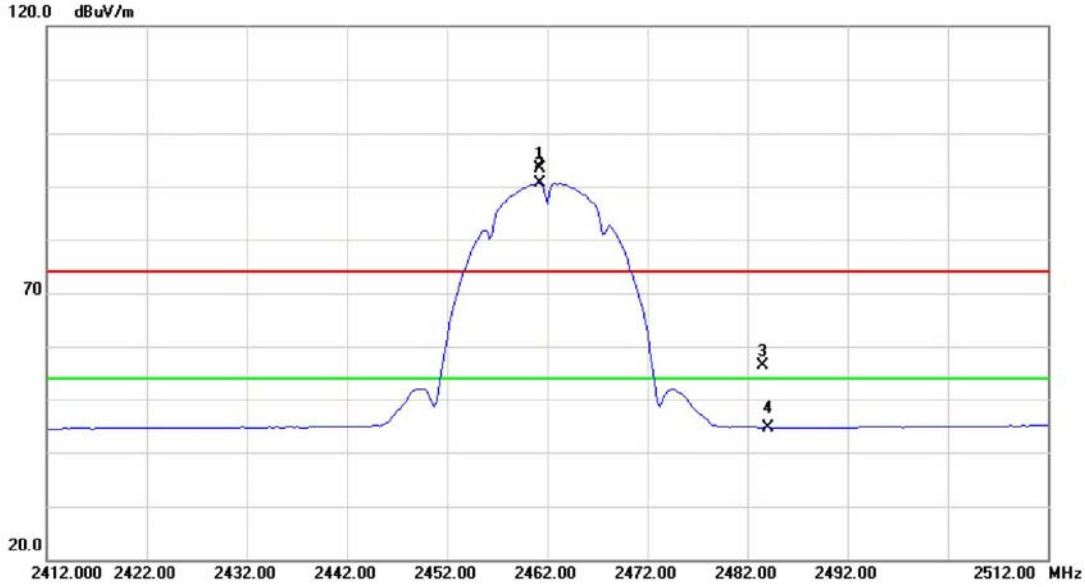
Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4873.890	43.75	7.47	51.22	74.00	-22.78	peak	
2		4873.890	36.16	7.47	43.63	54.00	-10.37	AVG	
3		7312.050	40.28	15.19	55.47	74.00	-18.53	peak	
4	*	7312.050	30.30	15.19	45.49	54.00	-8.51	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2461.250	62.10	31.36	93.46	74.00	19.46	peak	no limit
2	*	2461.250	59.31	31.36	90.67	54.00	36.67	AVG	no limit
3		2483.500	24.83	31.46	56.29	74.00	-17.71	peak	
4		2483.500	13.28	31.46	44.74	54.00	-9.26	AVG	

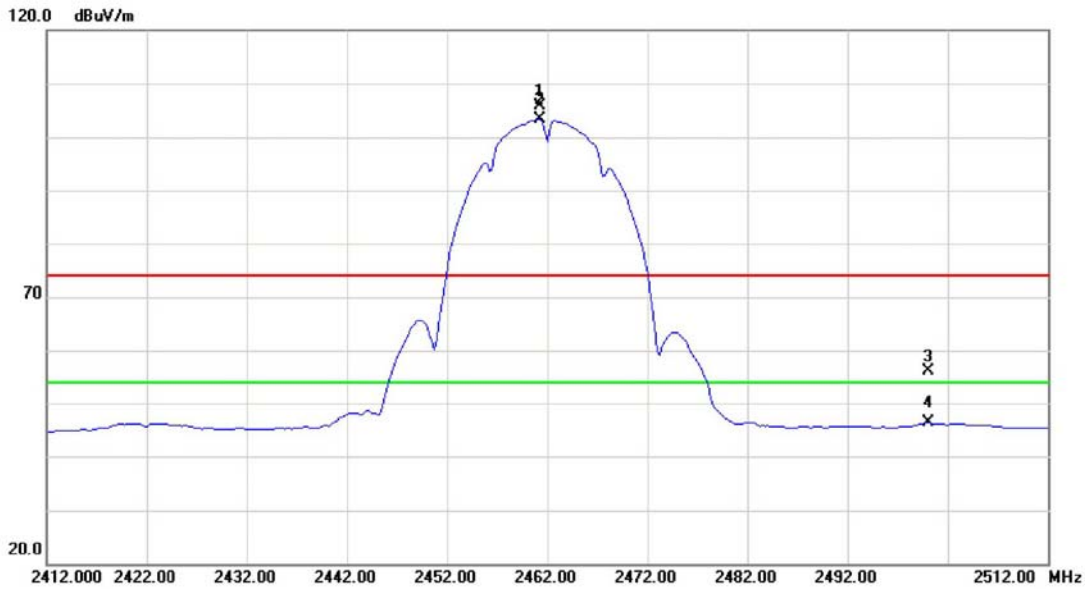
Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4923.950	47.30	7.53	54.83	74.00	-19.17	peak	
2	*	4923.950	43.20	7.53	50.73	54.00	-3.27	AVG	
3		7385.400	40.82	15.50	56.32	74.00	-17.68	peak	
4		7385.400	31.28	15.50	46.78	54.00	-7.22	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

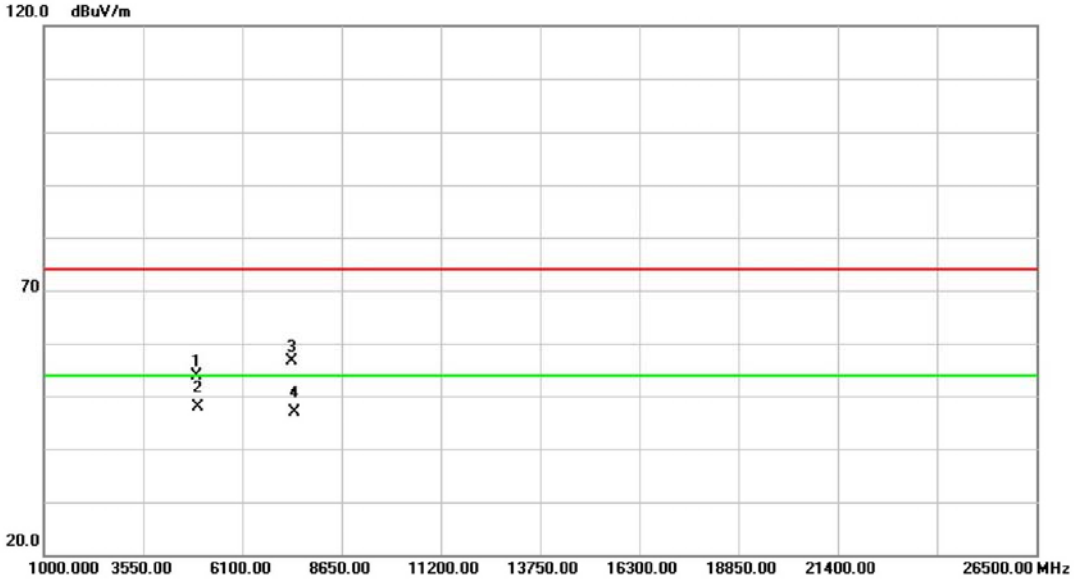
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2461.250	74.58	31.36	105.94	74.00	31.94	peak	no limit
2	*	2461.250	71.94	31.36	103.30	54.00	49.30	AVG	no limit
3		2500.000	24.60	31.54	56.14	74.00	-17.86	peak	
4		2500.000	14.79	31.54	46.33	54.00	-7.67	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

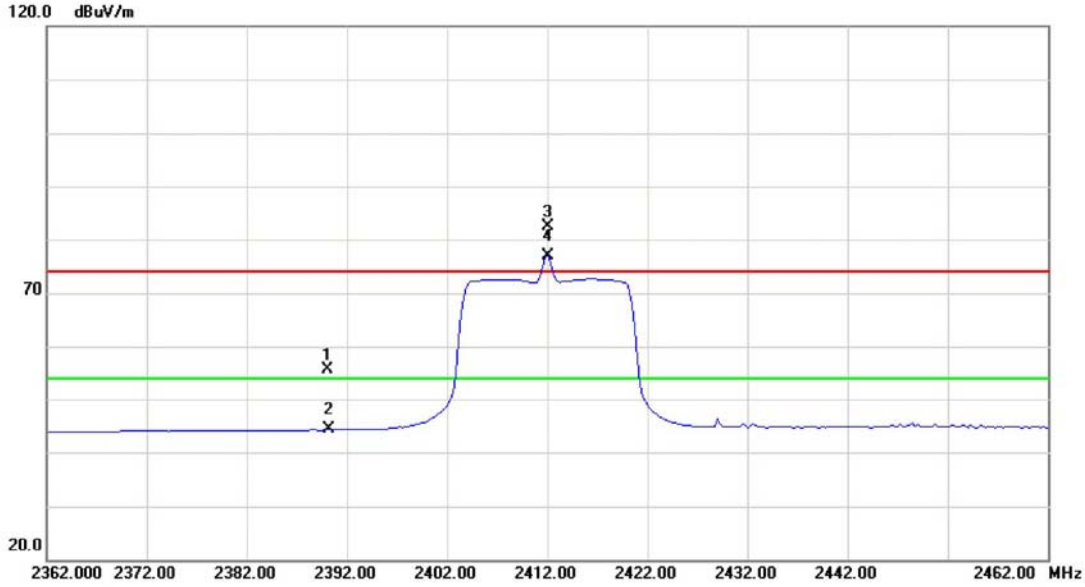
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4923.965	46.32	7.53	53.85	74.00	-20.15	peak	
2	*	4923.965	40.31	7.53	47.84	54.00	-6.16	AVG	
3		7386.400	41.21	15.50	56.71	74.00	-17.29	peak	
4		7386.400	31.29	15.50	46.79	54.00	-7.21	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	24.60	31.02	55.62	74.00	-18.38	peak	
2		2390.000	13.24	31.02	44.26	54.00	-9.74	AVG	
3	X	2412.000	51.20	31.12	82.32	74.00	8.32	peak	no limit
4	*	2412.000	45.77	31.12	76.89	54.00	22.89	AVG	no limit

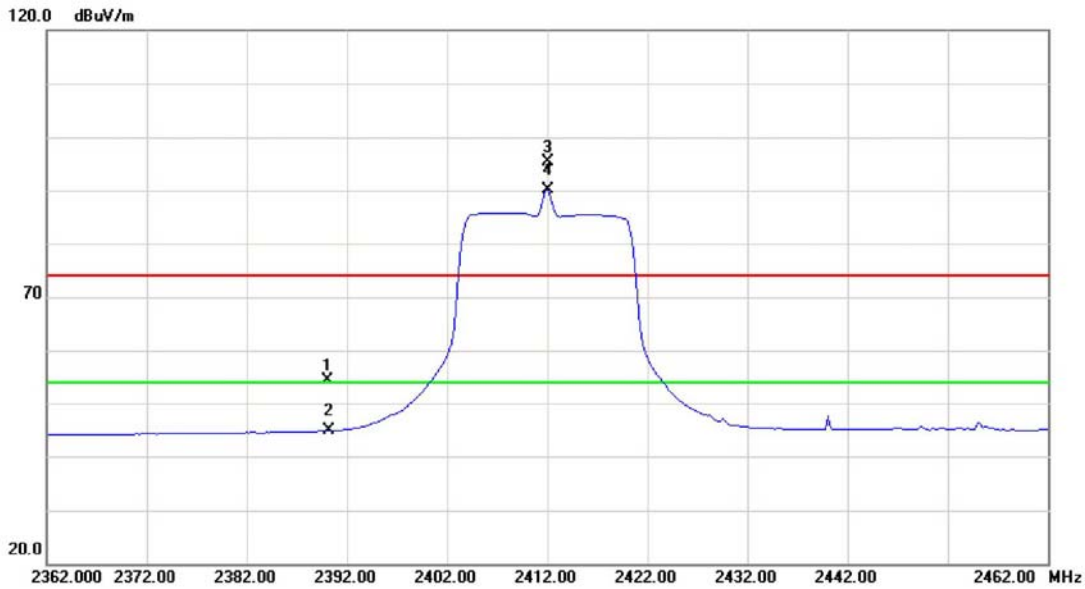
Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4823.875	41.48	7.39	48.87	74.00	-25.13	peak	
2		4823.875	31.19	7.39	38.58	54.00	-15.42	AVG	
3		7236.125	40.89	14.87	55.76	74.00	-18.24	peak	
4	*	7236.125	30.65	14.87	45.52	54.00	-8.48	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

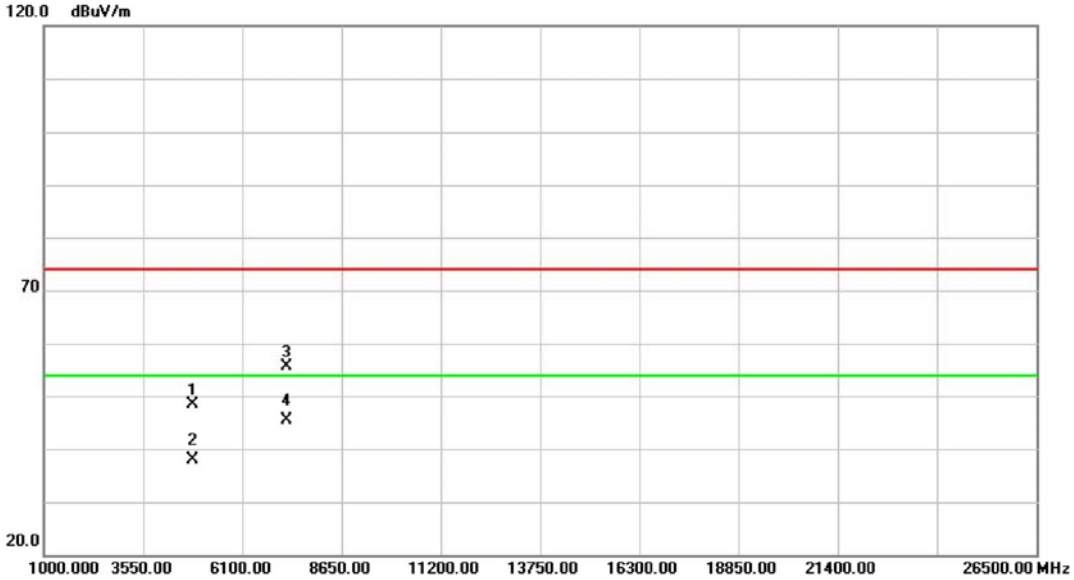
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	23.30	31.02	54.32	74.00	-19.68	peak	
2		2390.000	13.81	31.02	44.83	54.00	-9.17	AVG	
3	X	2412.000	64.30	31.12	95.42	74.00	21.42	peak	no limit
4	*	2412.000	58.92	31.12	90.04	54.00	36.04	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

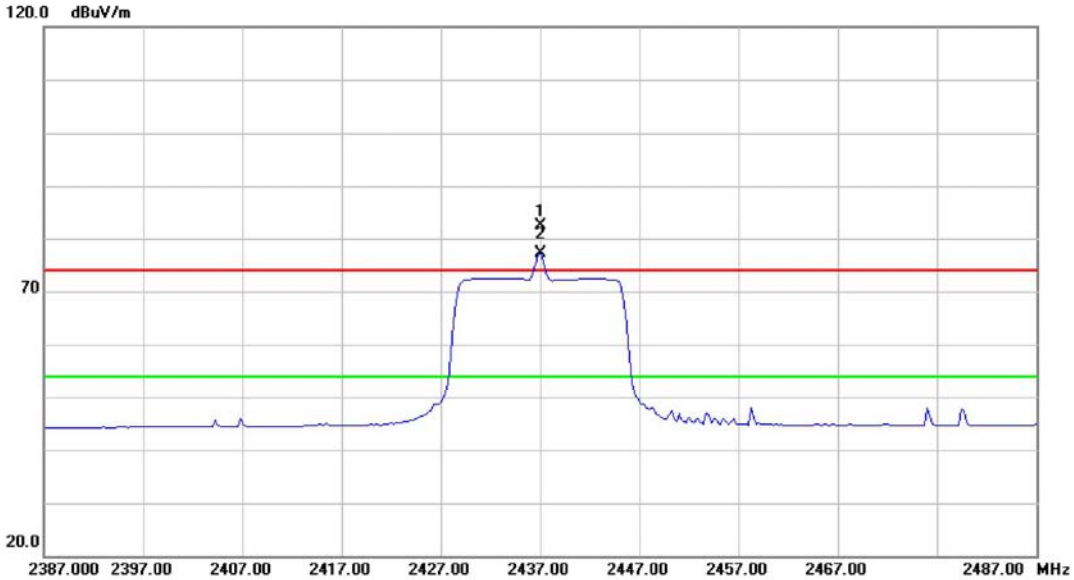
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4823.663	41.08	7.39	48.47	74.00	-25.53	peak	
2		4823.663	30.59	7.39	37.98	54.00	-16.02	AVG	
3		7236.125	40.71	14.87	55.58	74.00	-18.42	peak	
4	*	7236.125	30.60	14.87	45.47	54.00	-8.53	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2437.000	51.24	31.25	82.49	74.00	8.49	peak	
2	*	2437.000	45.86	31.25	77.11	54.00	23.11	AVG	

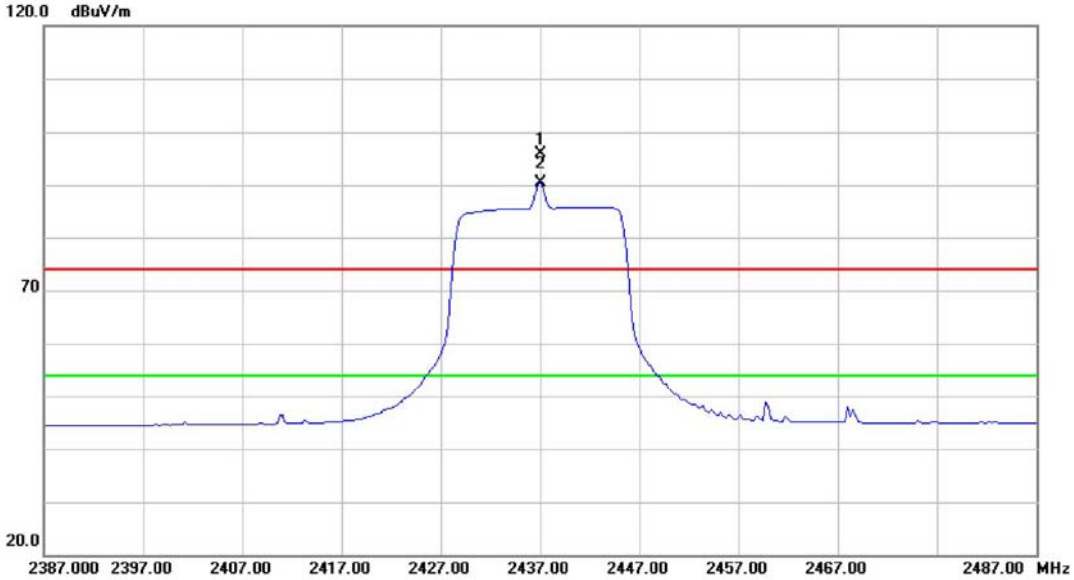
Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4873.950	41.47	7.47	48.94	74.00	-25.06	peak	
2		4873.950	30.74	7.47	38.21	54.00	-15.79	AVG	
3		7311.900	42.45	15.19	57.64	74.00	-16.36	peak	
4	*	7311.900	30.66	15.19	45.85	54.00	-8.15	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2437.000	64.60	31.25	95.85	74.00	21.85	peak	
2	*	2437.000	59.17	31.25	90.42	54.00	36.42	AVG	

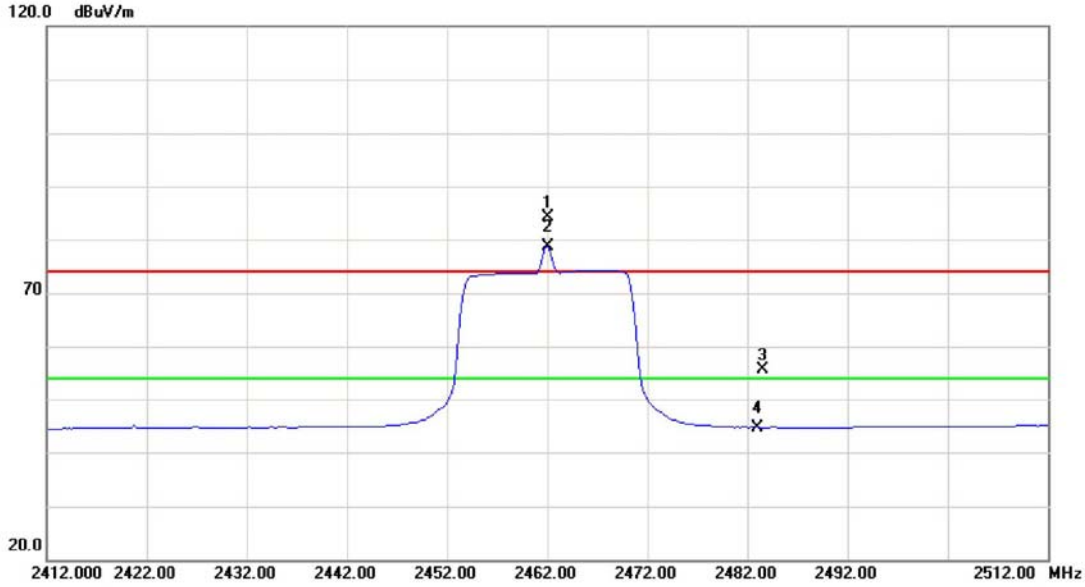
Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.300	40.52	7.47	47.99	74.00	-26.01	peak	
2		4874.300	30.72	7.47	38.19	54.00	-15.81	AVG	
3		7311.230	42.36	15.18	57.54	74.00	-16.46	peak	
4	*	7311.230	30.67	15.18	45.85	54.00	-8.15	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2462.000	52.70	31.36	84.06	74.00	10.06	peak	no limit
2	*	2462.000	47.38	31.36	78.74	54.00	24.74	AVG	no limit
3		2483.500	24.20	31.46	55.66	74.00	-18.34	peak	
4		2483.500	13.26	31.46	44.72	54.00	-9.28	AVG	

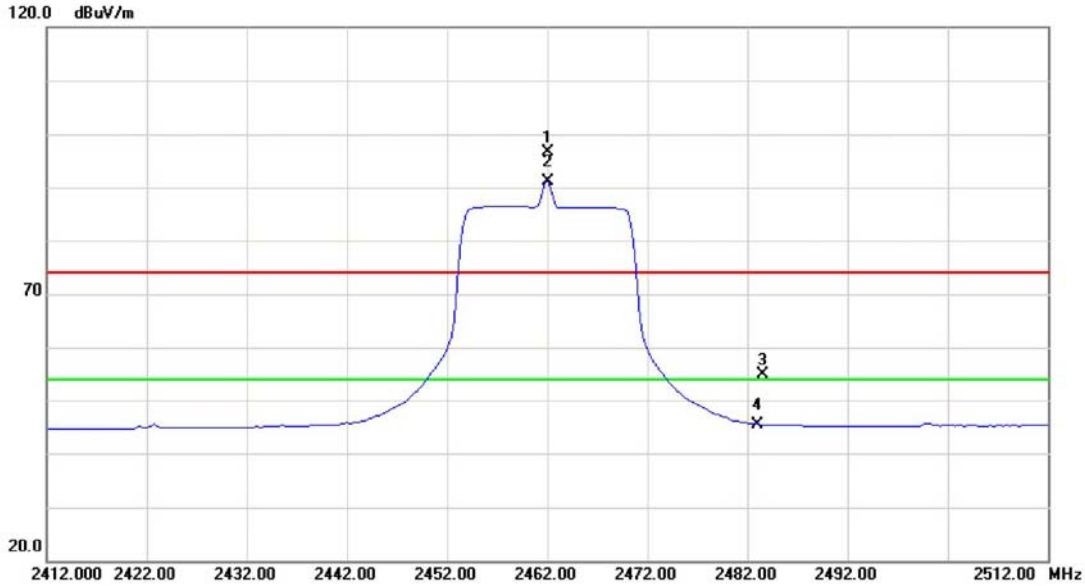
Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4924.100	41.70	7.53	49.23	74.00	-24.77	peak	
2		4924.100	31.12	7.53	38.65	54.00	-15.35	AVG	
3		7386.063	40.91	15.50	56.41	74.00	-17.59	peak	
4	*	7386.063	31.20	15.50	46.70	54.00	-7.30	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

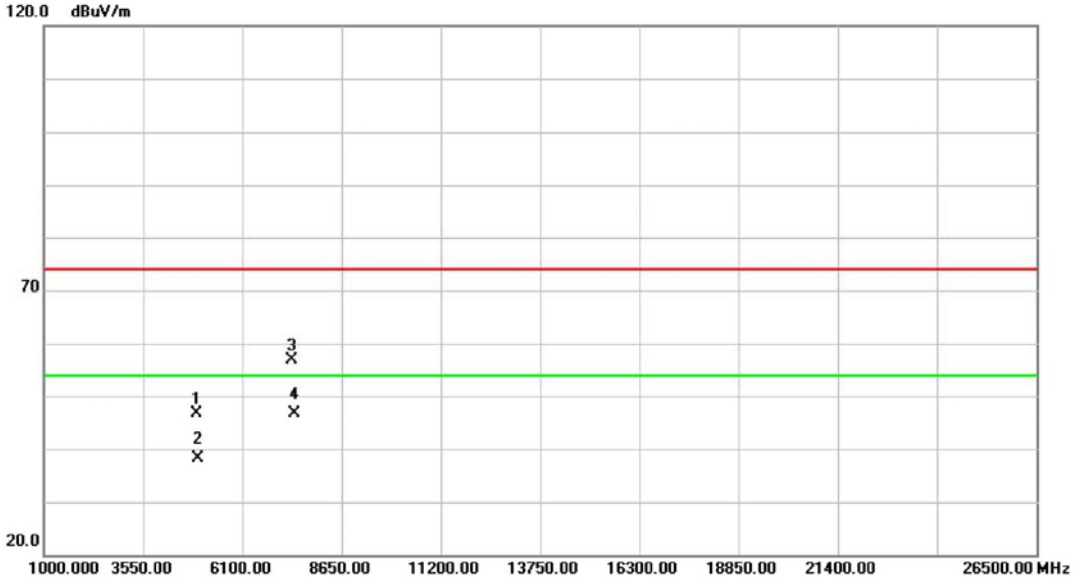
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2462.000	65.20	31.36	96.56	74.00	22.56	peak	no limit
2	*	2462.000	59.89	31.36	91.25	54.00	37.25	AVG	no limit
3		2483.500	23.50	31.46	54.96	74.00	-19.04	peak	
4		2483.500	14.03	31.46	45.49	54.00	-8.51	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

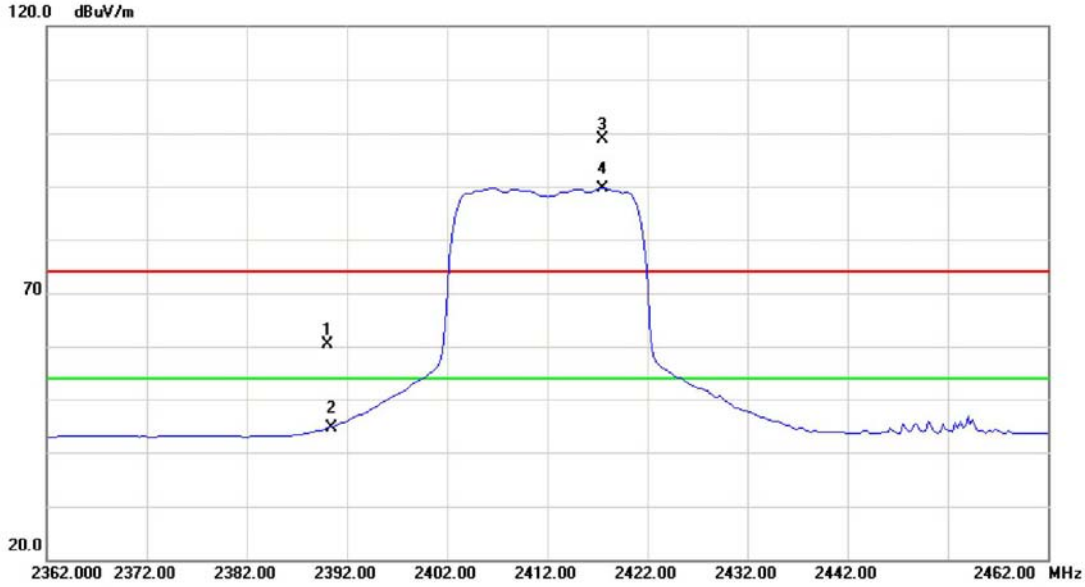
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4924.012	39.18	7.53	46.71	74.00	-27.29	peak	
2		4924.012	30.63	7.53	38.16	54.00	-15.84	AVG	
3		7386.025	41.49	15.50	56.99	74.00	-17.01	peak	
4	*	7386.025	31.22	15.50	46.72	54.00	-7.28	AVG	

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

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	29.38	31.02	60.40	74.00	-13.60	peak	
2		2390.000	13.51	31.02	44.53	54.00	-9.47	AVG	
3	X	2417.500	67.78	31.15	98.93	74.00	24.93	peak	no limit
4	*	2417.500	58.40	31.15	89.55	54.00	35.55	AVG	no limit

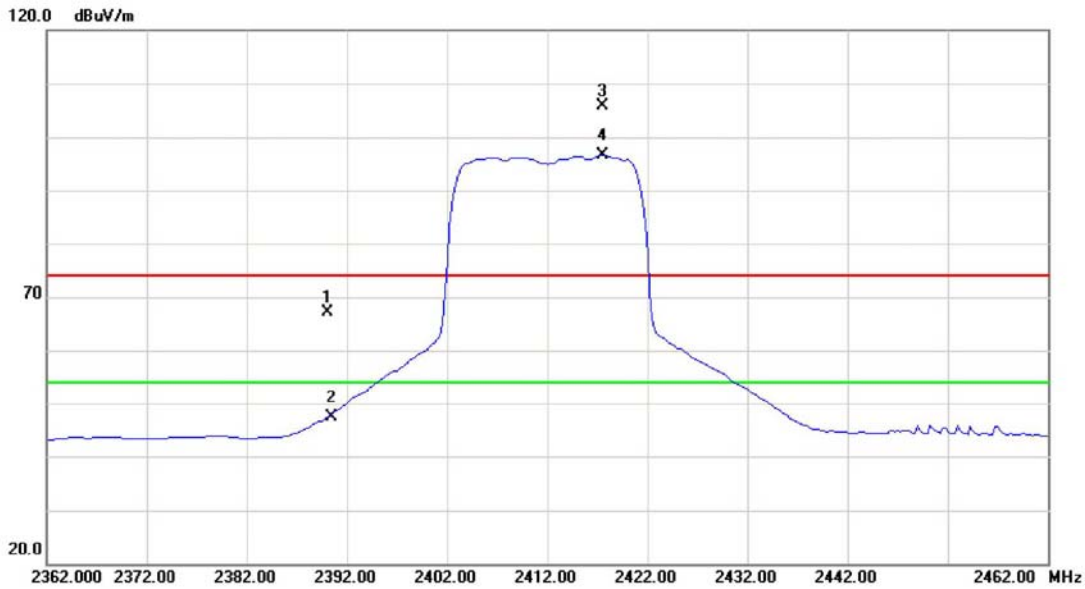
Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2412MHz

Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4823.915	48.05	7.39	55.44	74.00	-18.56	peak	
2		4823.915	34.00	7.39	41.39	54.00	-12.61	AVG	
3		7235.775	41.18	14.87	56.05	74.00	-17.95	peak	
4	*	7235.775	30.88	14.87	45.75	54.00	-8.25	AVG	

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

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	36.23	31.02	67.25	74.00	-6.75	peak	
2		2390.000	16.37	31.02	47.39	54.00	-6.61	AVG	
3	X	2417.500	74.70	31.15	105.85	74.00	31.85	peak	no limit
4	*	2417.500	65.39	31.15	96.54	54.00	42.54	AVG	no limit

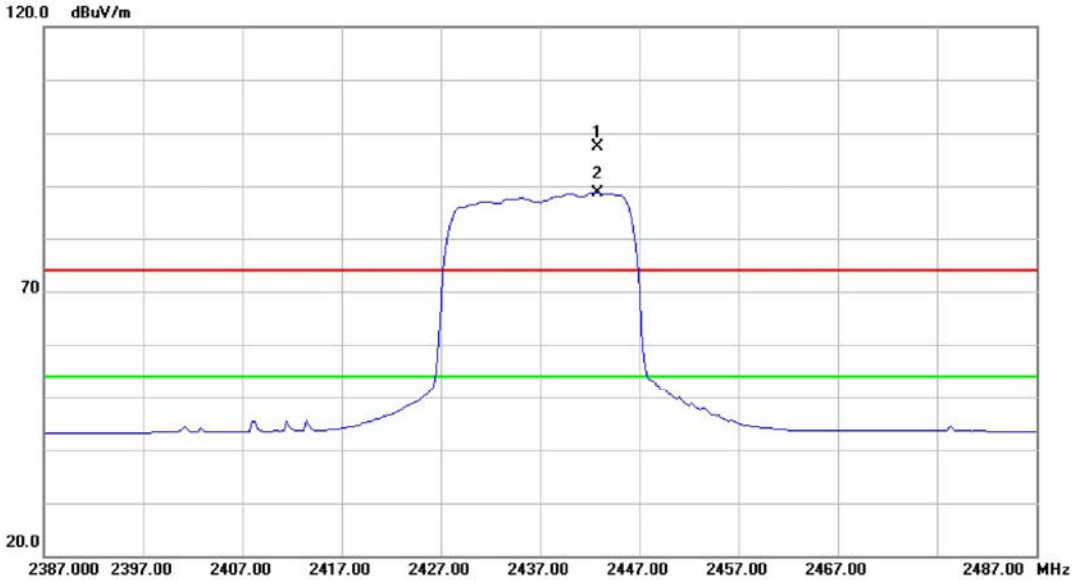
Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2412MHz

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4825.063	42.54	7.39	49.93	74.00	-24.07	peak	
2		4825.063	32.51	7.39	39.90	54.00	-14.10	AVG	
3		7235.837	42.46	14.87	57.33	74.00	-16.67	peak	
4	*	7235.837	30.78	14.87	45.65	54.00	-8.35	AVG	

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

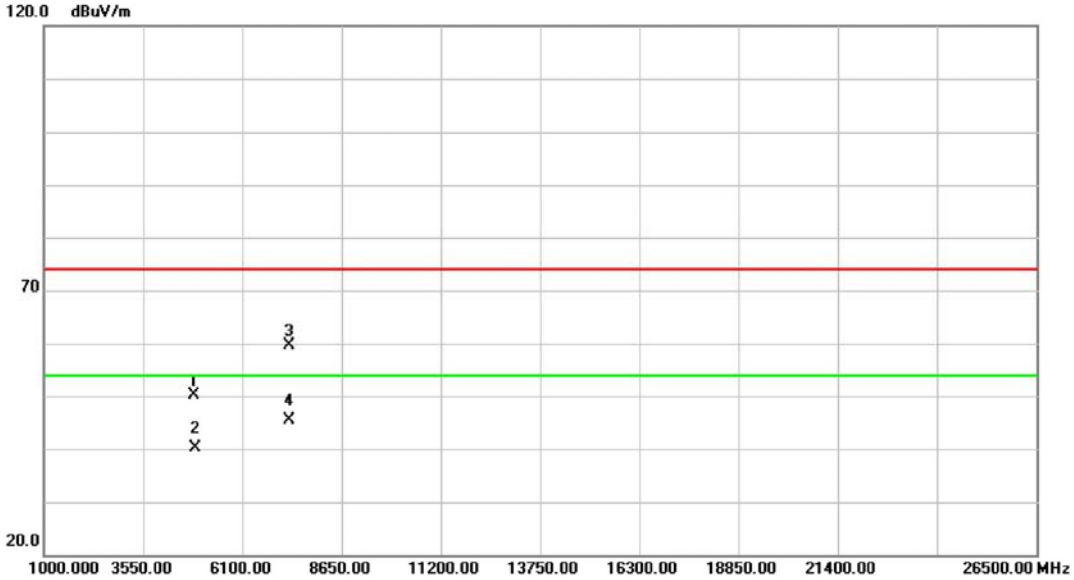
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2442.750	66.22	31.27	97.49	74.00	23.49	peak	
2	*	2442.750	57.37	31.27	88.64	54.00	34.64	AVG	

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

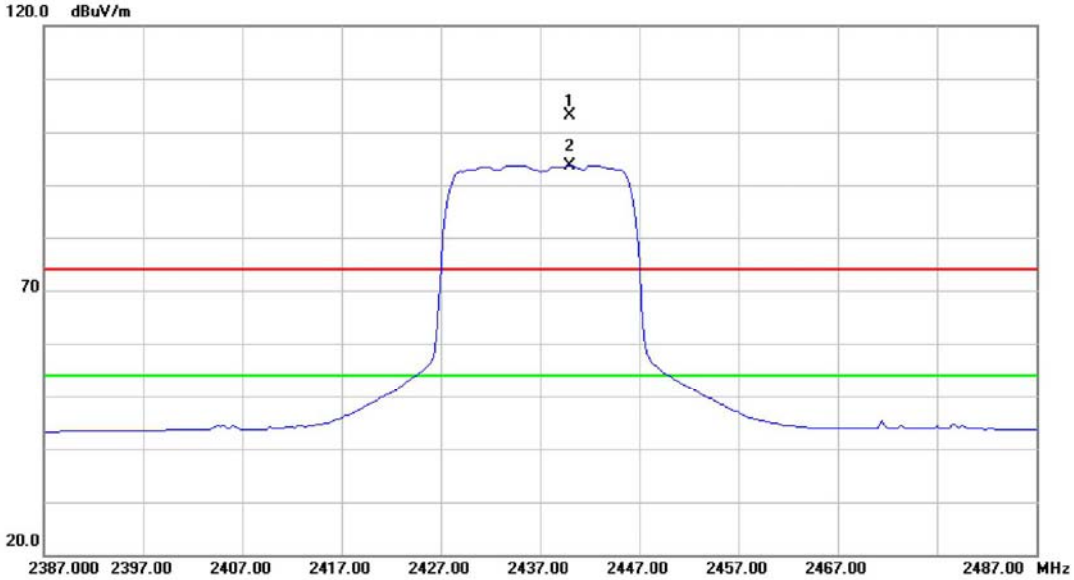
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.000	42.61	7.47	50.08	74.00	-23.92	peak	
2		4874.000	32.65	7.47	40.12	54.00	-13.88	AVG	
3		7310.695	44.34	15.18	59.52	74.00	-14.48	peak	
4	*	7310.695	30.17	15.18	45.35	54.00	-8.65	AVG	

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

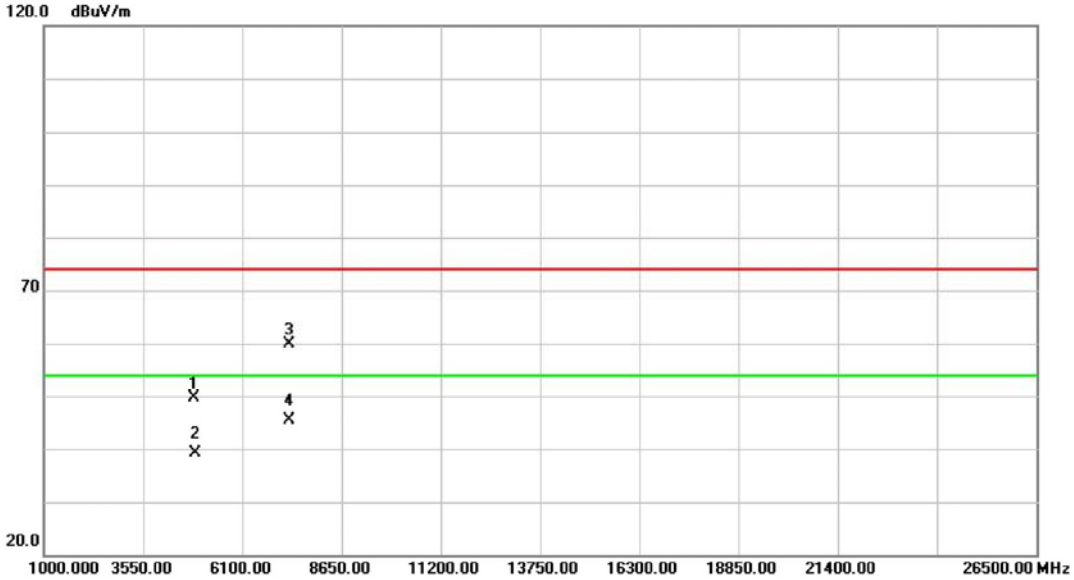
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2440.000	71.96	31.26	103.22	74.00	29.22	peak	
2	*	2440.000	62.40	31.26	93.66	54.00	39.66	AVG	

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

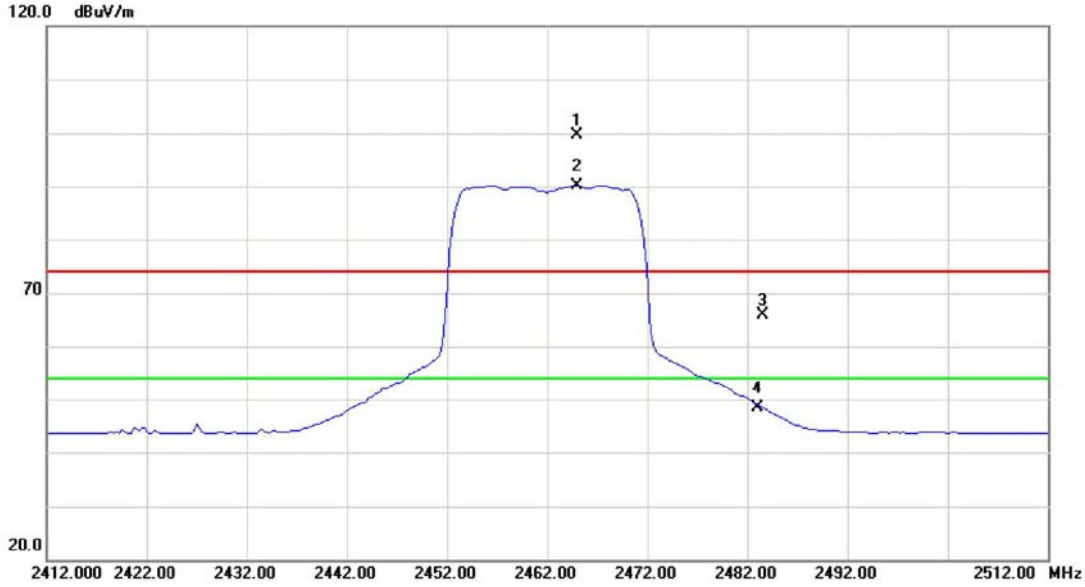
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4873.700	42.06	7.47	49.53	74.00	-24.47	peak	
2		4873.700	31.56	7.47	39.03	54.00	-14.97	AVG	
3		7310.785	44.76	15.18	59.94	74.00	-14.06	peak	
4	*	7310.785	30.18	15.18	45.36	54.00	-8.64	AVG	

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

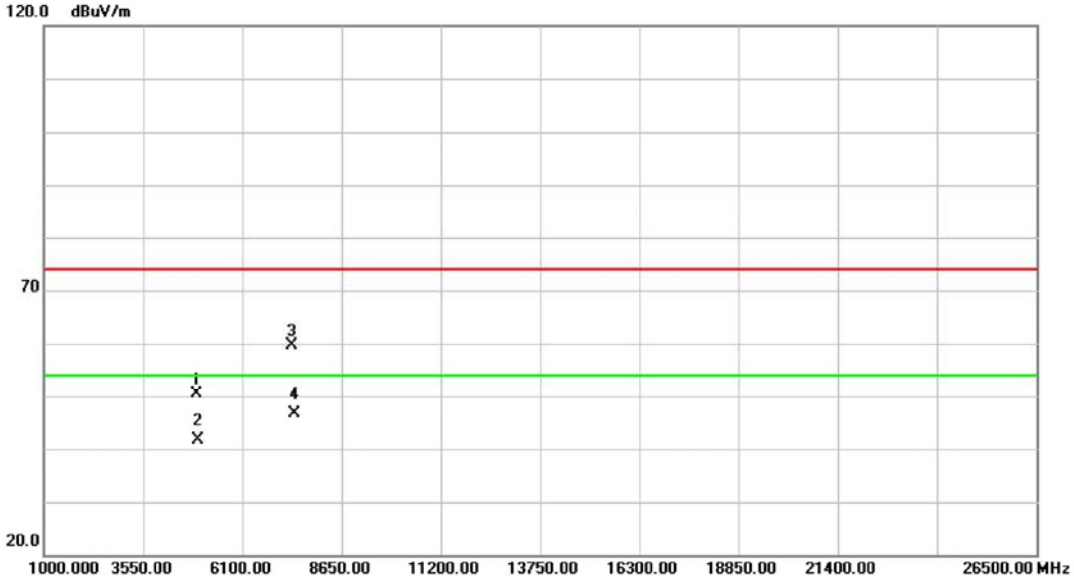
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2465.000	68.17	31.37	99.54	74.00	25.54	peak	no limit
2	*	2465.000	58.83	31.37	90.20	54.00	36.20	AVG	no limit
3		2483.500	34.38	31.46	65.84	74.00	-8.16	peak	
4		2483.500	16.96	31.46	48.42	54.00	-5.58	AVG	

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

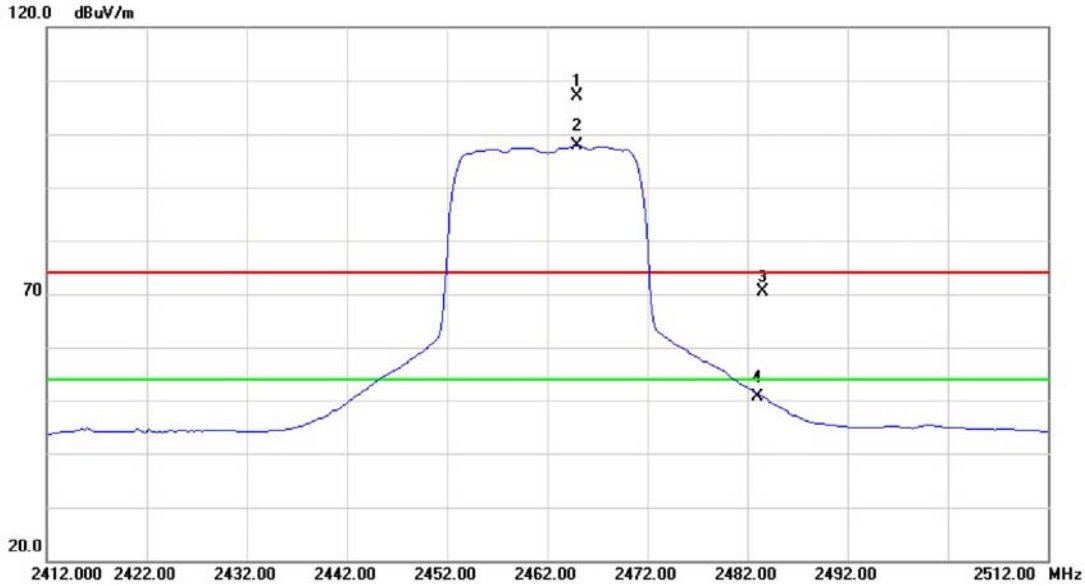
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4923.715	42.94	7.53	50.47	74.00	-23.53	peak	
2		4923.715	34.06	7.53	41.59	54.00	-12.41	AVG	
3		7386.795	44.18	15.50	59.68	74.00	-14.32	peak	
4	*	7386.795	31.06	15.50	46.56	54.00	-7.44	AVG	

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

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2465.000	75.71	31.37	107.08	74.00	33.08	peak	no limit
2	*	2465.000	66.47	31.37	97.84	54.00	43.84	AVG	no limit
3		2483.500	38.97	31.46	70.43	74.00	-3.57	peak	
4		2483.500	19.10	31.46	50.56	54.00	-3.44	AVG	