

# FCC Radio Test Report

## FCC ID: RWO-RZ090166

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

**Project No.** : 1607C289  
**Equipment** : Notebook  
**Model Name** : RZ09-0166  
**Applicant** : Razer Inc.  
**Address** : 201 3rd Street, Suite 900, San Francisco, CA 94103

**Date of Receipt** : Jul. 28, 2016  
**Date of Test** : Jul. 28, 2016 ~ Aug. 22, 2016  
**Issued Date** : Aug. 23, 2016  
**Tested by** : BTL Inc.

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### **Limitation**

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

**Table of Contents****Page**

<b>1 . CERTIFICATION</b>	<b>6</b>
<b>2 . SUMMARY OF TEST RESULTS</b>	<b>7</b>
<b>2.1 TEST FACILITY</b>	<b>8</b>
<b>2.2 MEASUREMENT UNCERTAINTY</b>	<b>8</b>
<b>3 . GENERAL INFORMATION</b>	<b>9</b>
<b>3.1 GENERAL DESCRIPTION OF EUT</b>	<b>9</b>
<b>3.2 DESCRIPTION OF TEST MODES</b>	<b>11</b>
<b>3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING</b>	<b>11</b>
<b>3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED</b>	<b>12</b>
<b>3.5 DESCRIPTION OF SUPPORT UNITS</b>	<b>12</b>
<b>4 . EMC EMISSION TEST</b>	<b>13</b>
<b>4.1 CONDUCTED EMISSION MEASUREMENT</b>	<b>13</b>
<b>4.1.1 POWER LINE CONDUCTED EMISSION LIMITS</b>	<b>13</b>
<b>4.1.2 TEST PROCEDURE</b>	<b>13</b>
<b>4.1.3 DEVIATION FROM TEST STANDARD</b>	<b>13</b>
<b>4.1.4 TEST SETUP</b>	<b>14</b>
<b>4.1.5 EUT OPERATING CONDITIONS</b>	<b>14</b>
<b>4.1.6 EUT TEST CONDITIONS</b>	<b>14</b>
<b>4.1.7 TEST RESULTS</b>	<b>14</b>
<b>4.2 RADIATED EMISSION MEASUREMENT</b>	<b>15</b>
<b>4.2.1 RADIATED EMISSION LIMITS</b>	<b>15</b>
<b>4.2.2 TEST PROCEDURE</b>	<b>16</b>
<b>4.2.3 DEVIATION FROM TEST STANDARD</b>	<b>16</b>
<b>4.2.4 TEST SETUP</b>	<b>17</b>
<b>4.2.5 EUT OPERATING CONDITIONS</b>	<b>18</b>
<b>4.2.6 EUT TEST CONDITIONS</b>	<b>18</b>
<b>4.2.7 TEST RESULTS (9KHZ TO 30MHZ)</b>	<b>18</b>
<b>4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)</b>	<b>19</b>
<b>4.2.9 TEST RESULTS (ABOVE 1000 MHZ)</b>	<b>19</b>
<b>5 . BANDWIDTH TEST</b>	<b>20</b>
<b>5.1 APPLIED PROCEDURES / LIMIT</b>	<b>20</b>
<b>5.1.1 TEST PROCEDURE</b>	<b>20</b>
<b>5.1.2 DEVIATION FROM STANDARD</b>	<b>20</b>
<b>5.1.3 TEST SETUP</b>	<b>20</b>
<b>5.1.4 EUT OPERATION CONDITIONS</b>	<b>20</b>
<b>5.1.5 EUT TEST CONDITIONS</b>	<b>20</b>
<b>5.1.6 TEST RESULTS</b>	<b>20</b>

Table of Contents	Page
<b>6 . MAXIMUM OUTPUT POWER TEST</b>	<b>21</b>
<b>6.1 APPLIED PROCEDURES / LIMIT</b>	<b>21</b>
<b>6.1.1 TEST PROCEDURE</b>	21
<b>6.1.2 DEVIATION FROM STANDARD</b>	21
<b>6.1.3 TEST SETUP</b>	21
<b>6.1.4 EUT OPERATION CONDITIONS</b>	21
<b>6.1.5 EUT TEST CONDITIONS</b>	21
<b>6.1.6 TEST RESULTS</b>	21
<b>7 . ANTENNA CONDUCTED SPURIOUS EMISSION</b>	<b>22</b>
<b>7.1 APPLIED PROCEDURES / LIMIT</b>	<b>22</b>
<b>7.1.1 TEST PROCEDURE</b>	22
<b>7.1.2 DEVIATION FROM STANDARD</b>	22
<b>7.1.3 TEST SETUP</b>	22
<b>7.1.4 EUT OPERATION CONDITIONS</b>	22
<b>7.1.5 EUT OPERATION CONDITIONS</b>	22
<b>7.1.6 TEST RESULTS</b>	22
<b>8 . POWER SPECTRAL DENSITY TEST</b>	<b>23</b>
<b>8.1 APPLIED PROCEDURES / LIMIT</b>	<b>23</b>
<b>8.1.1 TEST PROCEDURE</b>	23
<b>8.1.2 DEVIATION FROM STANDARD</b>	23
<b>8.1.3 TEST SETUP</b>	23
<b>8.1.4 EUT OPERATION CONDITIONS</b>	23
<b>8.1.5 EUT TEST CONDITIONS</b>	23
<b>8.1.6 TEST RESULTS</b>	23
<b>9 . MEASUREMENT INSTRUMENTS LIST</b>	<b>24</b>
<b>ATTACHMENT A - CONDUCTED EMISSION</b>	<b>26</b>
<b>ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)</b>	<b>29</b>
<b>ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)</b>	<b>31</b>
<b>ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)</b>	<b>38</b>
<b>ATTACHMENT E - BANDWIDTH</b>	<b>51</b>
<b>ATTACHMENT F - MAXIMUM OUTPUT POWER TEST</b>	<b>54</b>
<b>ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION</b>	<b>55</b>
<b>ATTACHMENT H - POWER SPECTRAL DENSITY TEST</b>	<b>62</b>

## REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-2-1607C289	Original Issue.	Aug. 23, 2016

## 1. CERTIFICATION

Equipment : Notebook  
Brand Name : RAZER  
Model Name : RZ09-0166  
Applicant : Razer Inc.  
Manufacturer : Razer Inc.  
Address : 201 3rd Street, Suite 900, San Francisco, CA 94103  
Factory : RAZER TECHNOLOGY AND DEVELOPMENT (SHENZHEN) CO., LTD  
Address : East Wing, 3rd Floor, Block 2, Phase 1 of Vision Shenzhen Business Park Keji South Road, Hi-Tech Industrial Park, Shenzhen 518057, China  
Date of Test : Jul. 28, 2016 ~ Aug. 22, 2016  
Test Sample : Engineering Sample  
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-2-1607C289) 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).

**Test results included in this report is only for the Bluetooth LE part.**

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

<b>Applied Standard(s): FCC Part15 (15.247) , Subpart C</b>			
Standard(s)	Section	Test Item	Judgment
	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 to this device.

## 2.1 TEST FACILITY

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

BTL's test firm number for FCC: 319330

## 2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2  $U_{cisp}$  requirement.

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

A. Conducted Measurement :

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

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	$U$ , (dB)
DG-CB03	CISPR	9KHz~30MHz	V	3.79
		9KHz~30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06
		1GHz~18GHz	V	3.12
		1GHz~18GHz	H	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	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	Notebook	
Brand Name	RAZER	
Model Name	RZ09-0166	
Model Difference	NA	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK(1Mbps)
	Bit Rate of Transmitter	
	Output Power (Max.)	-0.48 dBm (1Mbps)
Power Source	#1 DC voltage supplied from AC/DC adapter. Brand/Model: Razer / RC30-0166 #2 Supplied from battery. Model:F1	
Power Rating	#1 I/P:100-240Vac,3.4A O/P:19Vdc,13.16A #2 11.4Vdc,8700mA	

Note:

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

2.

Channel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	INPAQ TECHNOLOGY CO.LTD	WA-F-LB-01-038	Internal	IPEX	1.15

### 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 Mode <b>NOTE (1)</b>
Mode 2	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 2	TX Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>

Note:

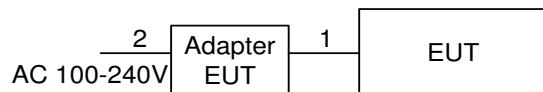
- (1) The measurements are performed at the high, middle, low available channels.
- (2) Both adapter and battery are evaluated, operated the adapter is the worst and recorded as below test data

### 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 BT LE

Test Software Version	QCARCT		
Frequency	2402 MHz	2441 MHz	2480 MHz
BT LE	N/A	N/A	N/A

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



### 3.5 DESCRIPTION OF SUPPORT UNITS

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

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

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.8m	DC Cable
2	NO	NO	1m	AC Cable

## 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 (dB $\mu$ V)	
	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

(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

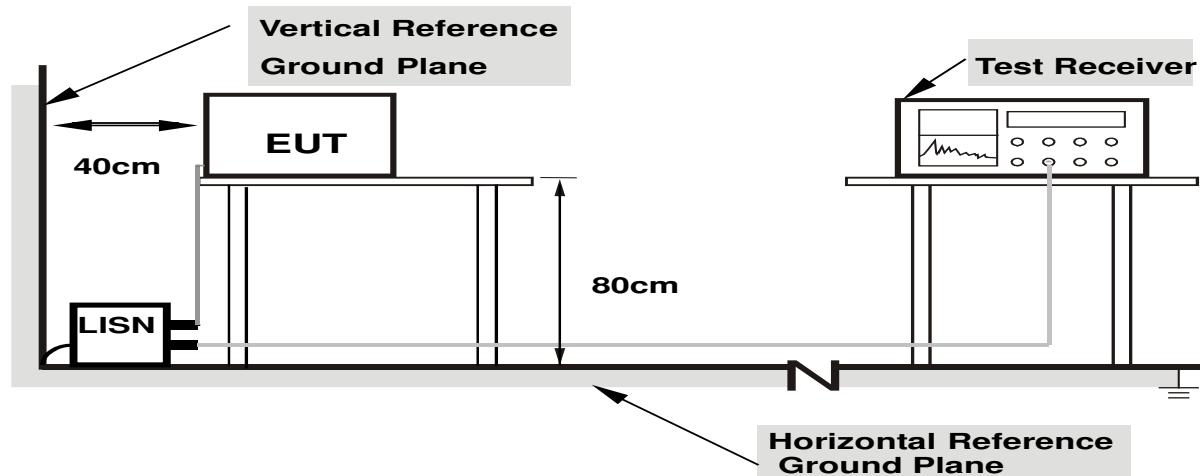
#### 4.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- 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 cm 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.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) “N/A” denotes test is not applicable to this device.

## 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 (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).
- (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)	RBW 1MHz VBW 3MHz peak detector for Pk value RMS detector for AV value

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

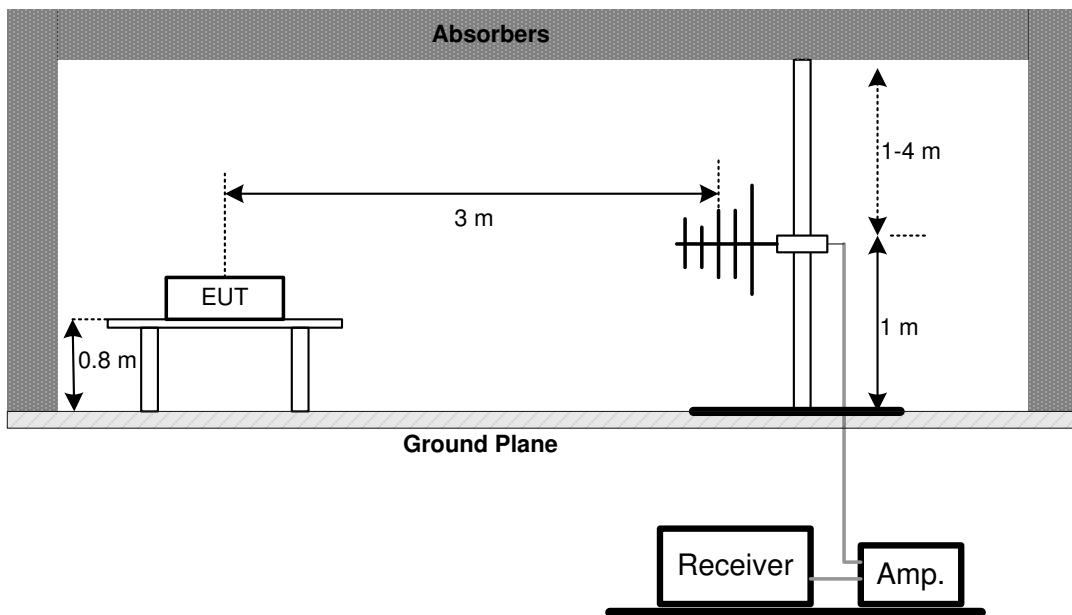
- The measuring distance of at 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance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

#### 4.2.3 DEVIATION FROM TEST STANDARD

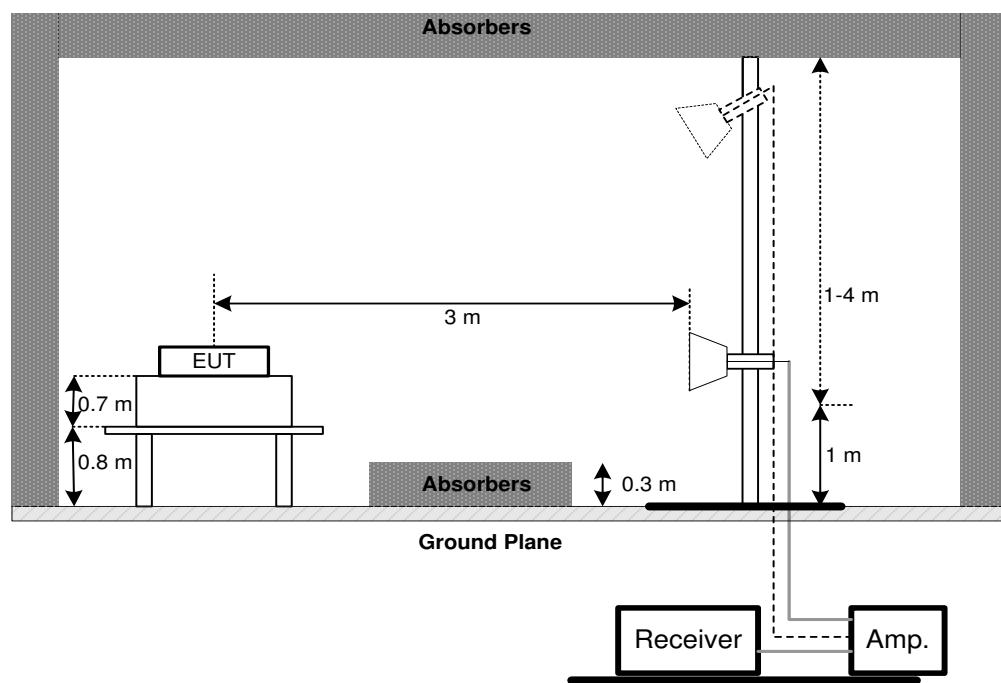
No deviation

#### 4.2.4 TEST SETUP

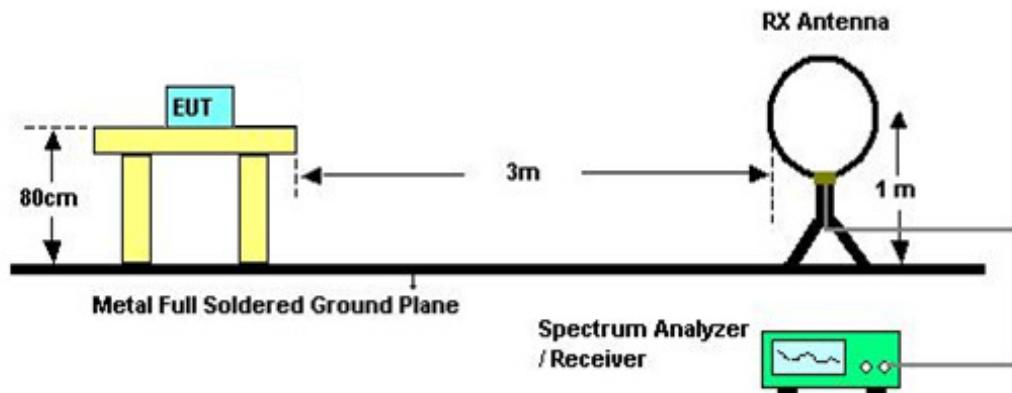
##### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



##### (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 4.1.5 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 =  $40 \log (\text{specific distance} / \text{test distance})$  (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

**4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)****Please refer to the Attachment C.****Remark:**

- (1) Measuring frequency range from 30MHz to 1000MHz.
- (2) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

**4.2.9 TEST RESULTS (ABOVE 1000 MHZ)****Please refer to the Attachment D.****Remark:**

- (1) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (2) EUT Orthogonal Axis:  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (3) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (4) 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 / limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

#### 5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 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 4.1.5 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				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Maximum Output Power	1 watt or 30dBm	2400-2483.5	PASS

#### 6.1.1 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance v03r05.

#### 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 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 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 device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits.

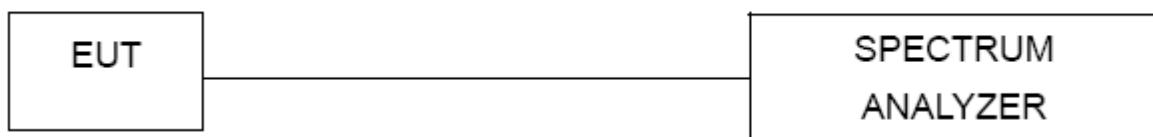
#### 7.1.1 TEST PROCEDURE

- 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 = 10 ms.
- 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 tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 7.1.5 EUT OPERATION 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				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

#### 8.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW=3KHz, VBW=10 KHz, Sweep time = auto.

#### 8.1.2 DEVIATION FROM STANDARD

No deviation.

#### 8.1.3 TEST SETUP



#### 8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 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	EMCO	3816/2	0052765	Mar. 27, 2017
2	LISN	R&S	ENV216	101447	Mar. 27, 2017
3	Test Cable	emci	RG223(9KHz-30MHz)	C_17	Mar. 10, 2017
4	EMI Test Receiver	R&S	ESCI	100382	Mar. 27, 2017
5	50Ω Terminator	SHX	TF2-3G-A	08122901	Mar. 27, 2017
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 27, 2017
2	Amplifier	HP	8447D	2944A09673	Nov. 09, 2016
3	Receiver	AGILENT	N9038A	MY52130039	Oct. 11, 2016
4	Test Cable	emci	LMR-400(30MHz-1GHz)	C-01	Jun. 26, 2017
5	Control	CT	SC100	N/A	N/A
6	Position Control	MF	MF-7802	MF780208416	N/A
7	Antenna	ETS	3115	00075789	Mar. 27, 2017
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2016
9	Receiver	AGILENT	N9038A	MY52130039	Oct. 11, 2016
10	Test Cable	emci	EMC104-SM-SM-10000(1GHz-26.5GHz)	C-68	Jun. 26, 2017
11	Controller	CT	SC100	N/A	N/A
12	Broad-Band Horn Antenna	Schwarbeck	BBHA 9170	9170319	Apr. 23, 2017
13	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 27, 2017
14	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2016
15	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

**6dB Bandwidth Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

**Peak Output Power Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	power Meter	ANRITSU	ML2495A	1128009	Mar. 27, 2017
2	Pulse Power Sensor	ANRITSU	MA 2411B	1027500	Mar. 27, 2017

**Antenna Conducted Spurious Emission Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

**Power Spectral Density Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

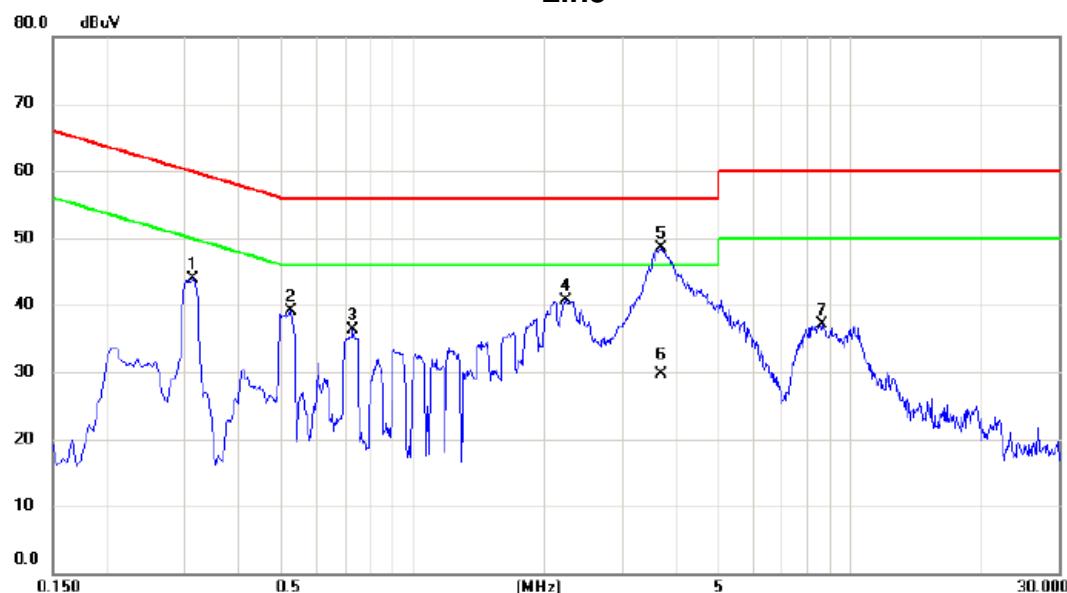
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

## ATTACHMENT A - CONDUCTED EMISSION

Test Mode: TX Mode

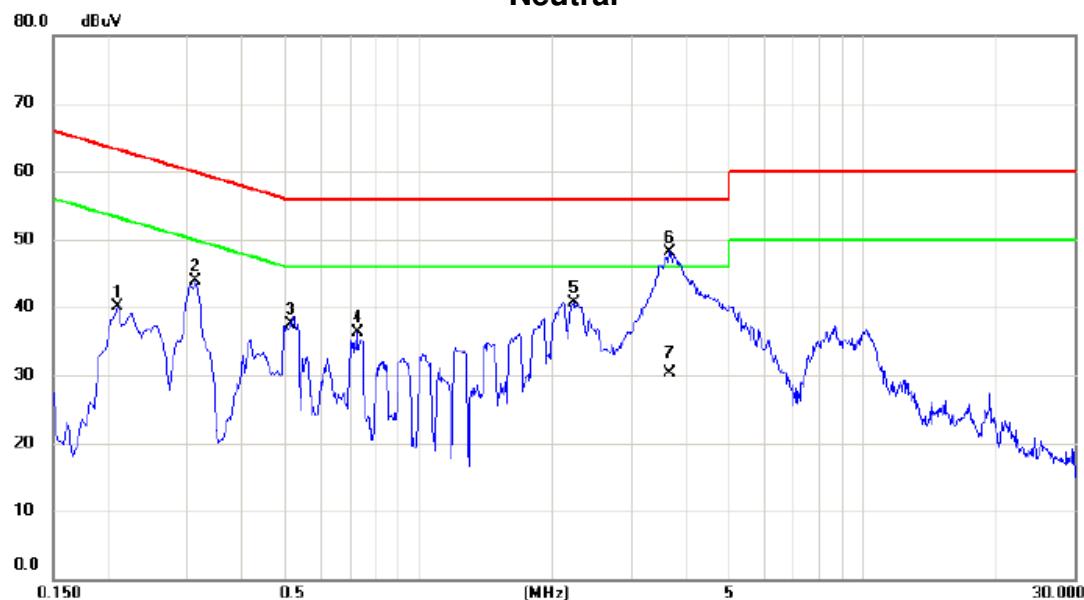
## Line



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB			
1		0.3140	34.40	9.53	43.93	59.86	-15.93	peak	
2		0.5260	29.37	9.64	39.01	56.00	-16.99	peak	
3		0.7300	26.60	9.68	36.28	56.00	-19.72	peak	
4		2.2340	30.79	9.98	40.77	56.00	-15.23	peak	
5	*	3.6940	38.32	10.16	48.48	56.00	-7.52	peak	
6		3.6940	19.60	10.16	29.76	46.00	-16.24	AVG	
7		8.6060	27.00	10.19	37.19	60.00	-22.81	peak	

Test Mode: TX Mode

## Neutral



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.2100	30.50	9.53	40.03	63.21	-23.18	peak	
2		0.3140	34.34	9.53	43.87	59.86	-15.99	peak	
3		0.5140	28.12	9.44	37.56	56.00	-18.44	peak	
4		0.7260	26.73	9.48	36.21	56.00	-19.79	peak	
5		2.2300	30.97	9.74	40.71	56.00	-15.29	peak	
6	*	3.6780	38.34	9.86	48.20	56.00	-7.80	peak	
7		3.6780	20.50	9.86	30.36	46.00	-15.64	AVG	

**ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)**

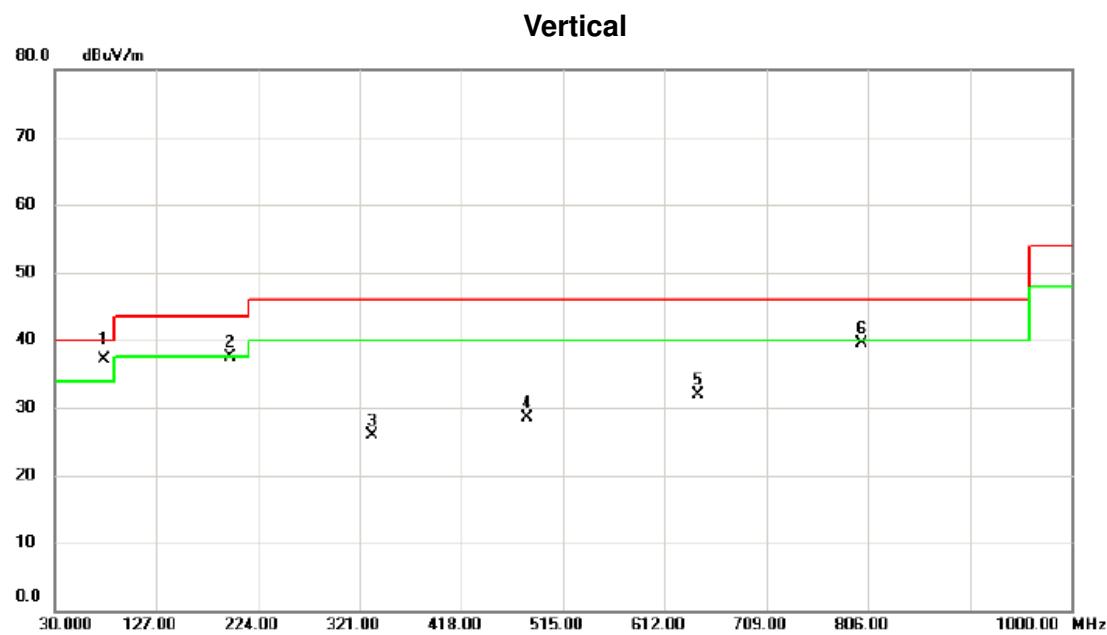
Test Mode:	TX Mode
------------	---------

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0098	0°	13.41	24.95	38.36	127.78	-89.42	AVG
0.0098	0°	14.28	24.95	39.23	147.78	-108.55	PEAK
0.0273	0°	6.73	23.84	30.57	118.88	-88.31	AVG
0.0273	0°	8.12	23.84	31.96	138.88	-106.92	PEAK
0.0314	0°	3.17	23.58	26.75	117.67	-90.92	AVG
0.0314	0°	5.58	23.58	29.16	137.67	-108.51	PEAK
0.0557	0°	1.16	22.29	23.45	112.69	-89.24	AVG
0.0557	0°	2.53	22.29	24.82	132.69	-107.87	PEAK
0.5240	0°	19.36	19.88	39.24	73.22	-33.98	QP
1.9539	0°	23.71	19.50	43.21	69.54	-26.33	QP

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0123	90°	13.16	24.30	37.46	125.81	-88.35	AVG
0.0123	90°	14.89	24.30	39.19	145.81	-106.62	PEAK
0.0257	90°	7.28	23.94	31.22	119.41	-88.19	AVG
0.0257	90°	8.94	23.94	32.88	139.41	-106.53	PEAK
0.0413	90°	5.23	22.95	28.18	115.29	-87.10	AVG
0.0413	90°	6.19	22.95	29.14	135.29	-106.14	PEAK
0.0569	90°	1.54	22.26	23.80	112.50	-88.70	AVG
0.0569	90°	2.86	22.26	25.12	132.50	-107.38	PEAK
0.6224	90°	22.17	20.19	42.36	71.72	-29.36	QP
2.0531	90°	24.56	19.47	44.03	69.54	-25.51	QP

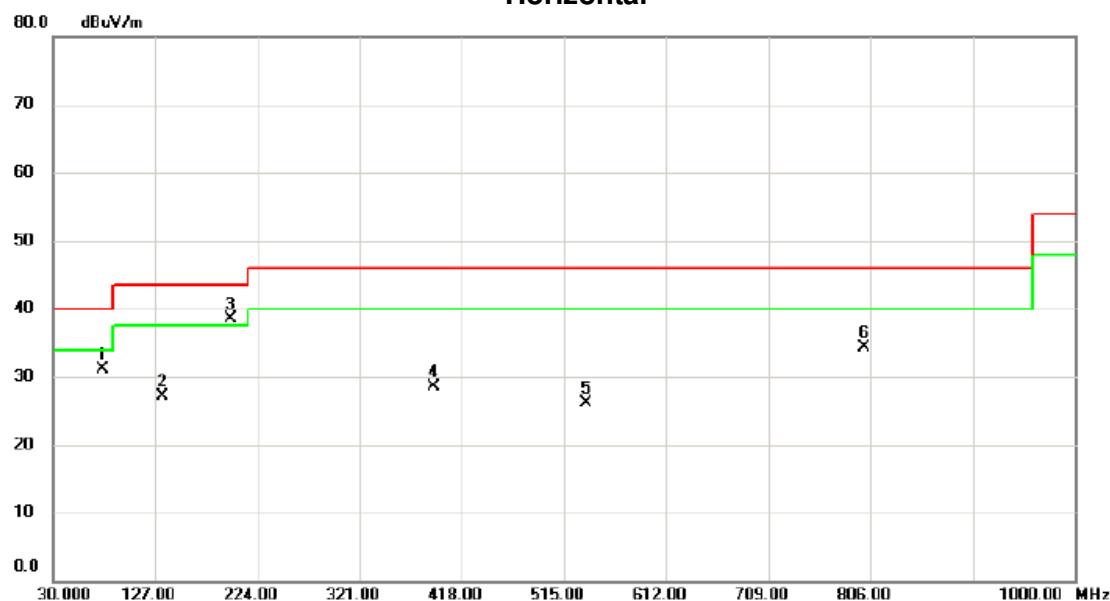
**ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)**

Test Mode: TX 2402MHz -CH00 -1Mbps



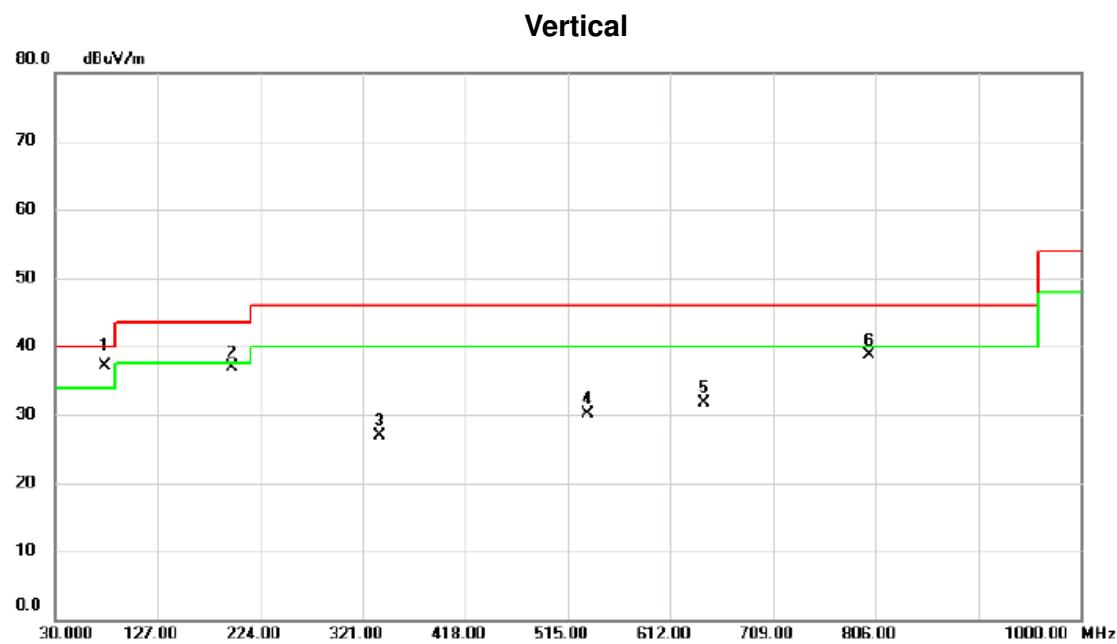
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
1	*	76.5600	53.56	-16.41	37.15	40.00	-2.85	QP
2	!	197.8100	51.86	-14.32	37.54	43.50	-5.96	peak
3		333.6100	36.83	-10.87	25.96	46.00	-20.04	peak
4		480.0800	37.47	-9.03	28.44	46.00	-17.56	peak
5		643.0400	36.41	-4.58	31.83	46.00	-14.17	peak
6		800.1800	39.35	0.25	39.60	46.00	-6.40	peak

Test Mode: TX 2402MHz -CH00 -1Mbps

**Horizontal**

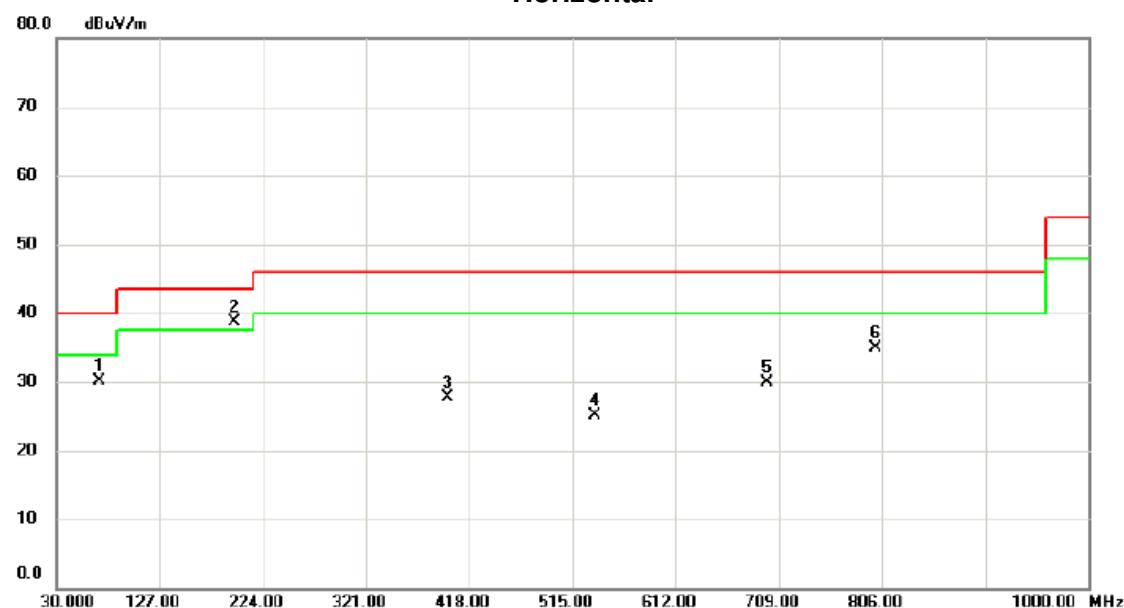
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	
1		76.5600	47.45	-16.41	31.04	40.00	-8.96	peak
2		133.7900	39.99	-12.88	27.11	43.50	-16.39	peak
3	*	198.7800	52.91	-14.37	38.54	43.50	-4.96	peak
4		390.8400	36.98	-8.41	28.57	46.00	-17.43	peak
5		536.3400	32.08	-5.96	26.12	46.00	-19.88	peak
6		800.1800	33.99	0.25	34.24	46.00	-11.76	peak

Test Mode: TX 2440MHz -CH19 -1Mbps



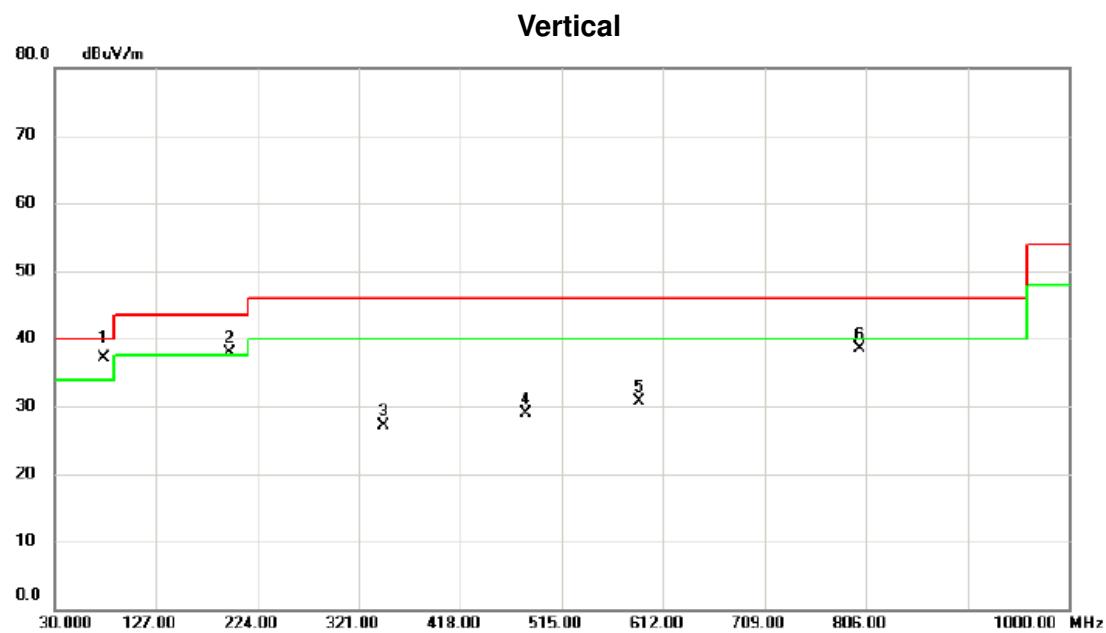
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	76.5600	53.57	-16.41	37.16	40.00	-2.84	QP	
2		196.8400	51.26	-14.27	36.99	43.50	-6.51	peak	
3		336.5200	37.82	-10.93	26.89	46.00	-19.11	peak	
4		533.4300	36.35	-6.26	30.09	46.00	-15.91	peak	
5		643.0400	36.38	-4.58	31.80	46.00	-14.20	peak	
6		800.1800	38.55	0.25	38.80	46.00	-7.20	peak	

Test Mode: TX 2440MHz -CH19 -1Mbps

**Horizontal**

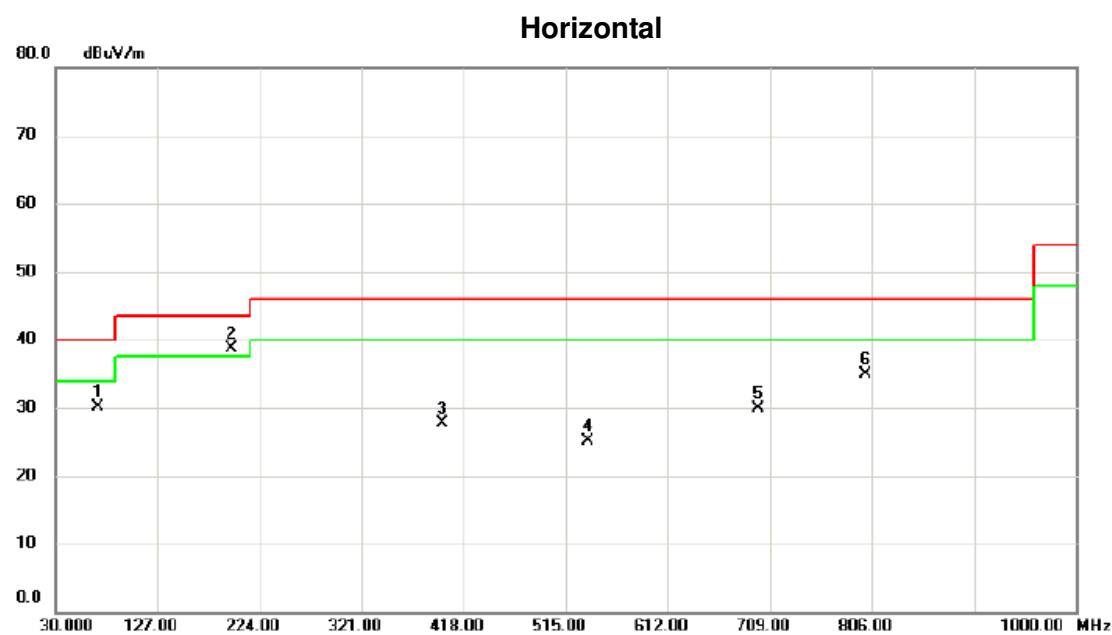
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		70.7400	46.73	-16.53	30.20	40.00	-9.80	peak
2	*	197.8100	53.07	-14.32	38.75	43.50	-4.75	peak
3		397.6300	35.69	-7.94	27.75	46.00	-18.25	peak
4		536.3400	31.14	-5.96	25.18	46.00	-20.82	peak
5		697.3600	32.12	-2.21	29.91	46.00	-16.09	peak
6		800.1800	34.67	0.25	34.92	46.00	-11.08	peak

Test Mode: TX 2480MHz -CH39 -1Mbps



No.	Mk.	Freq. MHz	Reading	Correct	Measure-	Limit	Margin	Comment
			Level dBuV	Factor dB	ment dBuV/m			
1	*	76.5600	53.49	-16.41	37.08	40.00	-2.92	QP
2	I	196.8400	52.22	-14.27	37.95	43.50	-5.55	peak
3		344.2800	38.11	-11.10	27.01	46.00	-18.99	peak
4		480.0800	38.03	-9.03	29.00	46.00	-17.00	peak
5		589.6900	37.24	-6.54	30.70	46.00	-15.30	peak
6		800.1800	38.26	0.25	38.51	46.00	-7.49	peak

Test Mode: TX 2480MHz -CH39 -1Mbps

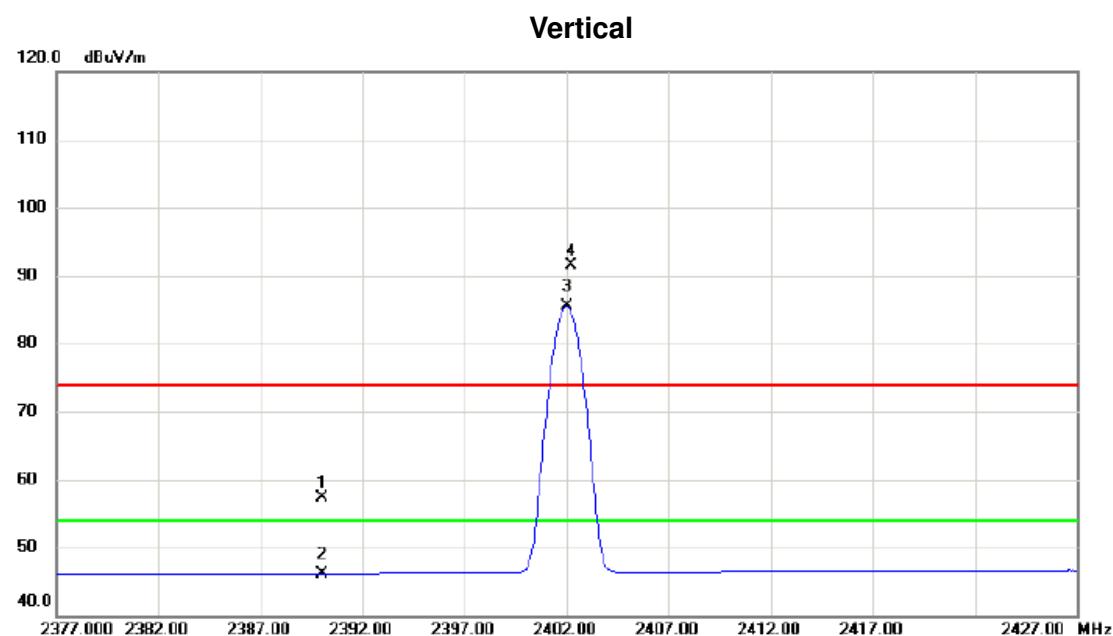


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1		70.7400	46.73	-16.53	30.20	40.00	-9.80	peak
2	*	197.8100	53.07	-14.32	38.75	43.50	-4.75	peak
3		397.6300	35.69	-7.94	27.75	46.00	-18.25	peak
4		536.3400	31.14	-5.96	25.18	46.00	-20.82	peak
5		697.3600	32.12	-2.21	29.91	46.00	-16.09	peak
6		800.1800	34.67	0.25	34.92	46.00	-11.08	peak

**ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)**

Orthogonal Axis : X

Test Mode : TX 2402MHz \_CH00\_1Mbps

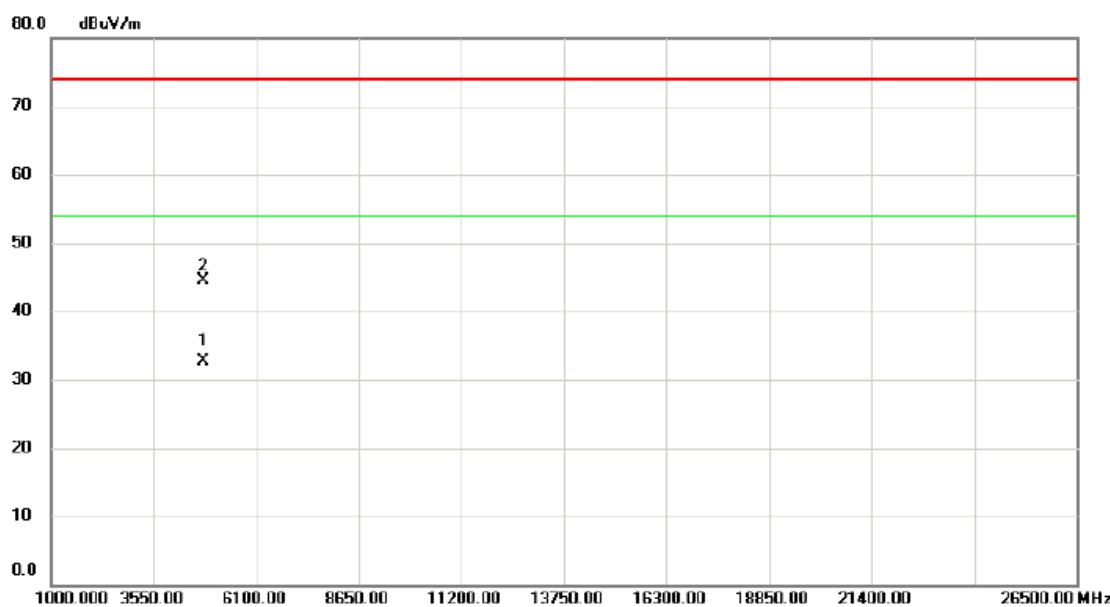


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		2390.000	24.31	33.01	57.32	74.00	-16.68	peak
2		2390.000	13.15	33.01	46.16	54.00	-7.84	AVG
3	*	2402.000	52.38	33.06	85.44	54.00	31.44	AVG No Limit
4	X	2402.250	58.41	33.06	91.47	74.00	17.47	peak No Limit

Orthogonal Axis : X

Test Mode : TX 2402MHz \_CH00\_1Mbps

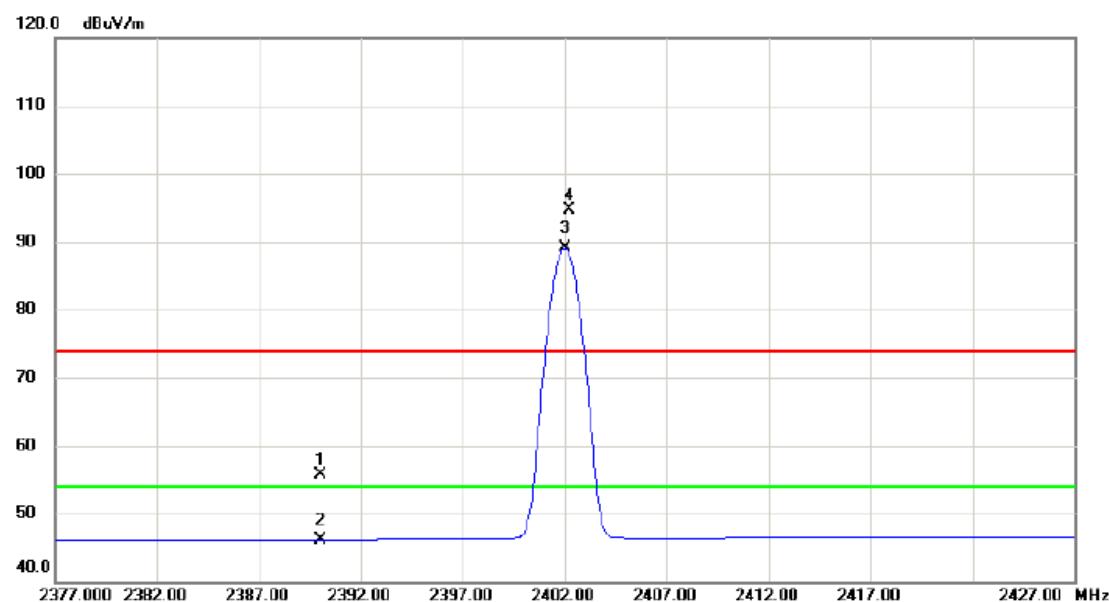
## Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1	*	4803.400	28.01	4.77	32.78	54.00	-21.22	AVG
2		4805.800	39.77	4.77	44.54	74.00	-29.46	peak

Orthogonal Axis : X

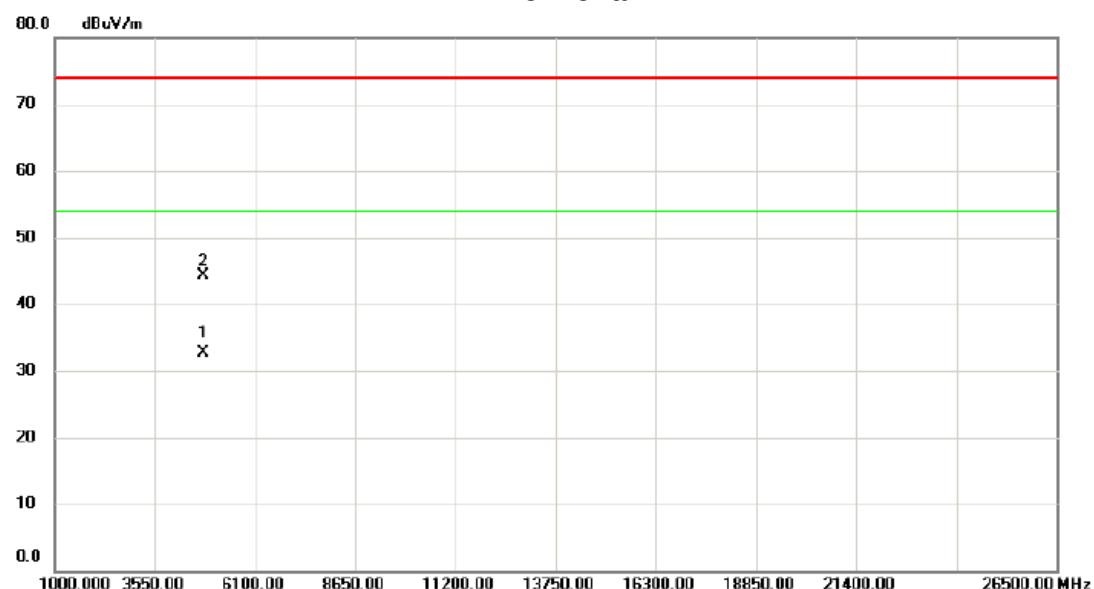
Test Mode : TX 2402MHz \_CH00\_1Mbps

**Horizontal**

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	22.66	33.01	55.67	74.00	-18.33	peak	
2		2390.000	13.16	33.01	46.17	54.00	-7.83	AVG	
3	*	2402.000	55.95	33.06	89.01	54.00	35.01	AVG	No Limit
4	X	2402.250	61.65	33.06	94.71	74.00	20.71	peak	No Limit

Orthogonal Axis : X

Test Mode : TX 2402MHz \_CH00\_1Mbps

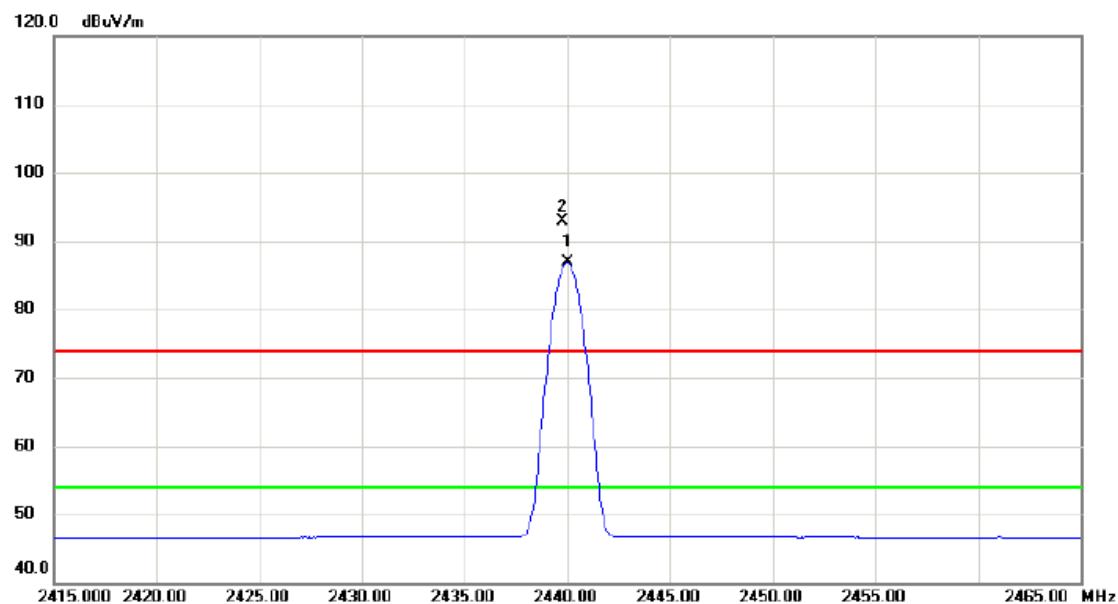
**Horizontal**

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	*	4802.300	28.03	4.77	32.80	54.00	-21.20	AVG
2		4804.100	39.47	4.77	44.24	74.00	-29.76	peak

Orthogonal Axis : X

Test Mode : TX 2440MHz \_CH19\_1Mbps

## Vertical

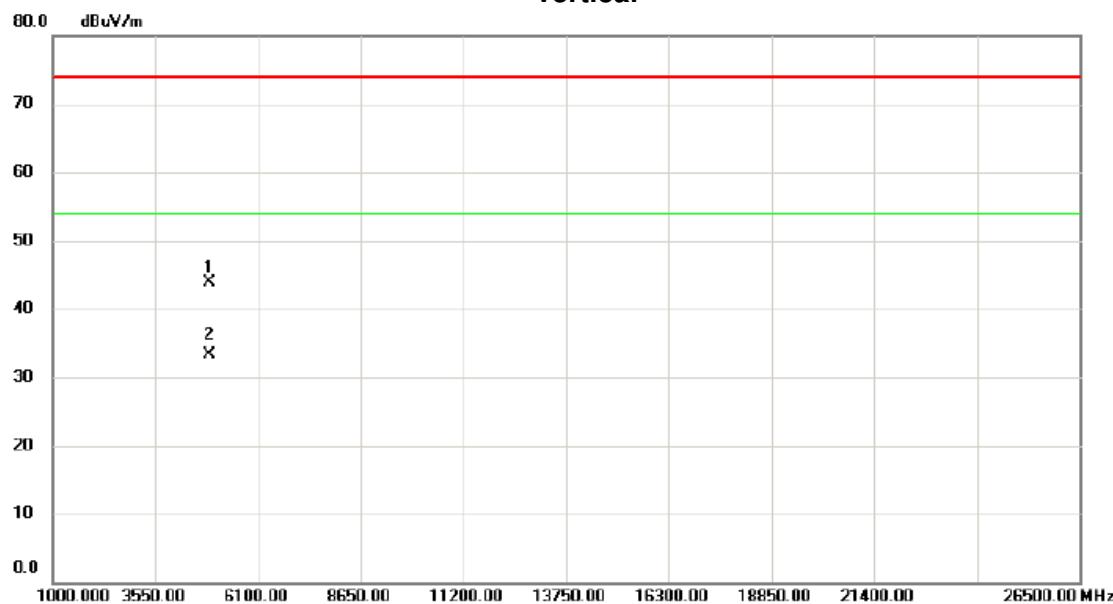


No.	Mk.	Reading	Correct	Measure-	Limit	Margin		
		Level	Factor	ment	dBuV/m	dB	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dB		
1	*	2440.000	53.68	33.22	86.90	54.00	32.90	AVG No Limit
2	X	2439.750	59.67	33.22	92.89	74.00	18.89	peak No Limit

Orthogonal Axis : X

Test Mode : TX 2440MHz \_CH19\_1Mbps

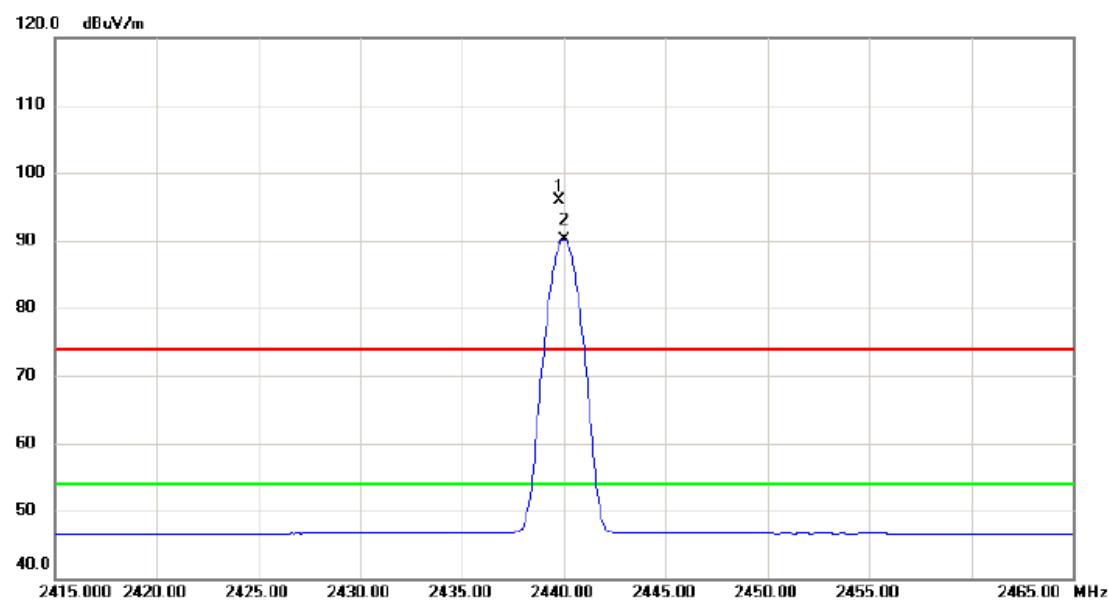
## Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		4879.300	38.85	5.09	43.94	74.00	-30.06	peak
2	*	4881.500	28.20	5.10	33.30	54.00	-20.70	AVG

Orthogonal Axis : X

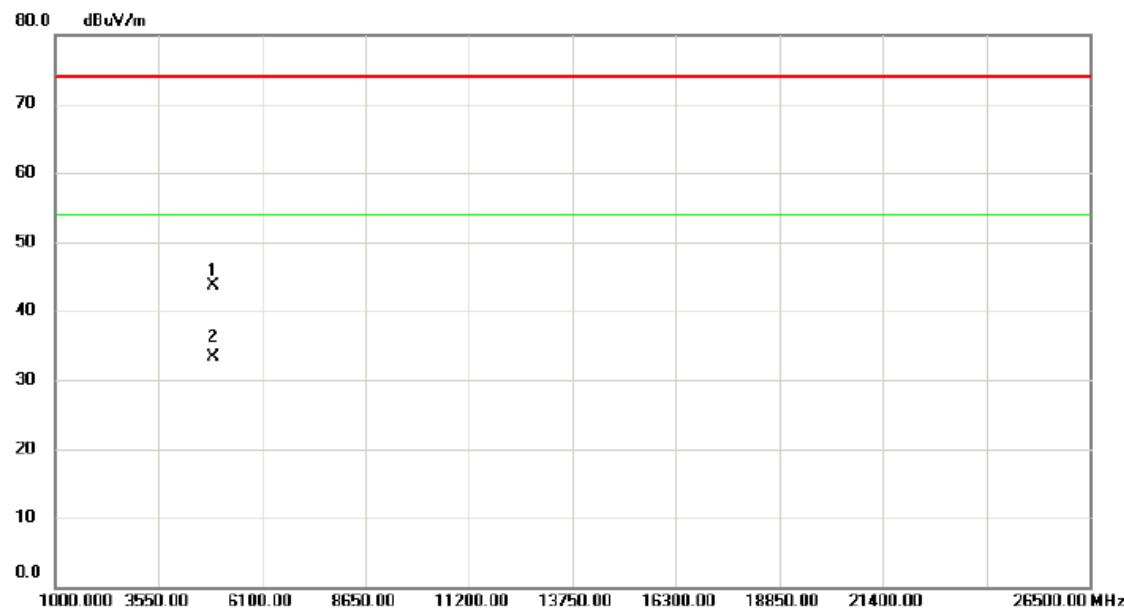
Test Mode : TX 2440MHz \_CH19\_1Mbps

**Horizontal**

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	X	2439.750	62.62	33.22	95.84	74.00	21.84	peak No Limit
2	*	2440.000	56.94	33.22	90.16	54.00	36.16	AVG No Limit

Orthogonal Axis : X

Test Mode : TX 2440MHz \_CH19\_1Mbps

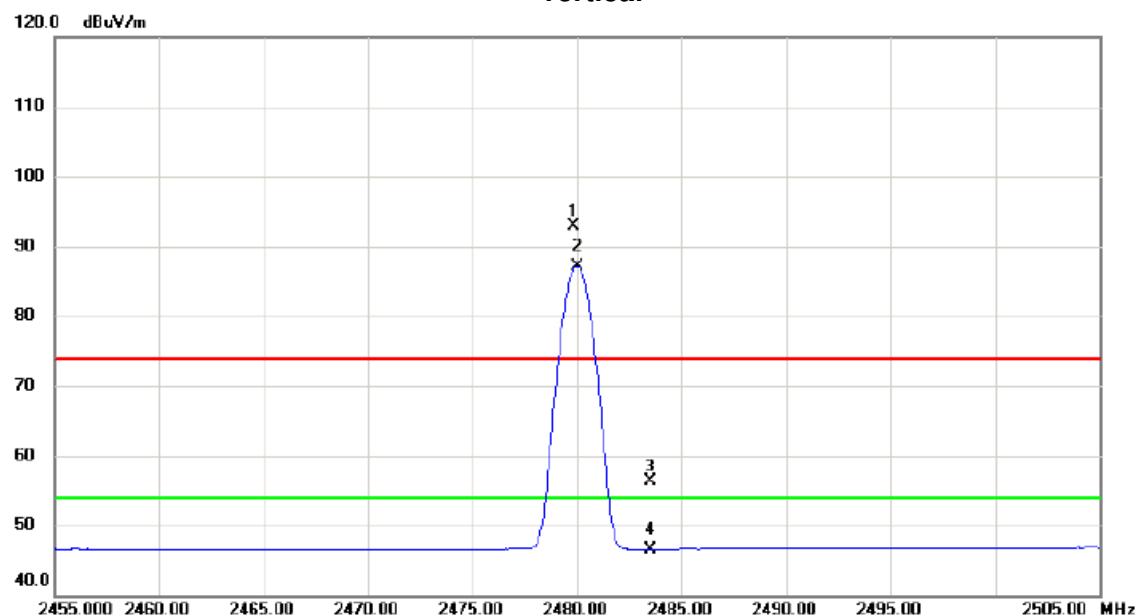
**Horizontal**

No.	Mk.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
	MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1	4879.200	38.68	5.09	43.77	74.00	-30.23	peak
2 *	4880.900	28.26	5.10	33.36	54.00	-20.64	AVG

Orthogonal Axis : X

Test Mode : TX 2480MHz \_CH39\_1Mbps

## Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	
1	X	2479.800	59.49	33.39	92.88	74.00	18.88	peak No Limit
2	*	2480.000	53.81	33.39	87.20	54.00	33.20	AVG No Limit
3		2483.500	22.89	33.40	56.29	74.00	-17.71	peak
4		2483.500	13.18	33.40	46.58	54.00	-7.42	AVG

Orthogonal Axis : X

Test Mode : TX 2480MHz \_CH39\_1Mbps

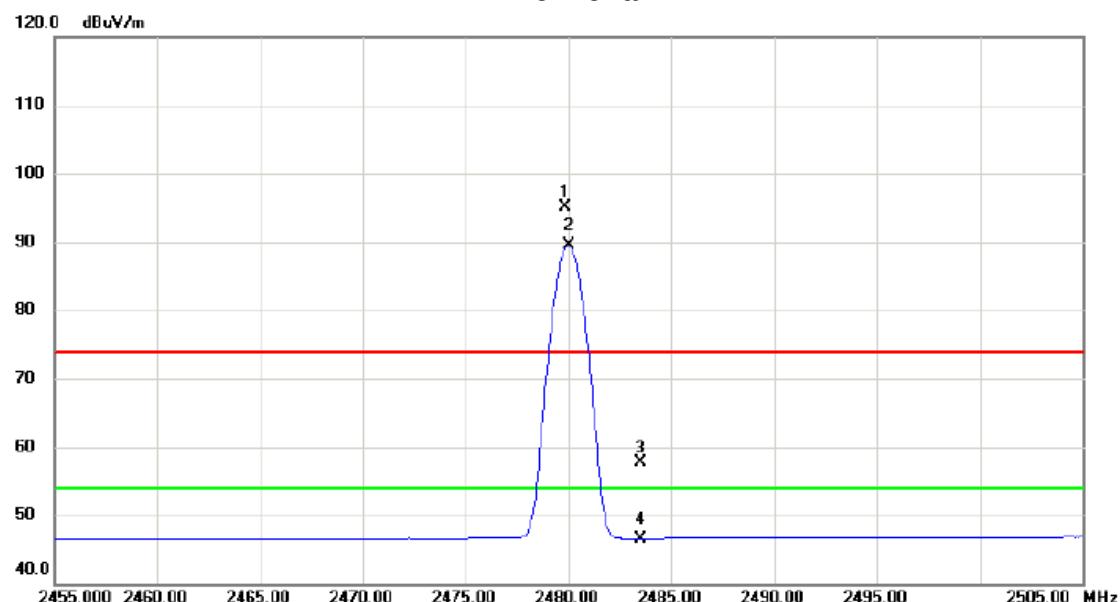
## Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4958.700	29.18	5.43	34.61	54.00	-19.39	AVG	
2		4959.500	38.14	5.43	43.57	74.00	-30.43	peak	

Orthogonal Axis : X

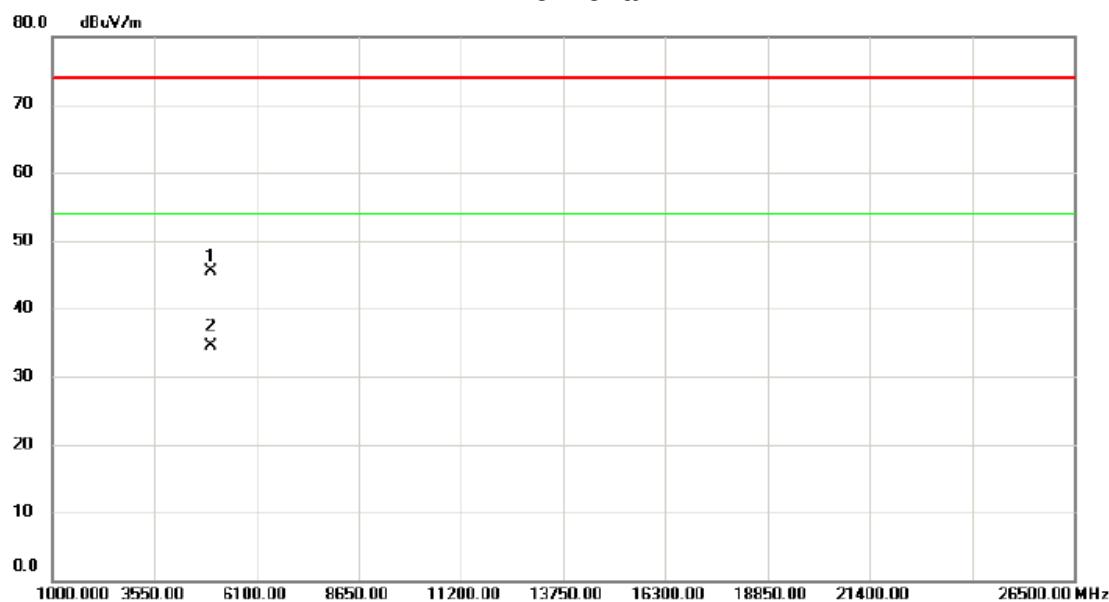
Test Mode : TX 2480MHz \_CH39\_1Mbps

**Horizontal**

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	
1	X	2479.800	61.70	33.39	95.09	74.00	21.09	peak No Limit
2	*	2480.000	56.05	33.39	89.44	54.00	35.44	AVG No Limit
3		2483.500	24.37	33.40	57.77	74.00	-16.23	peak
4		2483.500	13.18	33.40	46.58	54.00	-7.42	AVG

Orthogonal Axis : X

Test Mode : TX 2480MHz \_CH39\_1Mbps

**Horizontal**

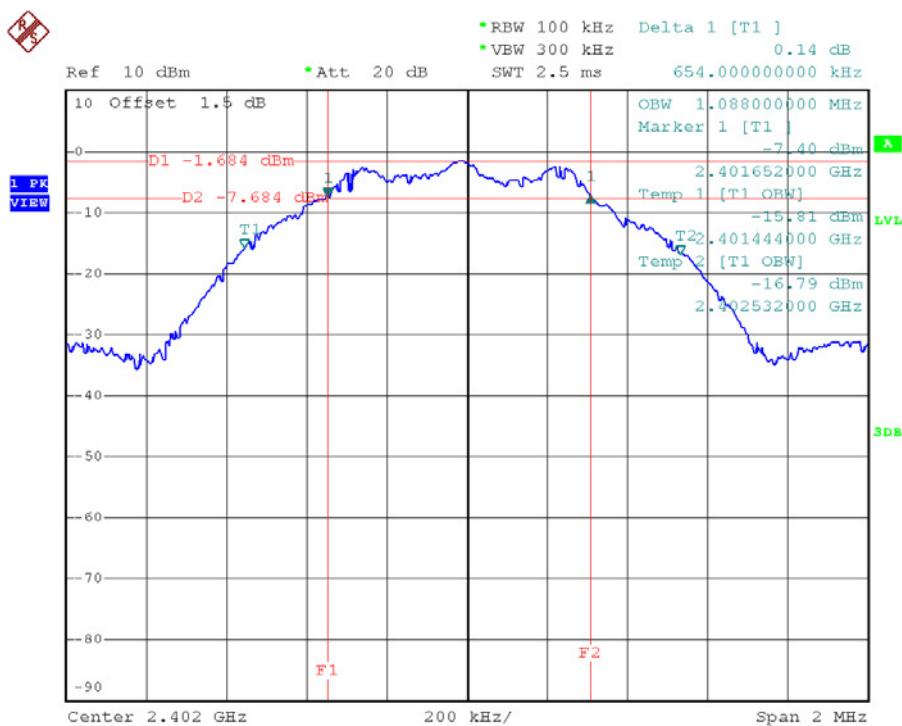
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		4959.400	40.00	5.43	45.43	74.00	-28.57	peak
2	*	4959.600	29.11	5.43	34.54	54.00	-19.46	AVG

## ATTACHMENT E - BANDWIDTH

Test Mode : CH00, CH19 , CH39 - 1Mbps

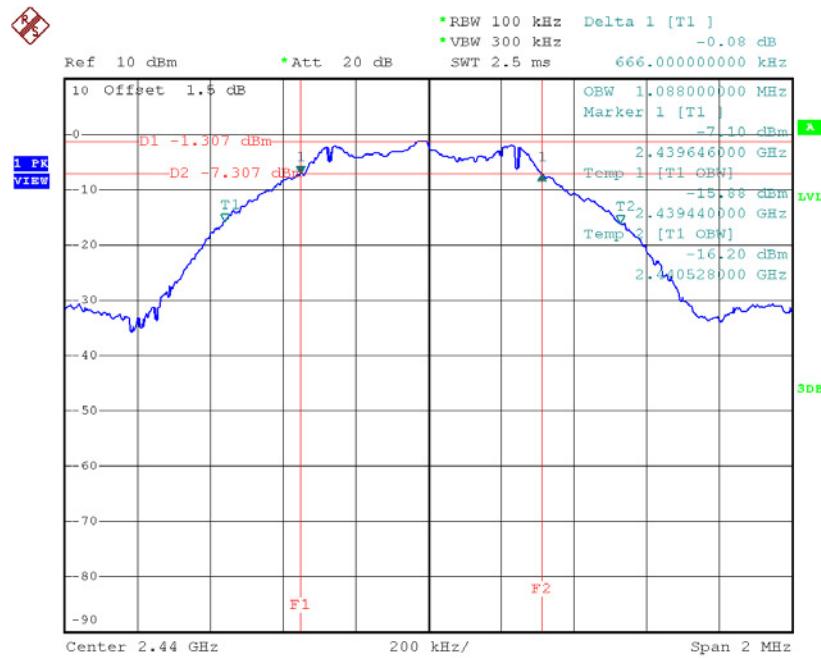
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2402	0.654	1.088	500	Complies
2440	0.666	1.088	500	Complies
2480	0.666	1.088	500	Complies

### TX CH00



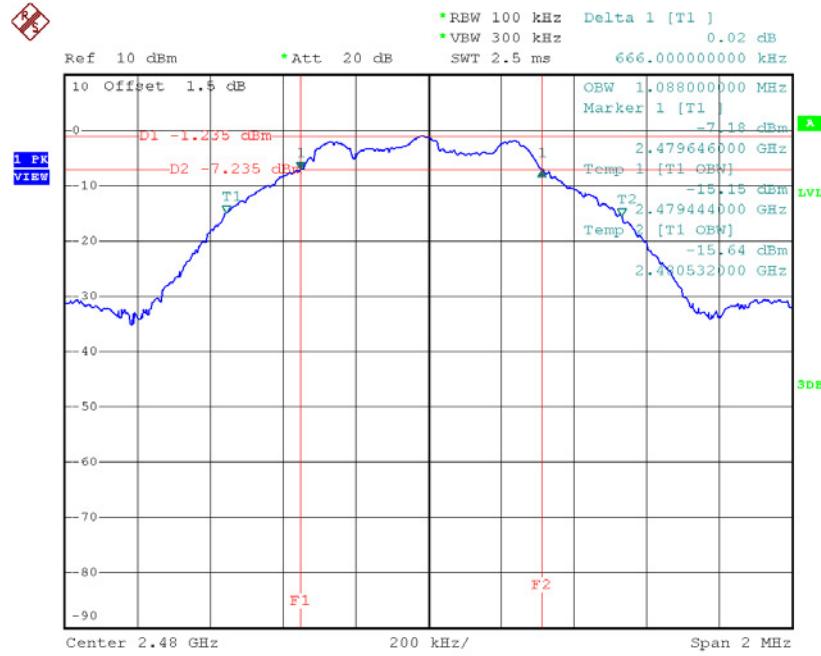
Date: 4.AUG.2016 21:23:51

TX CH19



Date: 4.AUG.2016 21:25:44

**TX CH39**



Date: 4.AUG.2016 21:27:14

## ATTACHMENT F - MAXIMUM OUTPUT POWER TEST

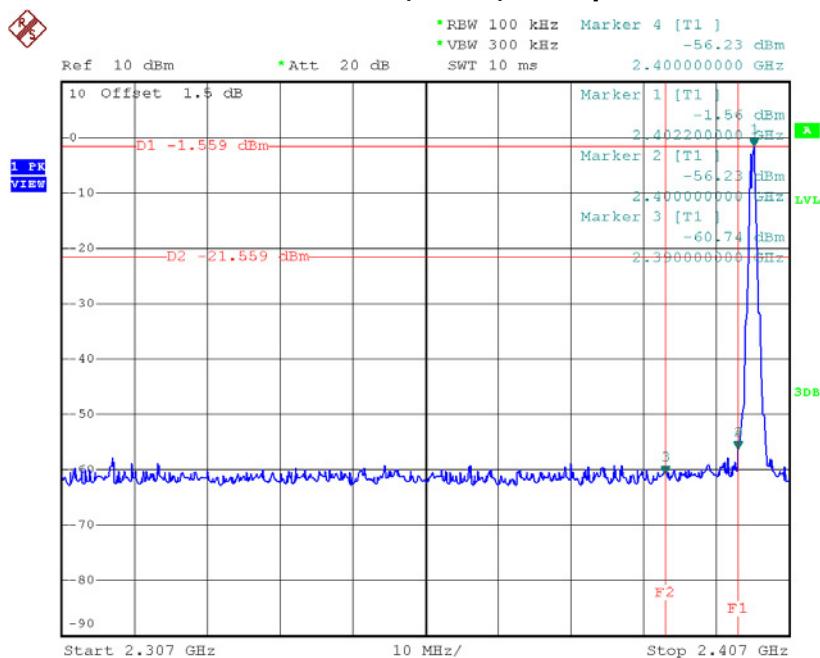
Test Mode :	CH00, CH19 , CH39 - 1Mbps
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Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watt)	Max. Limit (dBm)	Max. Limit (Watt)	Test Result
2402	-0.96	0.0008	30.00	1.00	Complies
2440	-0.59	0.0009	30.00	1.00	Complies
2480	-0.48	0.0009	30.00	1.00	Complies

## ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

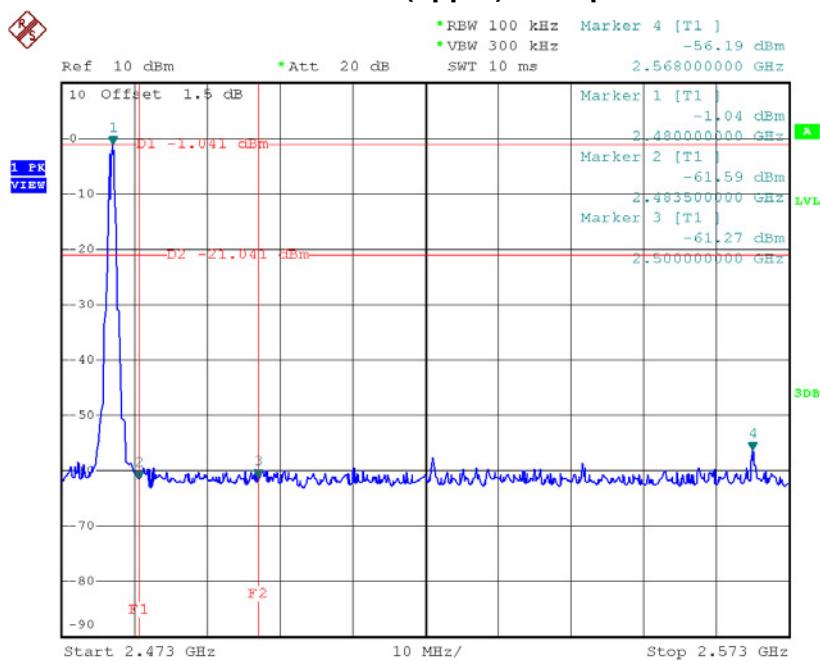
Test Mode : CH00, CH19 , CH39 - 1Mbps

### CH00 (Lower) - 1Mbps



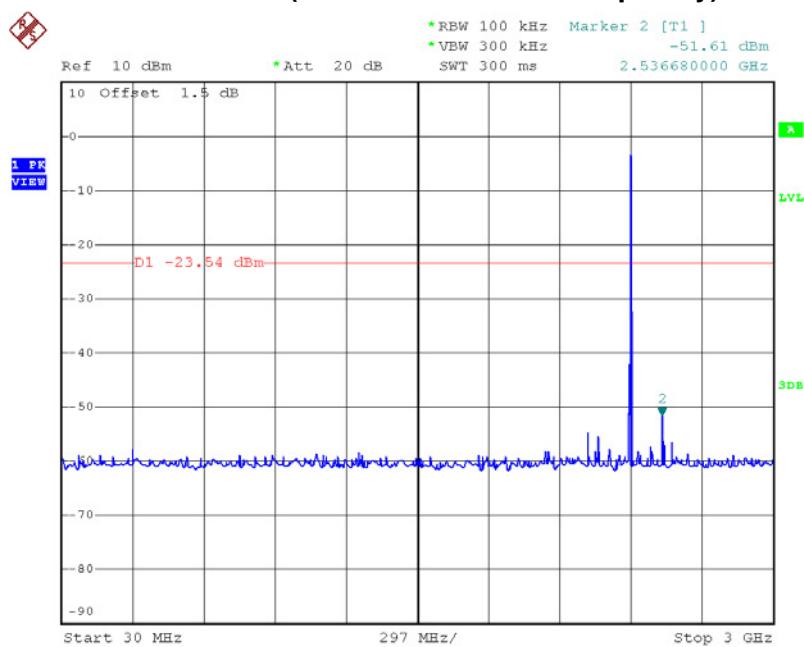
Date: 4.AUG.2016 21:24:00

### CH39 (upper) - 1Mbps

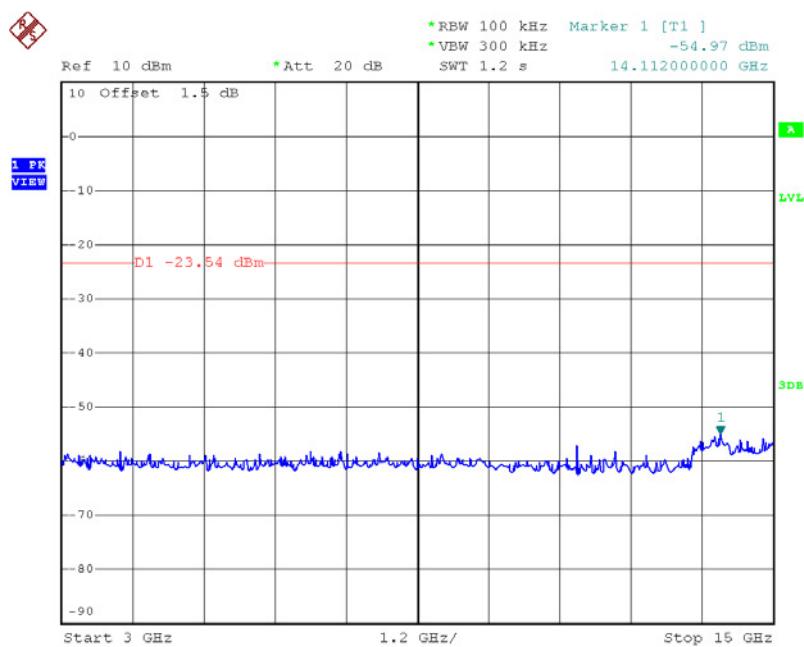


Date: 4.AUG.2016 21:27:23

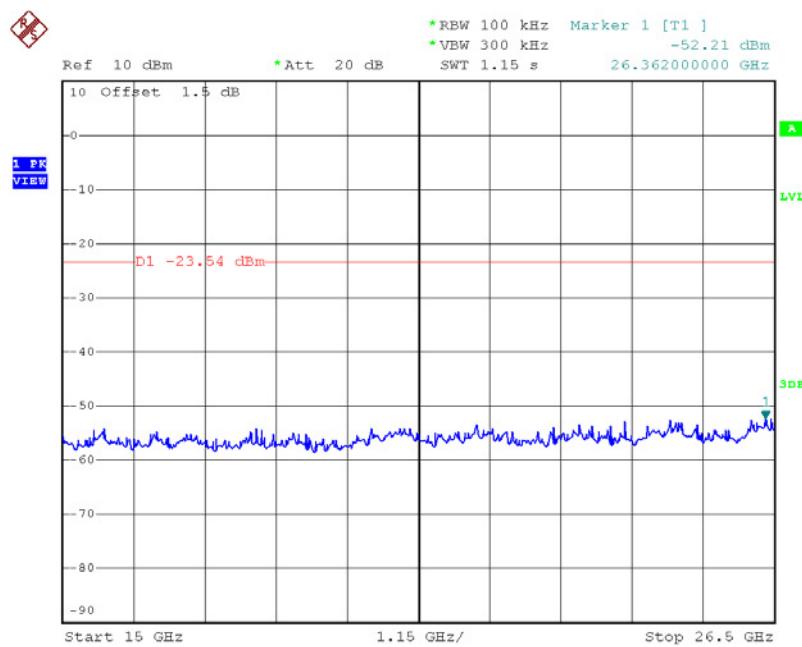
### CH00 (10 Harmonic of the frequency)



Date: 4.AUG.2016 21:24:14

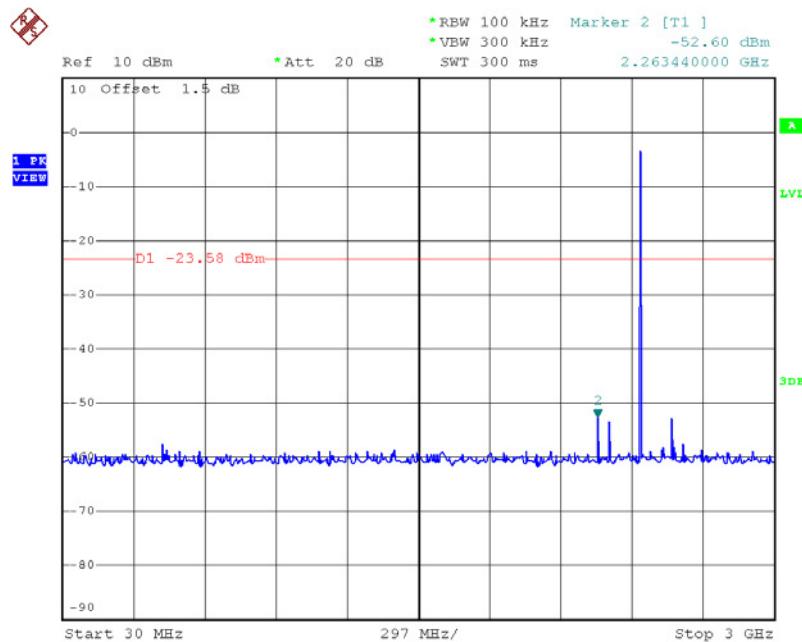


Date: 4.AUG.2016 21:24:23

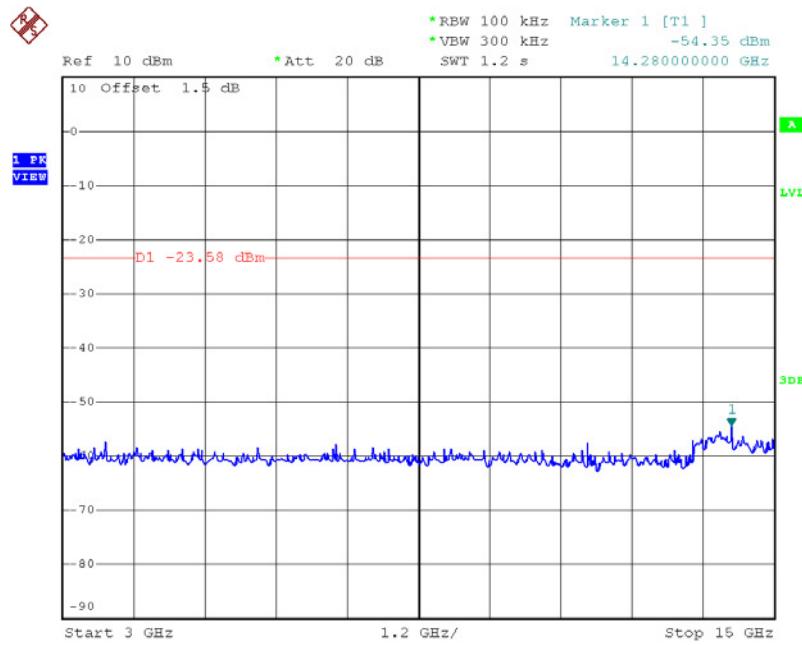


Date: 4.AUG.2016 21:24:32

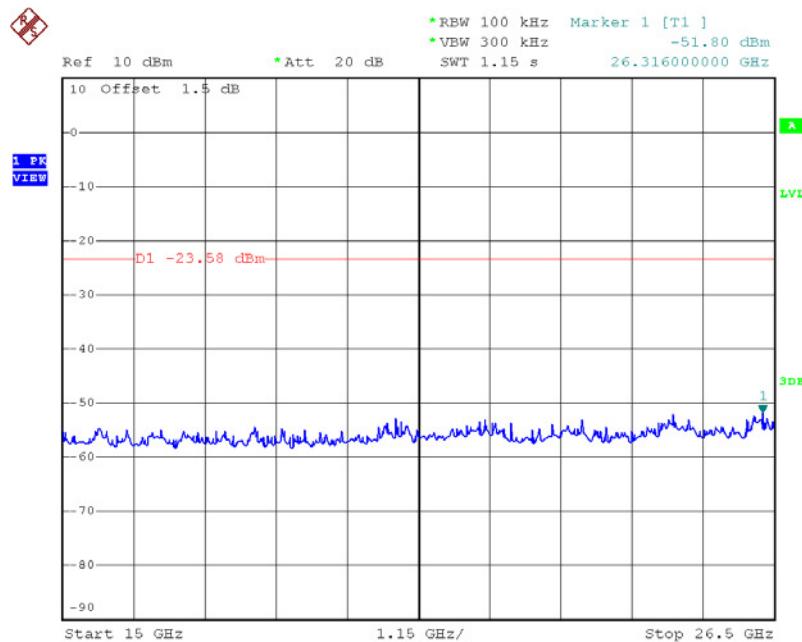
### CH19 (10 Harmonic of the frequency)



Date: 4.AUG.2016 21:25:59

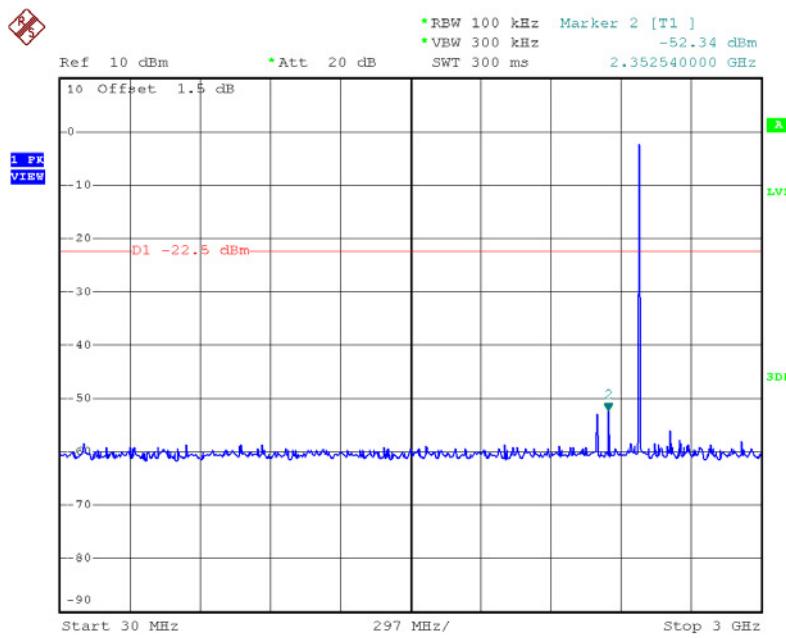


Date: 4.AUG.2016 21:26:08

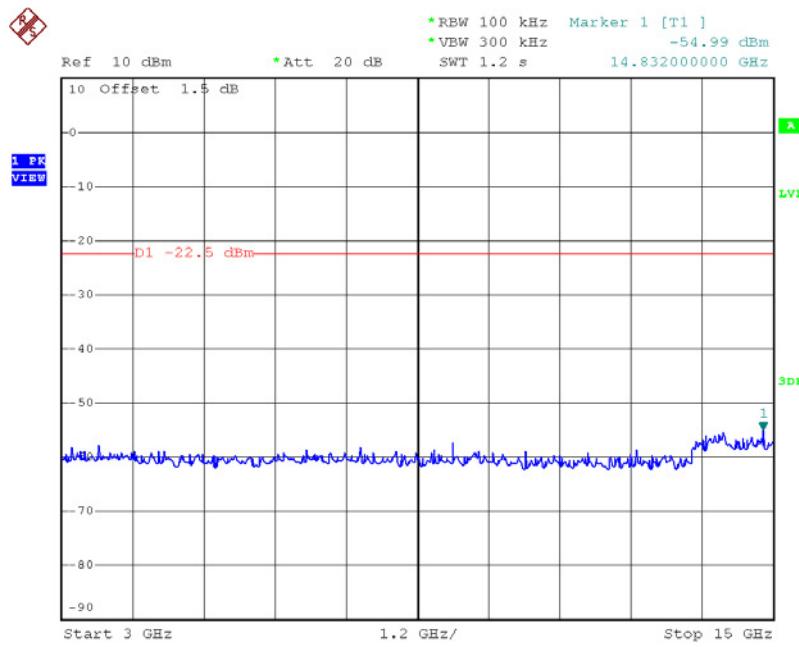


Date: 4.AUG.2016 21:26:17

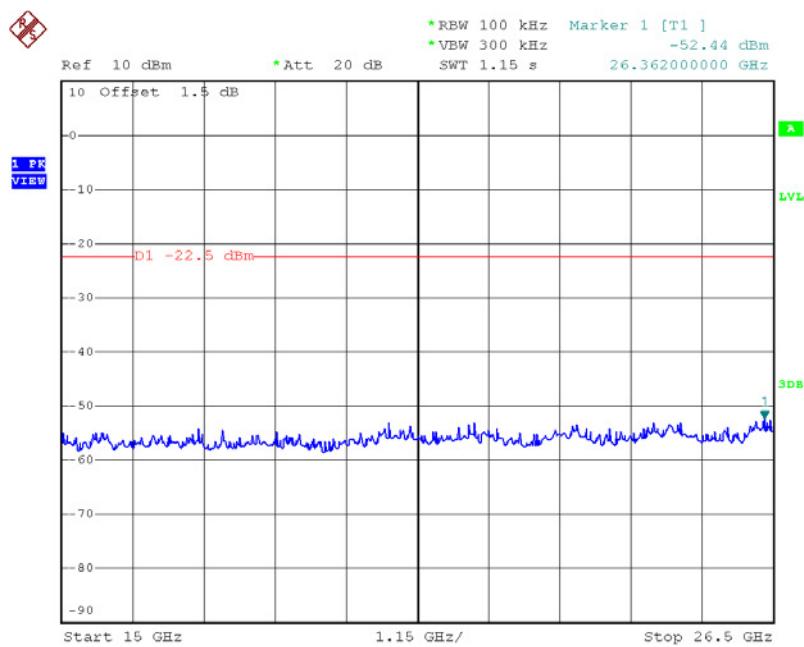
### CH39 (10 Harmonic of the frequency)



Date: 4.AUG.2016 21:27:37



Date: 4.AUG.2016 21:27:46



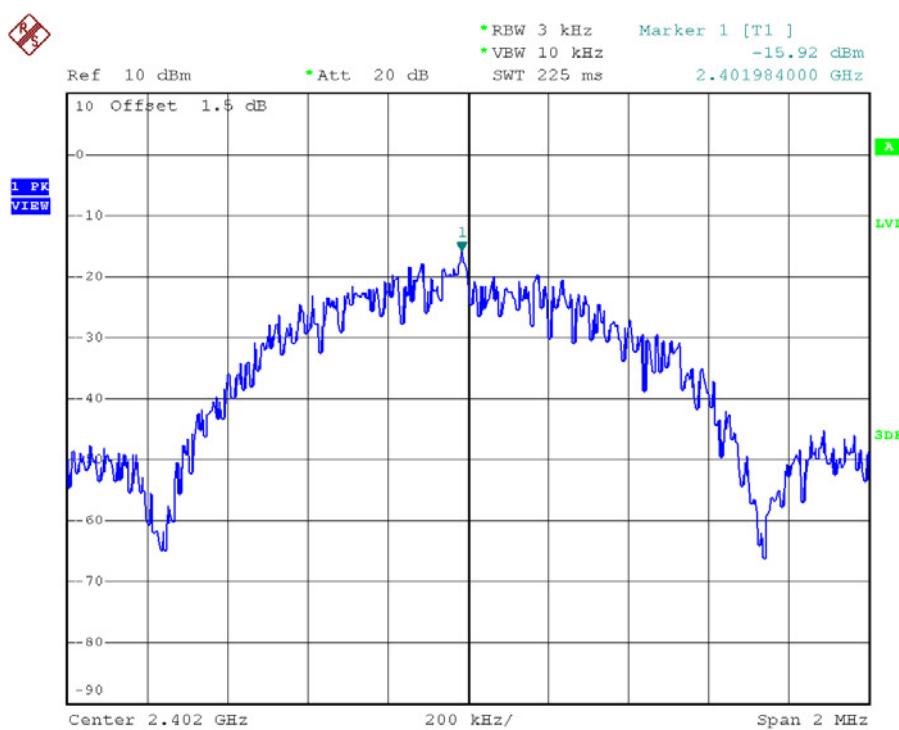
Date: 4.AUG.2016 21:27:55

## ATTACHMENT H - POWER SPECTRAL DENSITY TEST

Test Mode : CH00, CH19 , CH39 - 1Mbps

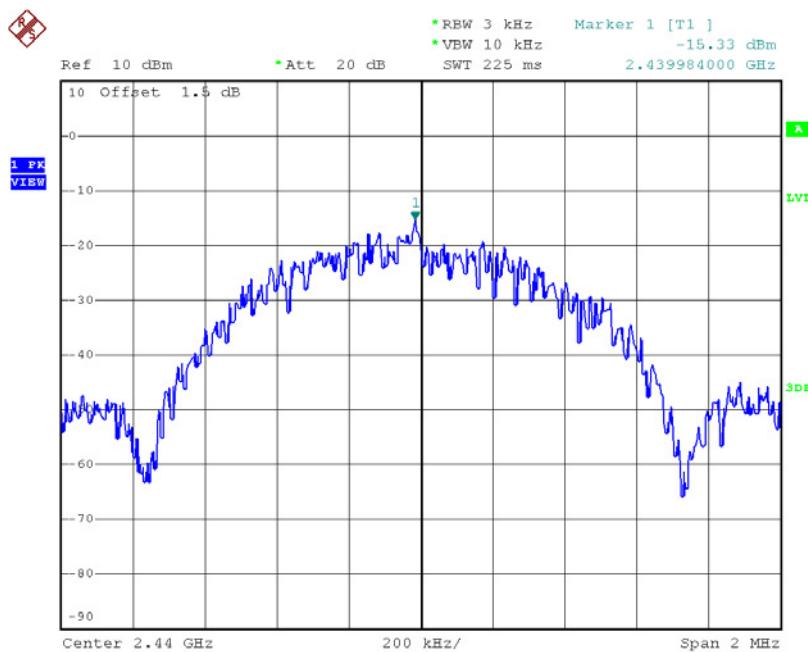
Frequency (MHz)	Power Density (dBm)	Max. Limit (dBm)	Result
2402	-15.92	8	Complies
2440	-15.33	8	Complies
2480	-15.21	8	Complies

### TX CH00



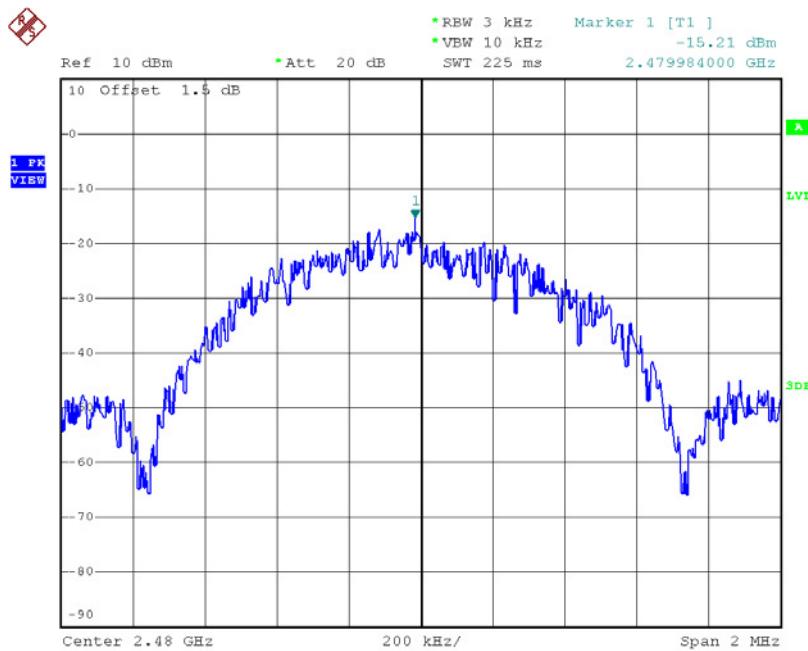
Date: 4.AUG.2016 21:24:39

## TX CH19



Date: 4.AUG.2016 21:26:24

## TX CH39



Date: 4.AUG.2016 21:28:02