

# FCC Radio Test Report

## FCC ID: RWO-RC30021702

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

**Project No.** : 1704C344  
**Equipment** : Wireless Mouse  
**Model Name** : RC30-021702  
**Applicant** : Razer Inc.  
**Address** : 201 3rd Street, Suite 900, San Francisco, CA 94103

**Date of Receipt** : May 02, 2017  
**Date of Test** : May 02, 2017 ~ Jun. 14, 2017  
**Issued Date** : Jun. 15, 2017  
**Tested by** : BTL Inc.

**Testing Engineer** : Vitas Zhou  
(Vitas Zhou)

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**Authorized Signatory** : Steven Lu  
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# **B T L I N C .**

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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

Issued No.	Description	Issued Date
BTL-FCCP-2-1704C344	Original Issue.	Jun. 15, 2017

## 1. CERTIFICATION

Equipment : Wireless Mouse  
Brand Name : RAZER  
Model Name : RC30-021702  
Applicant : Razer Inc.  
Manufacturer : Razer (Asia-Pacific) Pte.,Ltd.  
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  
Date of Test : May 02, 2017 ~ Jun. 14, 2017  
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-2-1704C1344) 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			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(b)(3)	AVG Power	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	
15.209/15.205	Transmitter Radiated Emissions	PASS	
RSS-247 5.5	Band Edge 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  $U_{cispr}$  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. 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	Wireless Mouse	
Brand Name	RAZER	
Model Name	RC30-021702	
Model Difference	The System's model name is RZ01-0217 and the system contains of a Wireless mouse (Model Name: RC30-021702) and the USB Dongle (Model Name: DGRFG5).	
Product Description	Operation Frequency	2402-2480 MHz
	Modulation Technology	GFSK (1 Mbps)
	Bit Rate of Transmitter	
	AVG Power (Max.)	5.25dBm
Power Source	Supplied from 2*AA battery.	
Power Rating	DC 3V	

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)	Channel	Frequency (MHz)
01	2402	28	2429	55	2456
02	2403	29	2430	56	2457
03	2404	30	2431	57	2458
04	2405	31	2432	58	2459
05	2406	32	2433	59	2460
06	2407	33	2434	60	2461
07	2408	34	2435	61	2462
08	2409	35	2436	62	2463
09	2410	36	2437	63	2464
10	2411	37	2438	64	2465
11	2412	38	2439	65	2466
12	2413	39	2440	66	2467
13	2414	40	2441	67	2468
14	2415	41	2442	68	2469
15	2416	42	2443	69	2470
16	2417	43	2444	70	2471
17	2418	44	2445	71	2472
18	2419	45	2446	72	2473
19	2420	46	2447	73	2474
20	2421	47	2448	74	2475
21	2422	48	2449	75	2476
22	2423	49	2450	76	2477
23	2424	50	2451	77	2478
24	2425	51	2452	78	2479
25	2426	52	2453	79	2480
26	2427	53	2454		
27	2428	54	2455		

3. Table for Filed Antenna:

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	GainForce	AT3216	Chip	N/A	0.5

### 3.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>

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

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

Note:

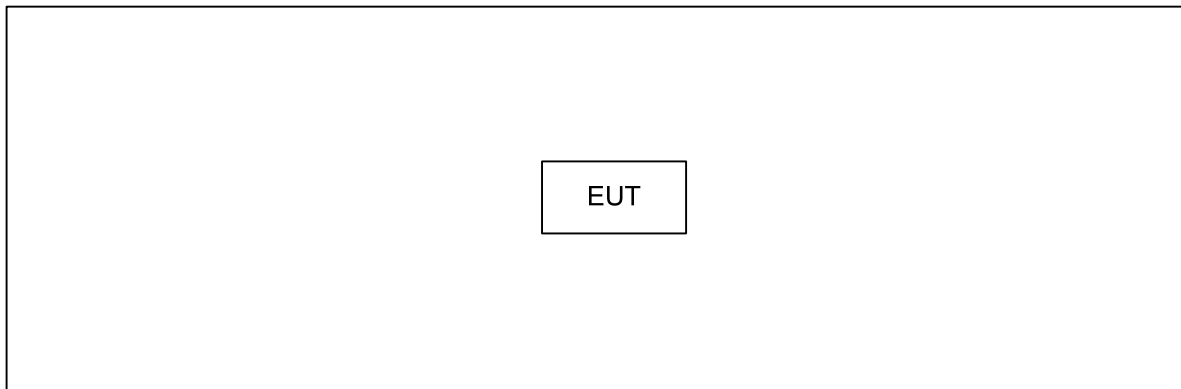
(1) The measurements are performed at the high, middle, low available channels.

### 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	N/A		
Frequency (MHz)	2402	2440	2480
-	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
-	-	-	-	-

Note:

- (1) For detachable type I/O cable should be specified the length in m in 『Length』 column.

## 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

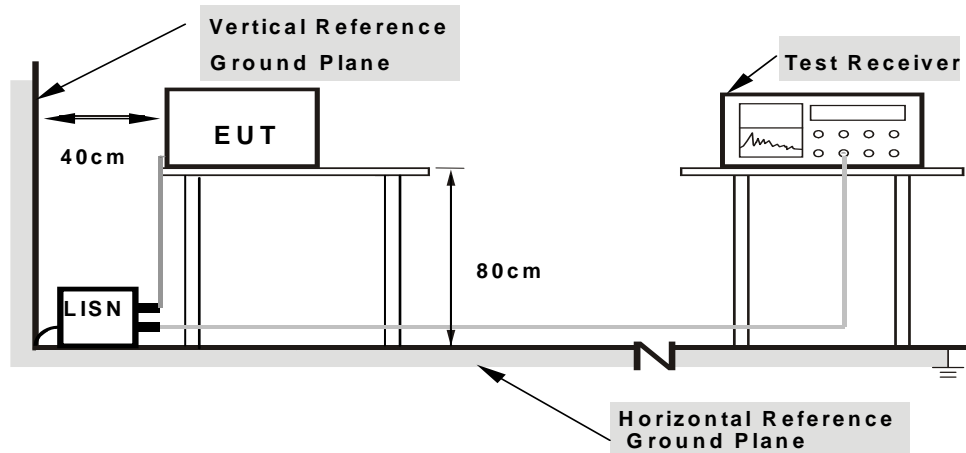
#### 4.1.2 TEST PROCEDURE

- 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 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: 53%    Test Voltage: N/A

#### 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

- 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 1GHz)
- 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 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 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 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.
- e. 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)
- f. 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)
- g. For the actual test configuration, please refer to the related Item –EUT Test Photos.

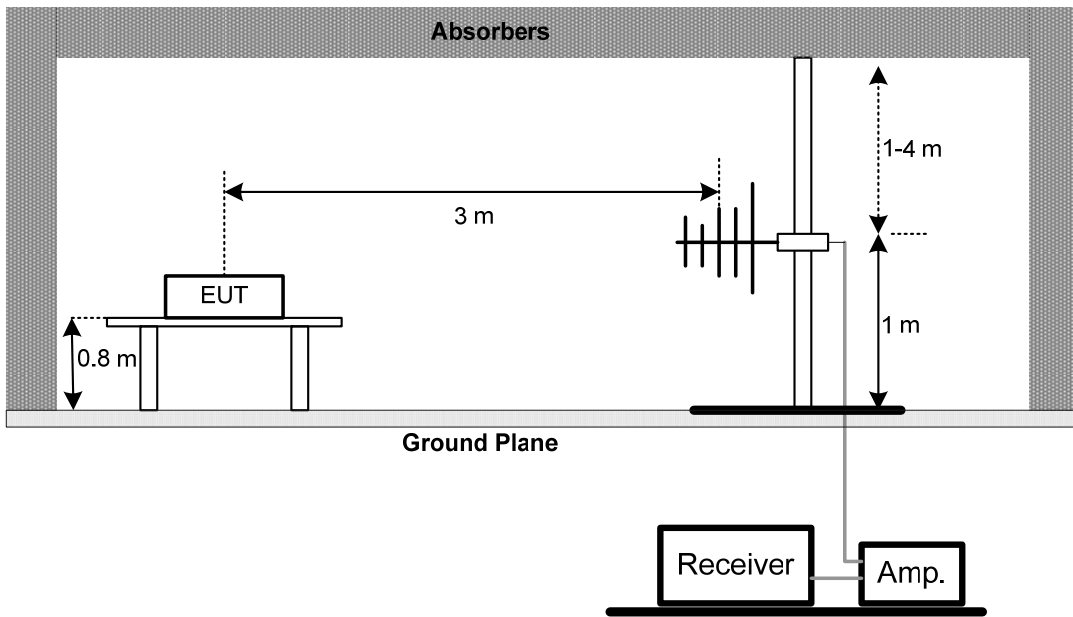
#### 4.2.3 DEVIATION FROM TEST STANDARD

No deviation

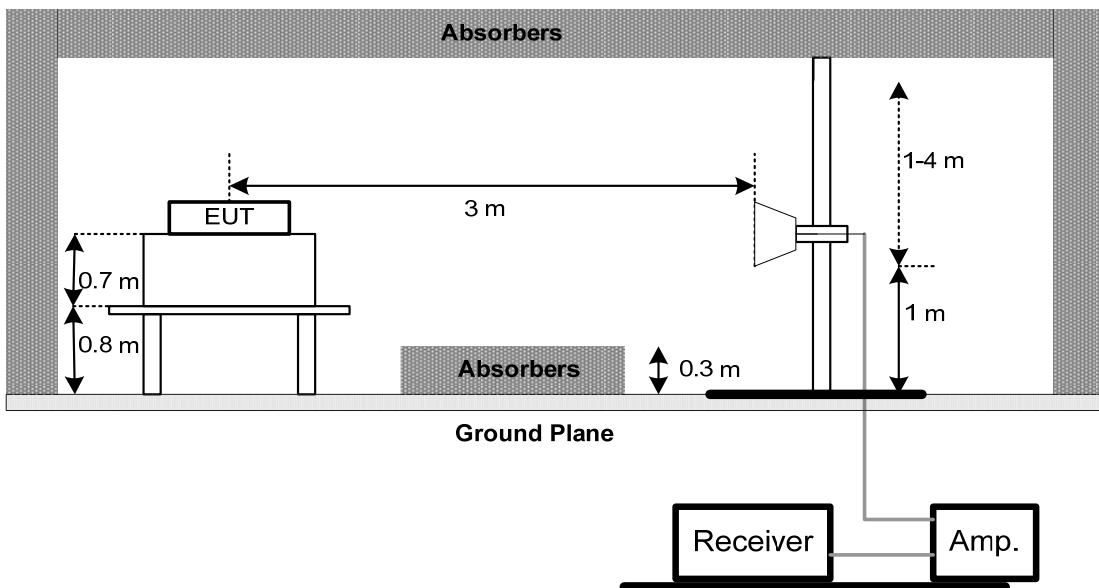


**4.2.4 TEST SETUP**

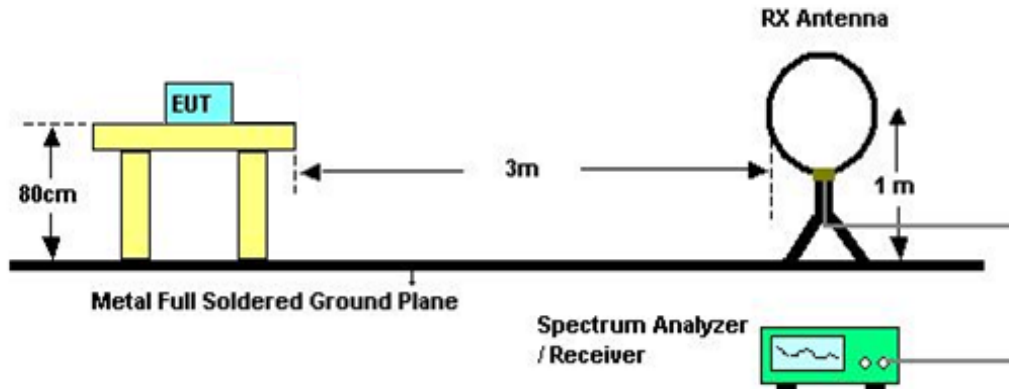
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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: 60%    Test Voltage: DC 3V

#### 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) 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.
- (2) Measuring frequency range from 30MHz to 1000MHz.
- (3) 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) 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.
- (2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (3) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (4) EUT Orthogonal Axis:  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (5) 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
- (6) 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	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

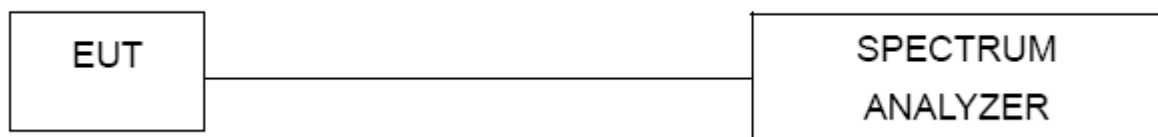
#### 5.1.1 TEST PROCEDURE

- 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: 60%    Test Voltage: DC 3V

#### 5.1.6 TEST RESULTS

Please refer to the Attachment E.

## 6. CONDUCTED 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

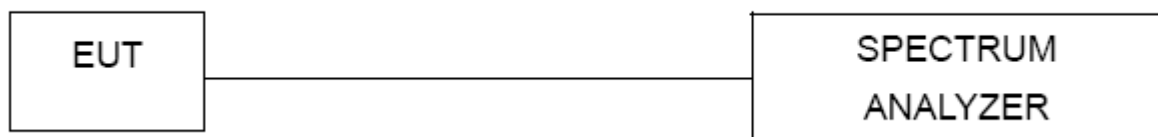
#### 6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. The maximum conducted output power was performed in accordance with method 9.2 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: 60%    Test Voltage: DC 3V

#### 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.

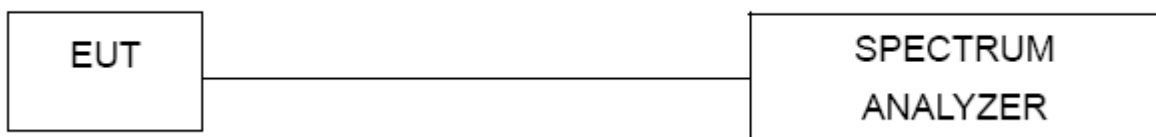
#### 7.1.1 TEST PROCEDURE

- 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: 60%    Test Voltage: DC 3V

#### 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

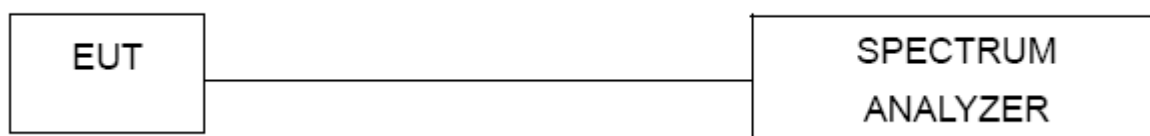
#### 8.1.1 TEST PROCEDURE

- 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=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: 60%    Test Voltage: DC 3V

#### 8.1.6 TEST RESULTS

Please refer to the Attachment H.

## 9. MEASUREMENT INSTRUMENTS LIST

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 26, 2018
2	Amplifier	HP	8447D	2944A09673	Oct. 20, 2017
3	Receiver	AGILENT	N9038A	MY52130039	Sep. 04, 2017
4	Test Cable	emci	LMR-400(30MHz-1 GHz)	C-01	Jun. 26, 2017
5	Controller	CT	SC100	N/A	N/A
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Antenna	ETS	3115	00075789	Mar. 26, 2018
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2017
9	Test Cable	emci	EMC104-SM-SM-10000(1GHz-26.5G Hz)	C-68	Jun. 26, 2017
10	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Apr. 22, 2018
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 26, 2018
12	EMI Test Receiver	R&S	ESCI	100895	Mar. 26, 2018
13	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2017

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

Conducted Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

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

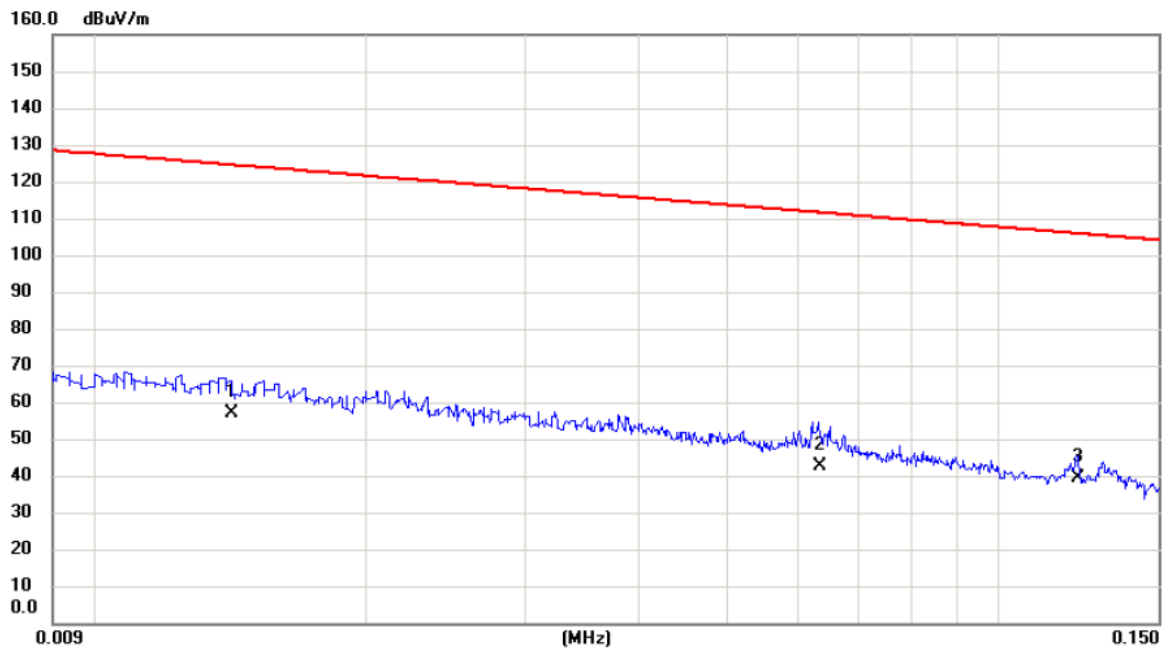
**Test Mode: N/A**

Note: "N/A" denotes test is not applicable to this device.

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

Test Mode: TX Mode

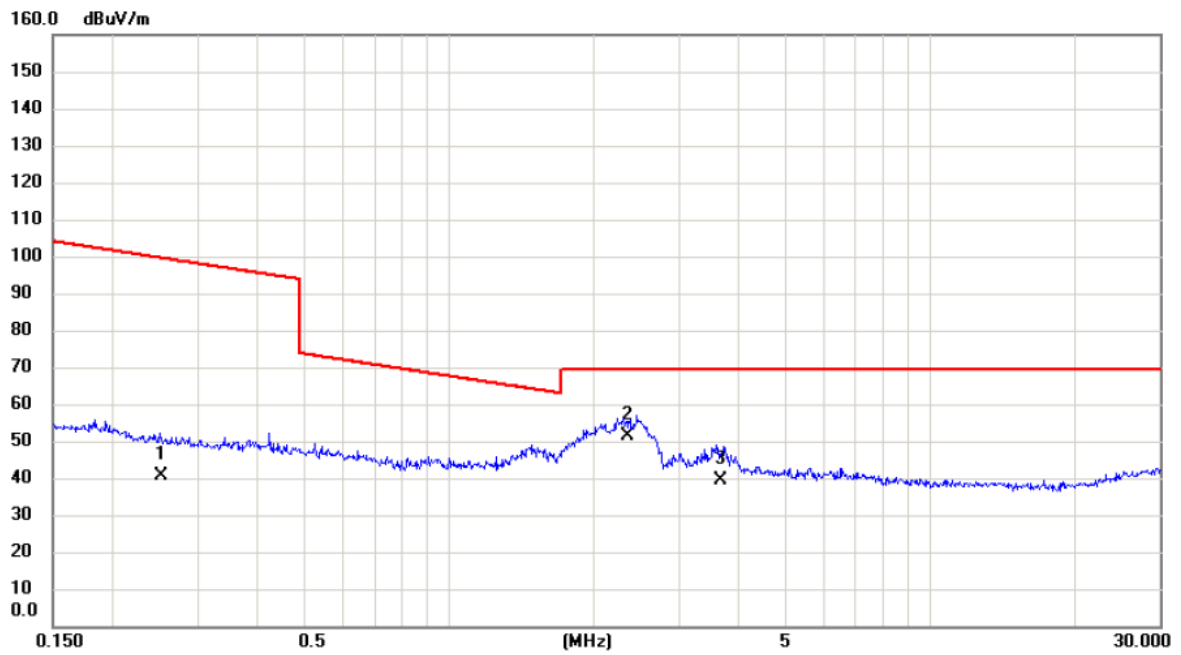
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.014	36.83	20.37	57.20	124.56	-67.36	AVG	
2		0.063	24.30	18.46	42.76	111.58	-68.82	AVG	
3	*	0.122	22.21	17.32	39.53	105.87	-66.34	AVG	

Test Mode: TX Mode

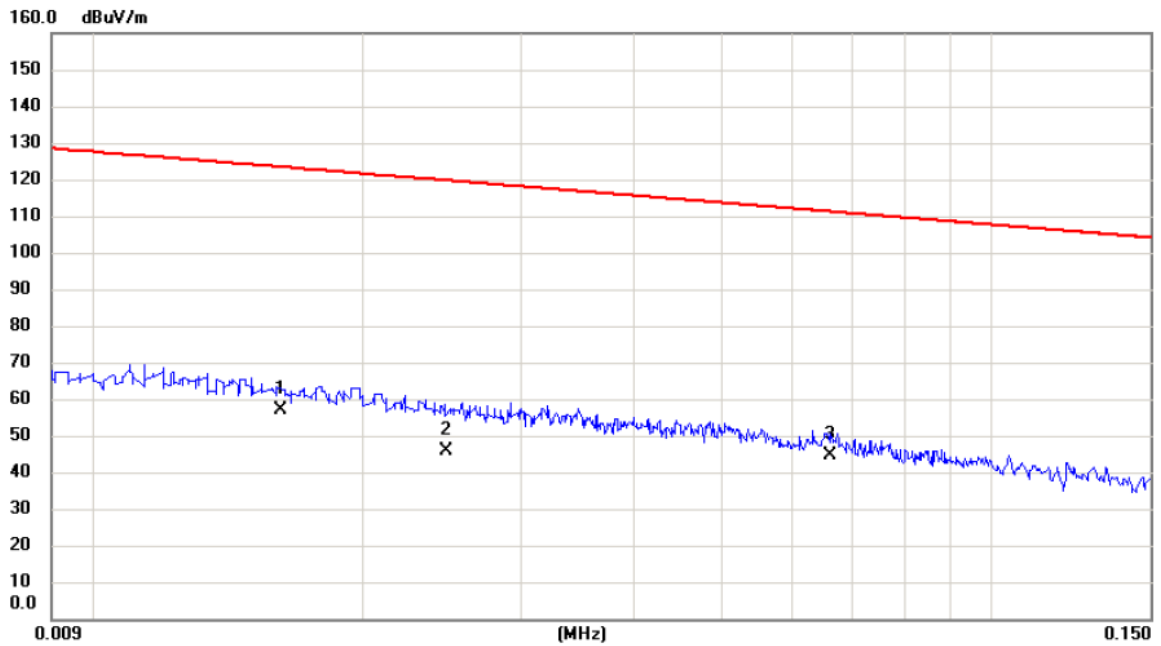
**Ant 0°**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.253	23.94	16.65	40.59	99.55	-58.96	AVG	
2	*	2.346	36.09	15.41	51.50	69.54	-18.04	QP	
3		3.662	24.26	15.05	39.31	69.54	-30.23	QP	

Test Mode: TX Mode

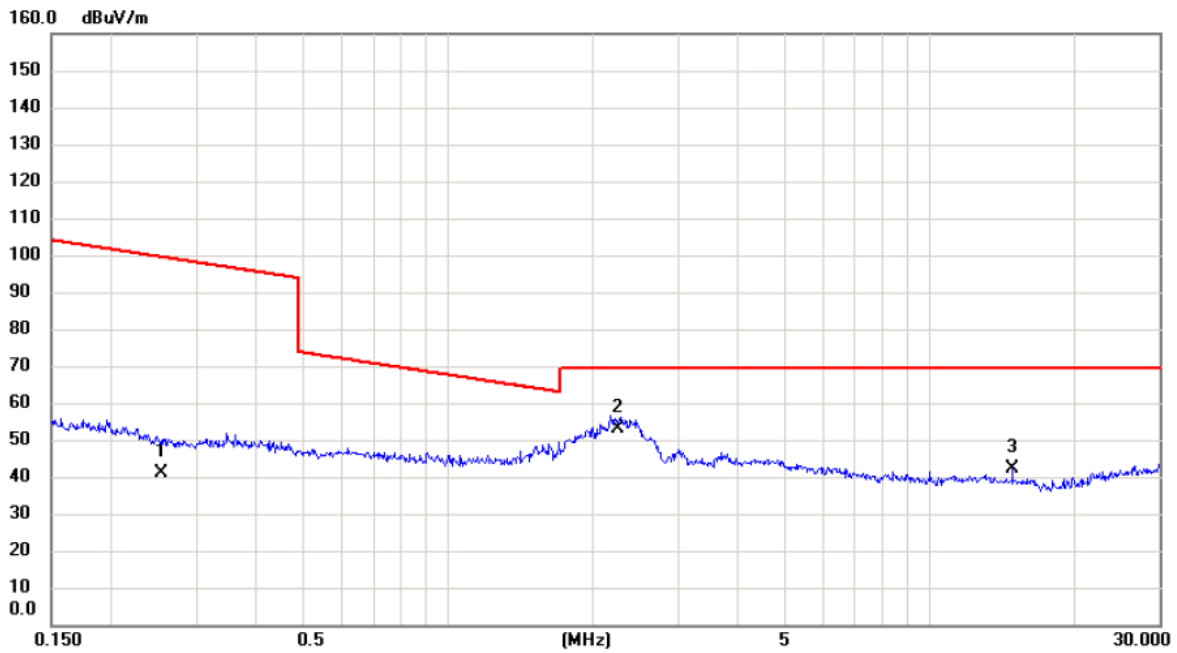
Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	0.016	36.81	20.11	56.92	123.41	-66.49	AVG	
2		0.025	26.51	19.48	45.99	119.75	-73.76	AVG	
3		0.066	26.17	18.41	44.58	111.19	-66.61	AVG	

Test Mode: TX Mode

**Ant 90°**

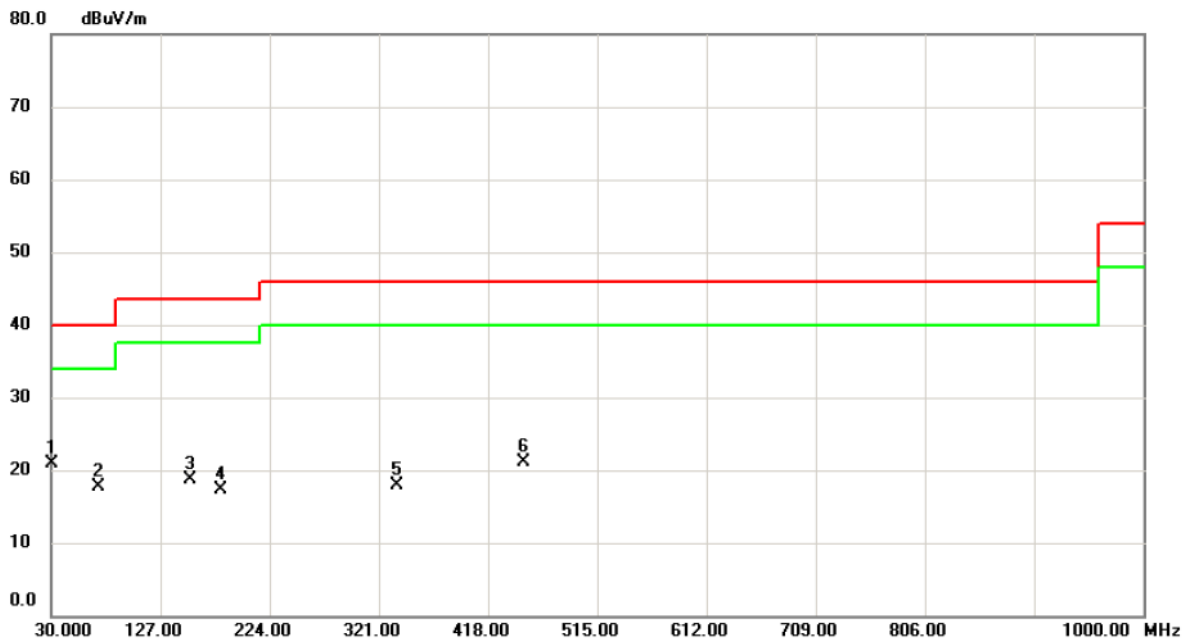


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.253	24.37	16.65	41.02	99.53	-58.51	AVG	
2	*	2.247	37.71	15.44	53.15	69.54	-16.39	QP	
3		14.834	28.21	14.08	42.29	69.54	-27.25	QP	

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

Test Mode: TX Mode\_2402MHz

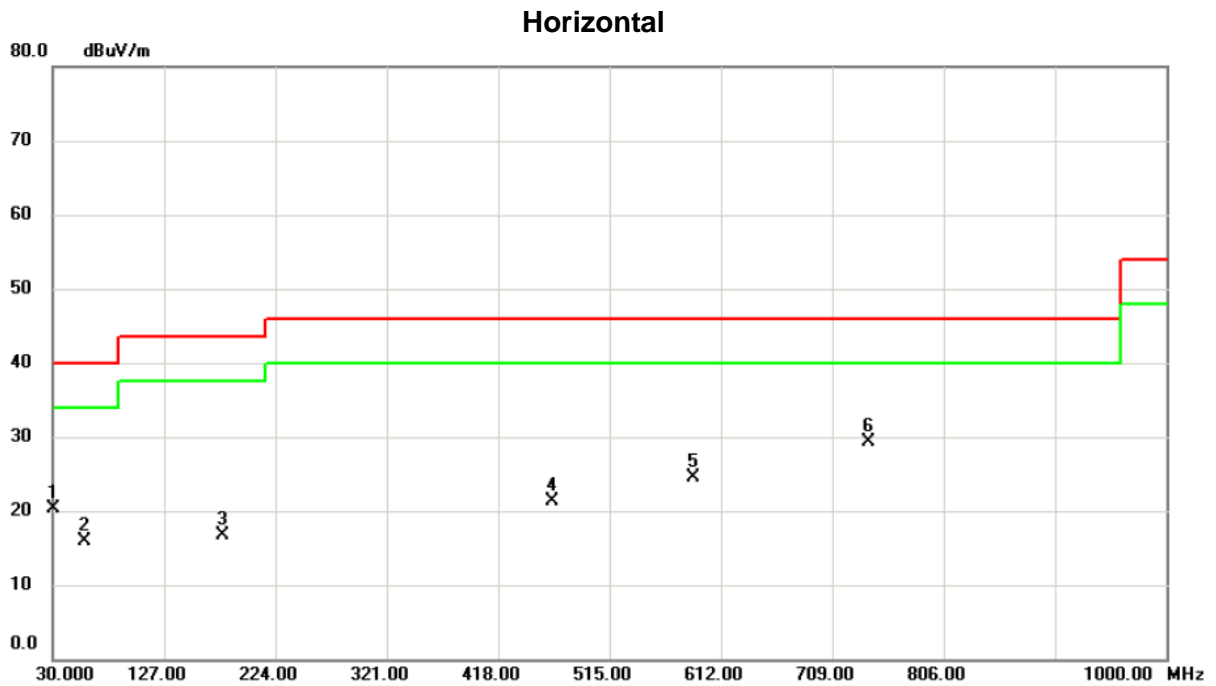
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	30.0000	34.94	-14.03	20.91	40.00	-19.09	peak	
2		71.7100	34.32	-16.54	17.78	40.00	-22.22	peak	
3		153.1900	31.32	-12.70	18.62	43.50	-24.88	peak	
4		180.3500	30.13	-12.88	17.25	43.50	-26.25	peak	
5		336.5200	28.79	-10.93	17.86	46.00	-28.14	peak	
6		449.0400	29.13	-8.00	21.13	46.00	-24.87	peak	



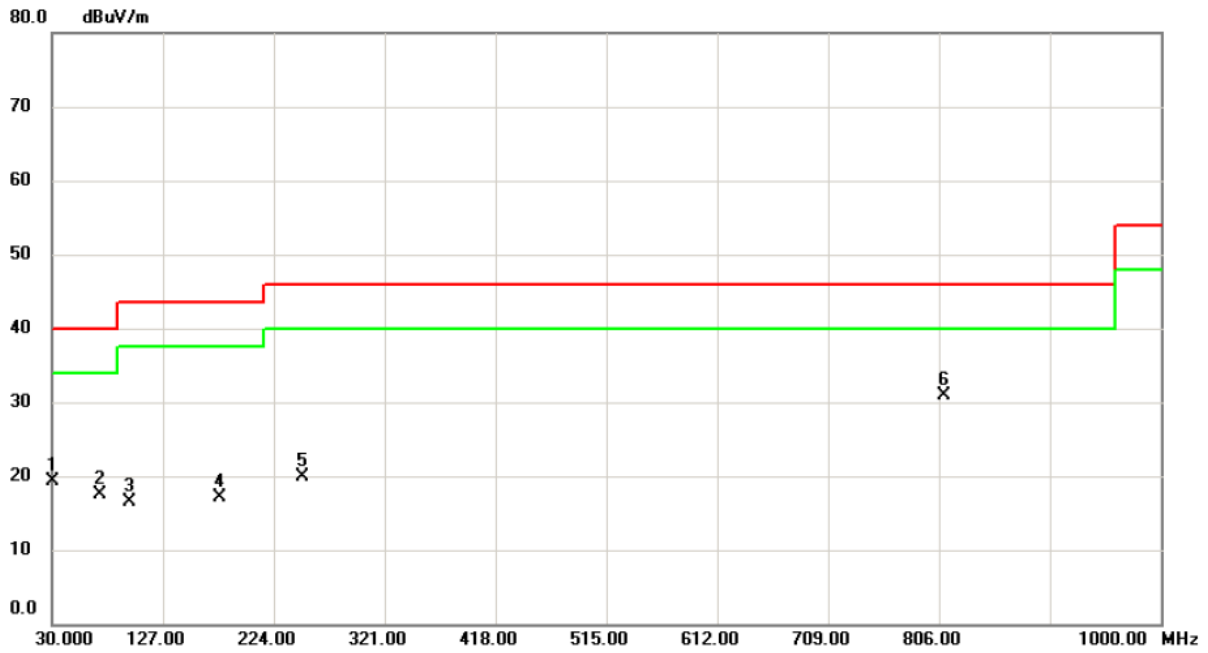
Test Mode: TX Mode\_2402MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		30.0000	34.24	-14.03	20.21	40.00	-19.79	peak	
2		57.1600	29.44	-13.59	15.85	40.00	-24.15	peak	
3		178.4100	29.49	-12.75	16.74	43.50	-26.76	peak	
4		465.5300	29.91	-8.53	21.38	46.00	-24.62	peak	
5		587.7500	31.03	-6.44	24.59	46.00	-21.41	peak	
6	*	741.0100	31.24	-1.99	29.25	46.00	-16.75	peak	

Test Mode: TX Mode\_2440MHz

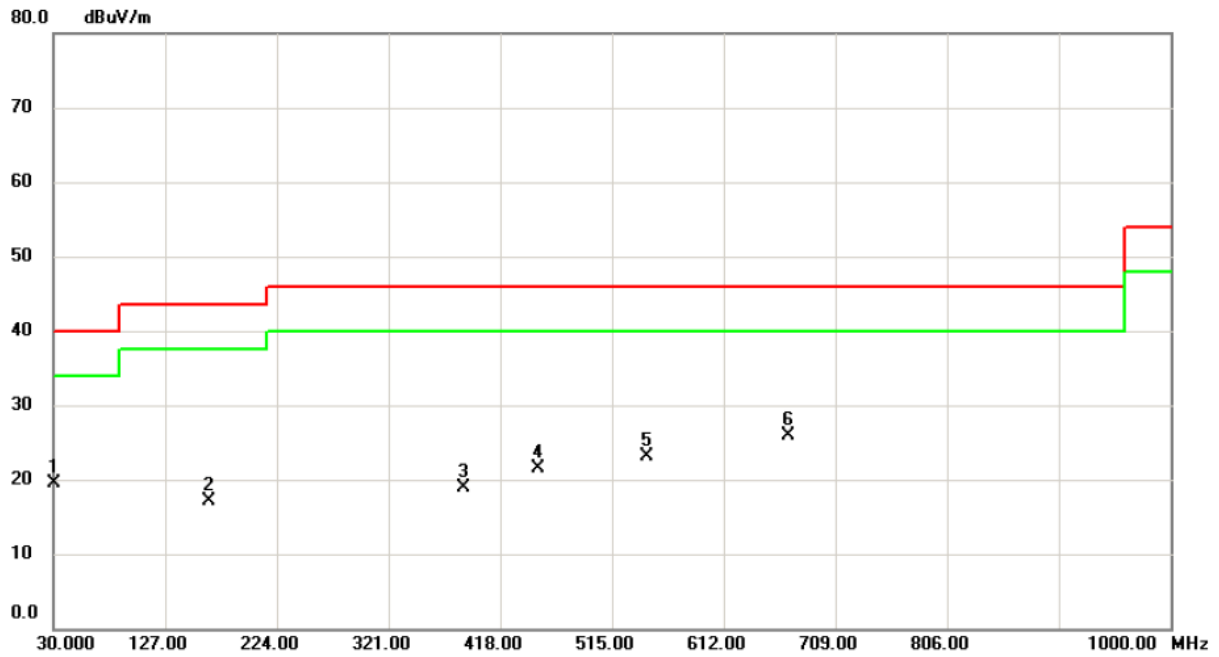
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		30.0000	33.37	-14.03	19.34	40.00	-20.66	peak	
2		71.7100	33.99	-16.54	17.45	40.00	-22.55	peak	
3		97.9000	32.70	-16.23	16.47	43.50	-27.03	peak	
4		176.4700	29.78	-12.62	17.16	43.50	-26.34	peak	
5		249.2200	33.98	-14.16	19.82	46.00	-26.18	peak	
6	*	809.8800	30.99	-0.05	30.94	46.00	-15.06	peak	

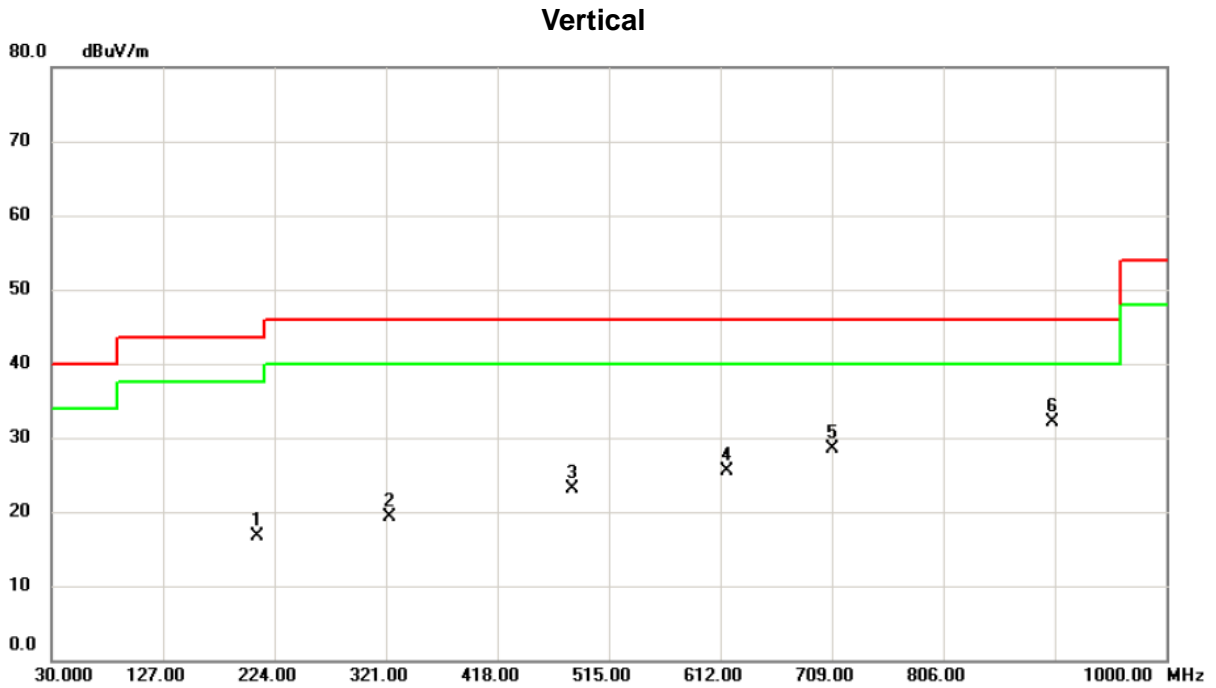
Test Mode: TX Mode\_2440MHz

### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		30.0000	33.58	-14.03	19.55	40.00	-20.45	peak	
2		164.8300	29.33	-12.20	17.13	43.50	-26.37	peak	
3		385.9900	27.58	-8.74	18.84	46.00	-27.16	peak	
4		450.9800	29.49	-8.03	21.46	46.00	-24.54	peak	
5		545.0700	28.15	-5.04	23.11	46.00	-22.89	peak	
6	*	668.2600	29.40	-3.42	25.98	46.00	-20.02	peak	

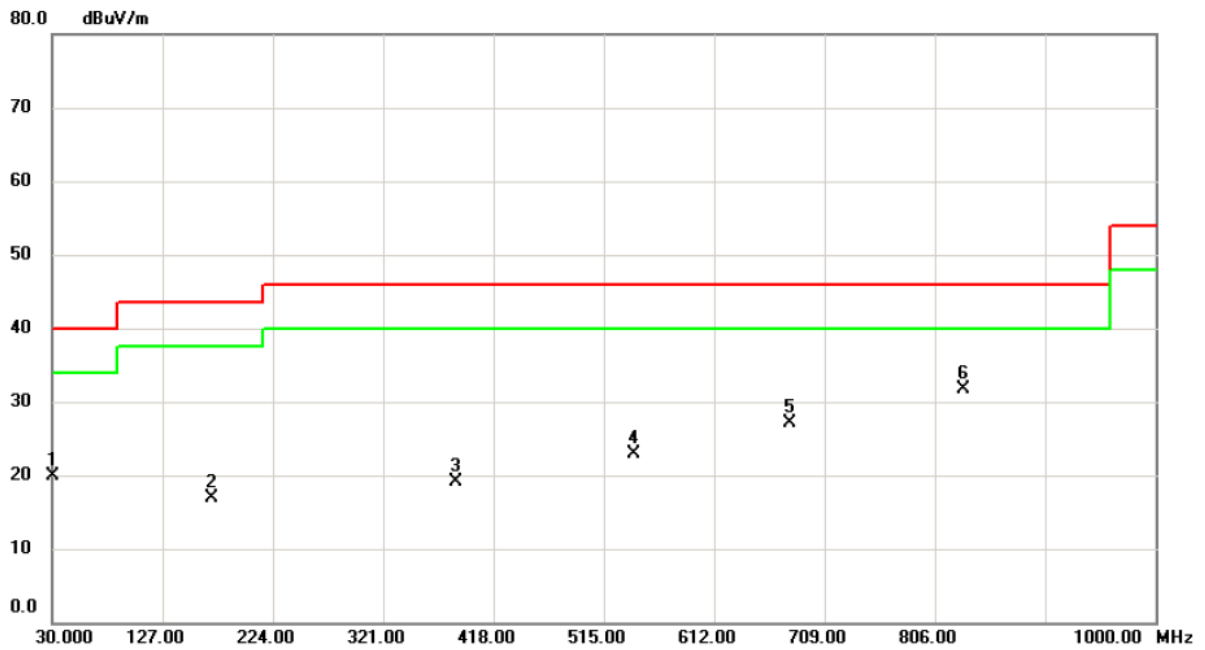
Test Mode: TX Mode\_2480MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		208.4800	31.25	-14.60	16.65	43.50	-26.85	peak	
2		323.9100	29.90	-10.67	19.23	46.00	-26.77	peak	
3		482.9900	32.18	-9.13	23.05	46.00	-22.95	peak	
4		617.8200	31.60	-6.03	25.57	46.00	-20.43	peak	
5		709.0000	30.64	-2.08	28.56	46.00	-17.44	peak	
6	*	901.0600	29.39	2.64	32.03	46.00	-13.97	peak	

Test Mode: TX Mode\_2480MHz

### Horizontal

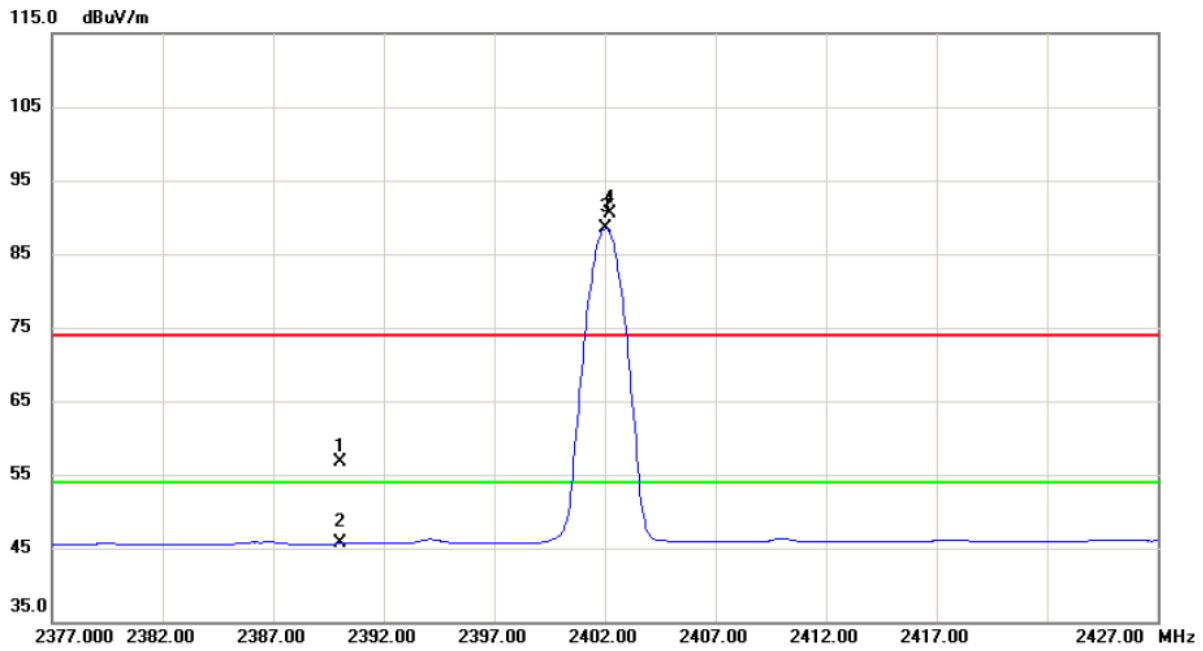


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	30.0000	33.85	-14.03	19.82	40.00	-20.18	peak	
2	170.6500	29.26	-12.29	16.97	43.50	-26.53	peak	
3	385.0200	27.94	-8.81	19.13	46.00	-26.87	peak	
4	541.1900	28.32	-5.46	22.86	46.00	-23.14	peak	
5	677.9600	30.04	-3.01	27.03	46.00	-18.97	peak	
6 *	831.2200	32.48	-0.69	31.79	46.00	-14.21	peak	

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

Test Mode TX Mode\_2402 MHz

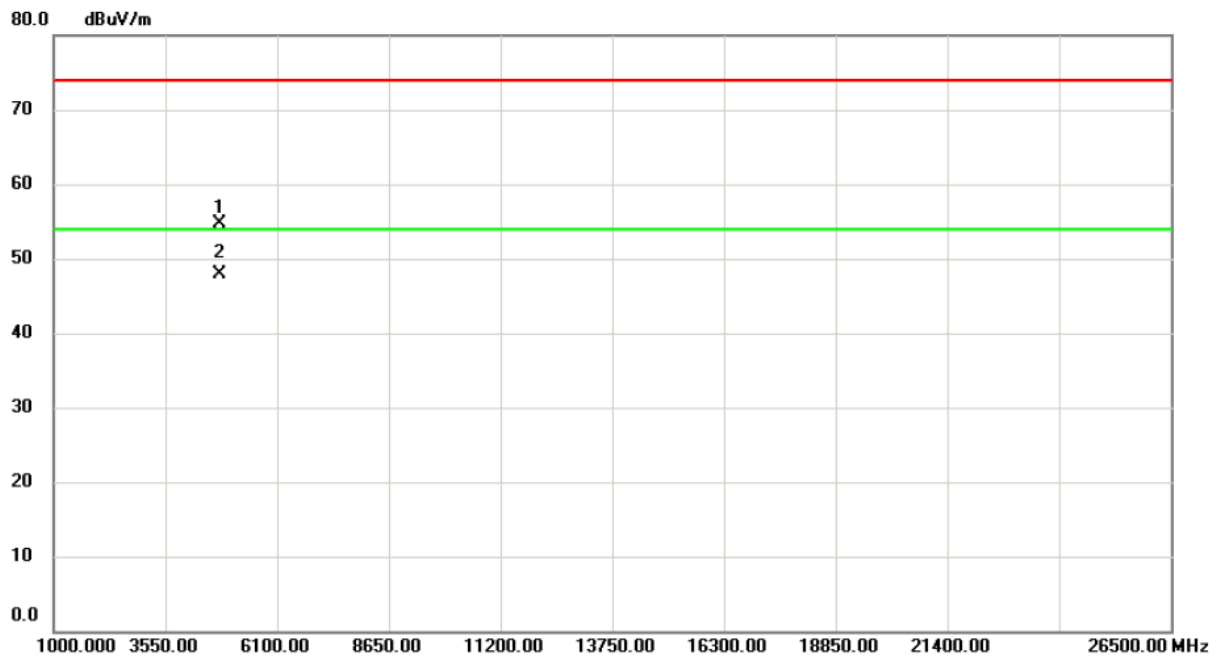
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	24.42	32.37	56.79	74.00	-17.21	peak	
2		2390.000	13.24	32.37	45.61	54.00	-8.39	AVG	
3	*	2402.050	56.03	32.42	88.45	54.00	34.45	AVG	No limit
4	X	2402.250	58.15	32.42	90.57	74.00	16.57	peak	No limit

Test Mode	TX Mode_2402 MHz
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### Vertical

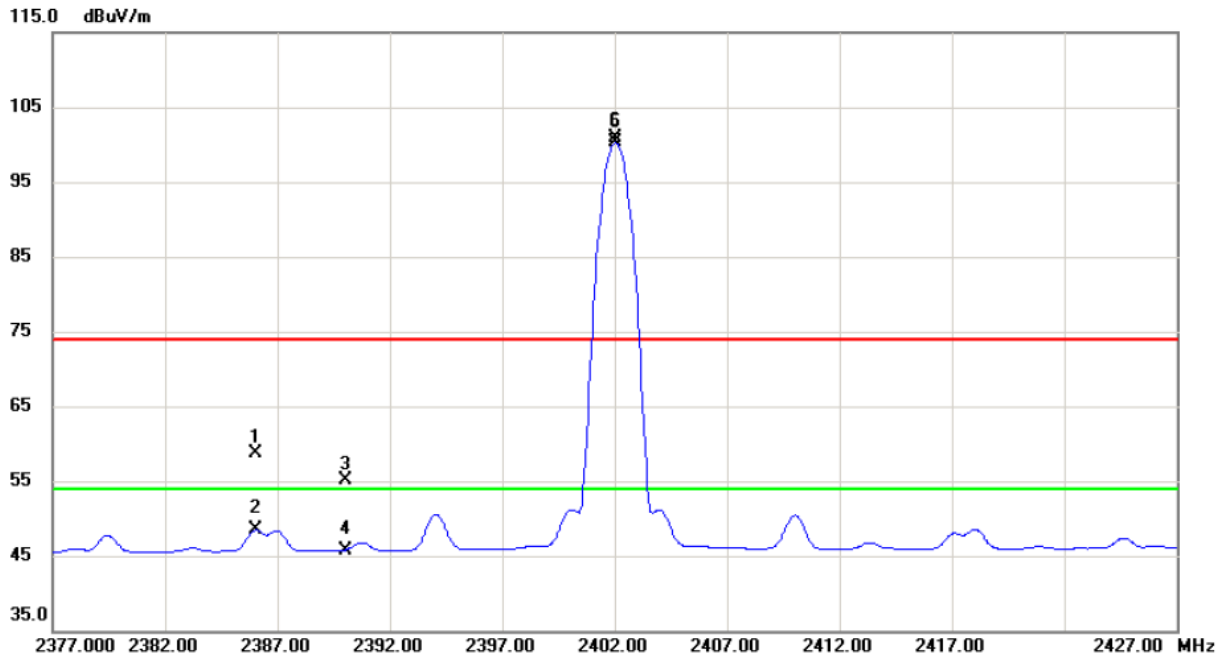


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4804.350	50.00	4.77	54.77	74.00	-19.23	peak	
2	*	4804.605	43.21	4.78	47.99	54.00	-6.01	AVG	



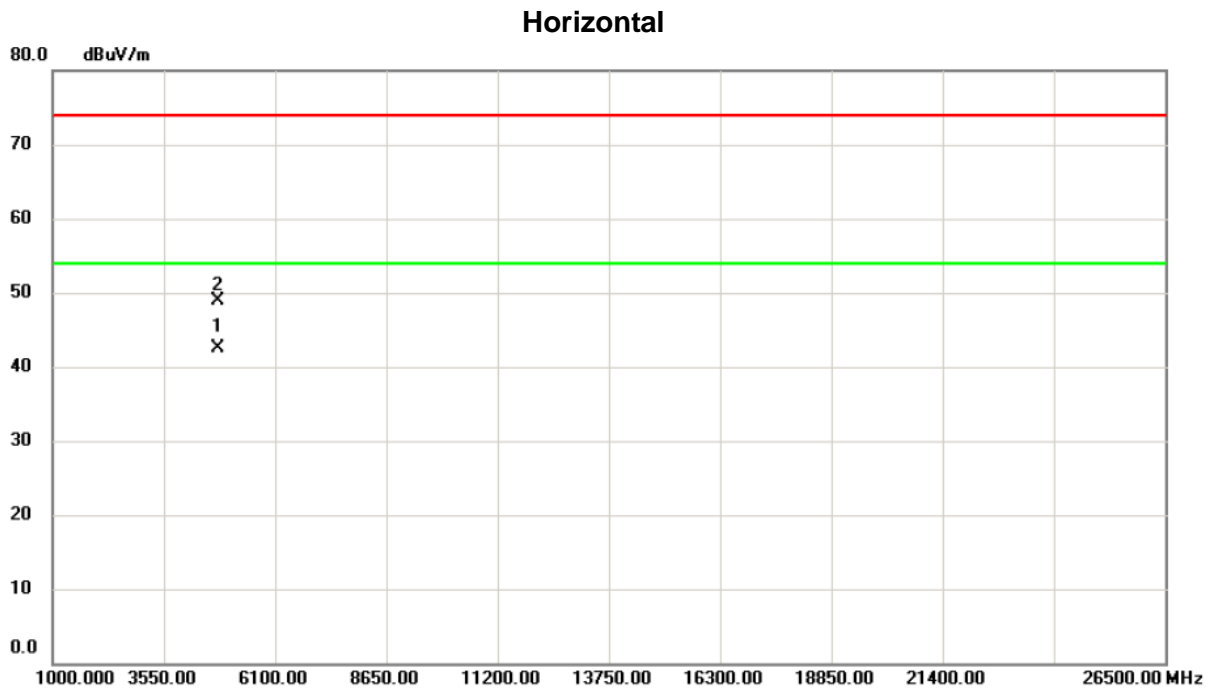
Test Mode TX Mode\_2402 MHz

### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2386.050	26.28	32.36	58.64	74.00	-15.36	peak	
2		2386.050	16.09	32.36	48.45	54.00	-5.55	AVG	
3		2390.000	22.72	32.37	55.09	74.00	-18.91	peak	
4		2390.000	13.40	32.37	45.77	54.00	-8.23	AVG	
5	X	2402.000	68.52	32.42	100.94	74.00	26.94	peak	No limit
6	*	2402.050	67.83	32.42	100.25	54.00	46.25	AVG	No limit

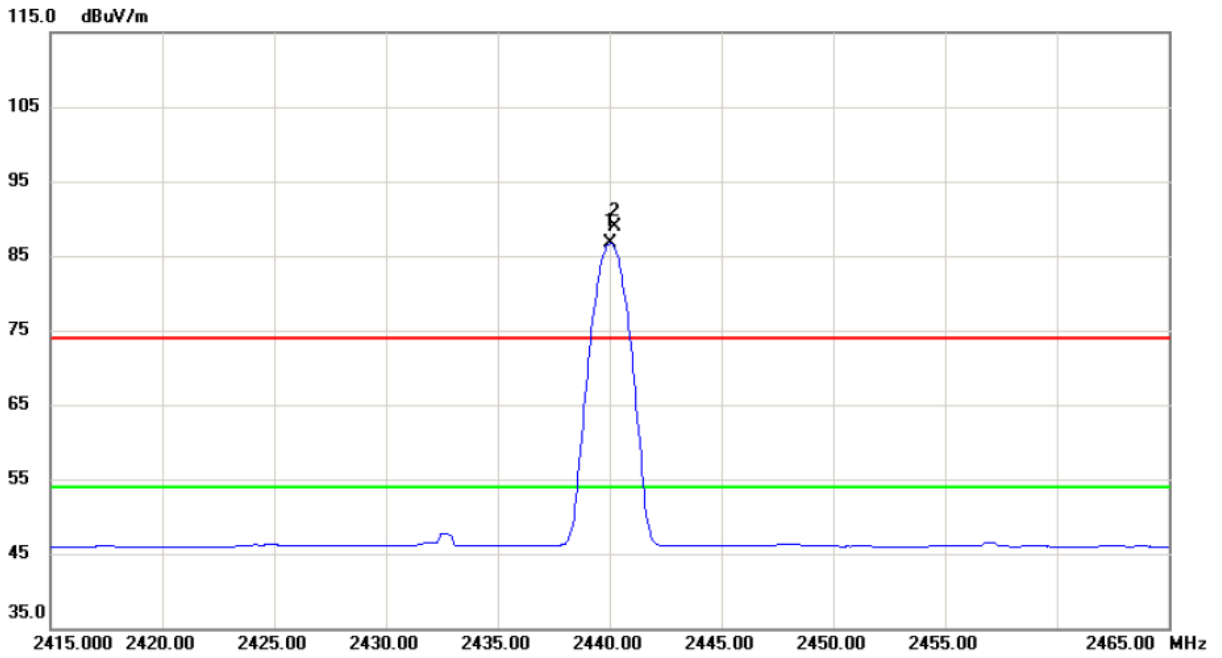
Test Mode	TX Mode_2402 MHz
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4804.320	37.70	4.77	42.47	54.00	-11.53	AVG	
2		4804.504	44.11	4.78	48.89	74.00	-25.11	peak	

Test Mode TX Mode\_2440 MHz

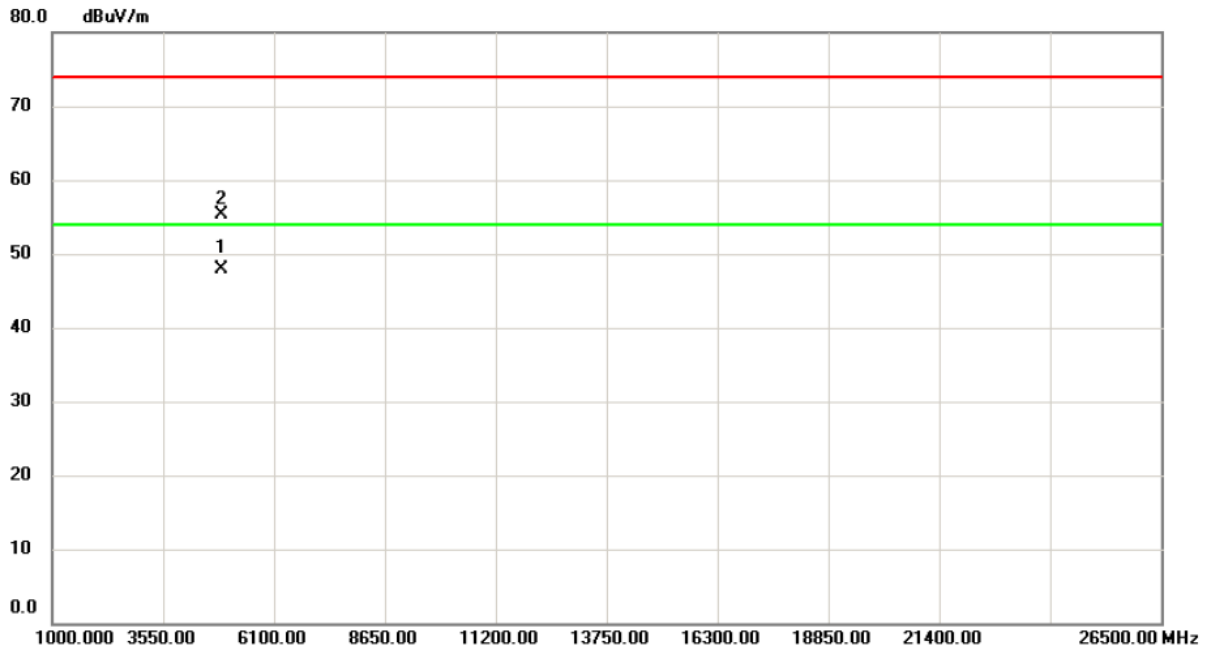
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2440.050	54.14	32.55	86.69	54.00	32.69	AVG	No limit
2	X	2440.250	56.30	32.55	88.85	74.00	14.85	peak	No limit

Test Mode	TX Mode_2440 MHz
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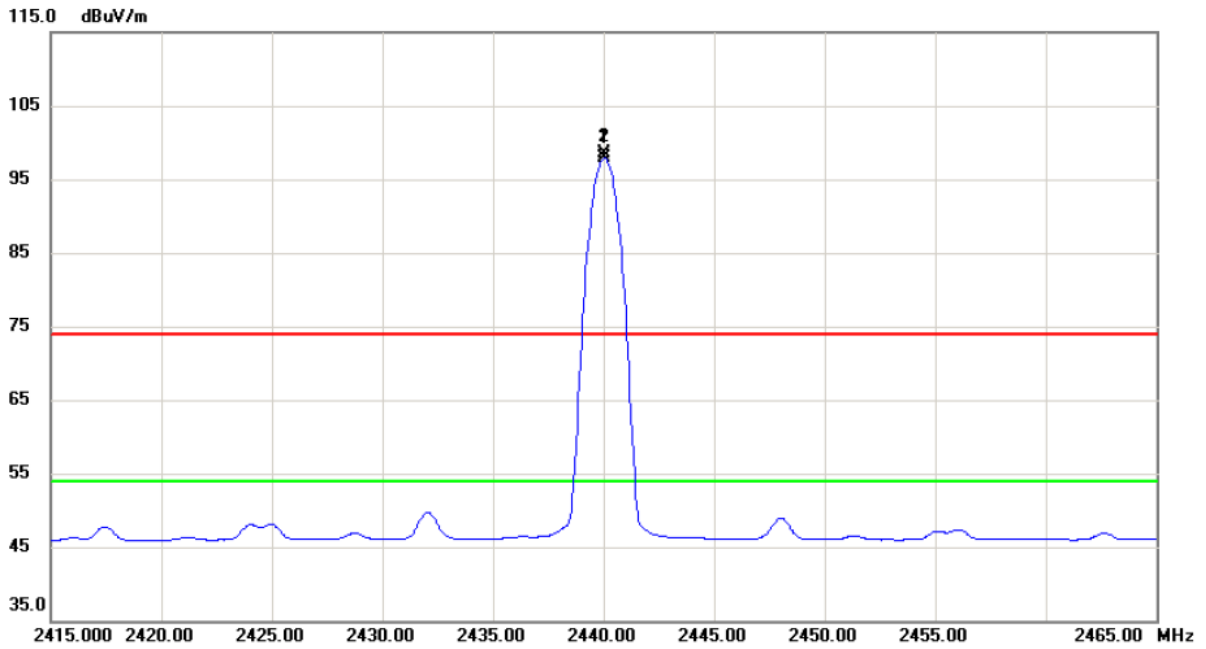
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4881.574	42.84	5.10	47.94	54.00	-6.06	AVG	
2		4881.957	50.12	5.10	55.22	74.00	-18.78	peak	

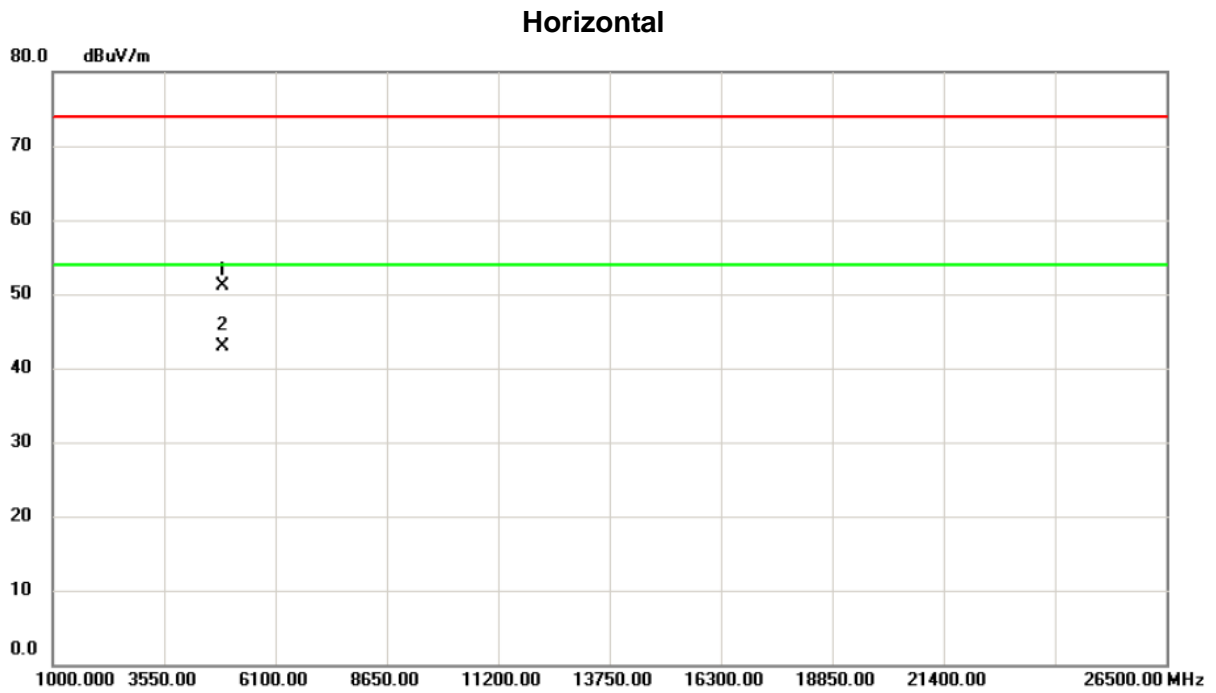
Test Mode TX Mode\_2440 MHz

**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2440.000	66.05	32.55	98.60	74.00	24.60	peak	No limit
2	*	2440.050	65.32	32.55	97.87	54.00	43.87	AVG	No limit

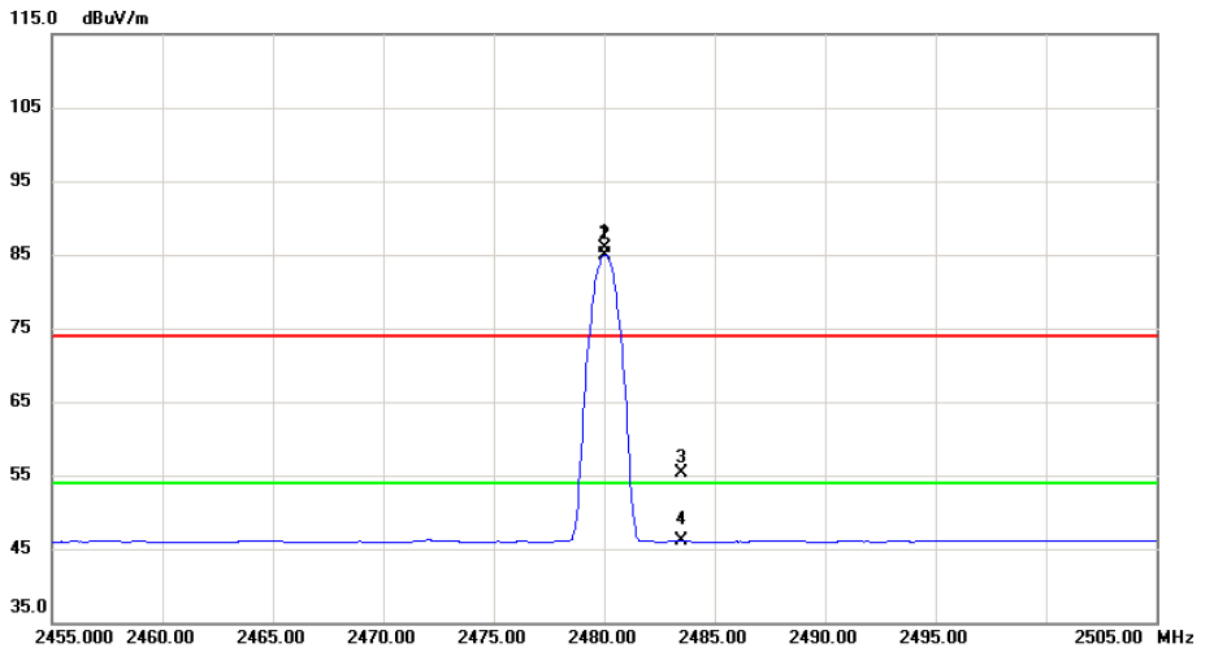
Test Mode	TX Mode_2440 MHz
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4881.057	45.91	5.10	51.01	74.00	-22.99	peak	
2	*	4881.354	37.78	5.10	42.88	54.00	-11.12	AVG	

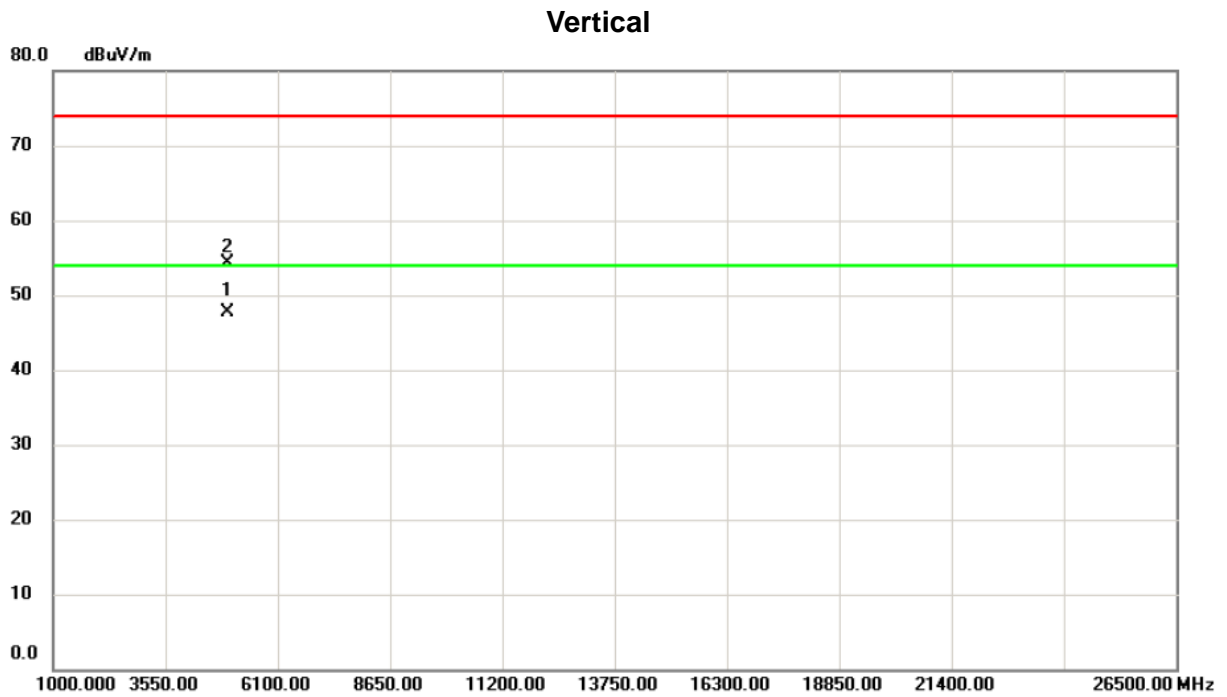
Test Mode	TX Mode_2480 MHz
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### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2480.000	53.22	32.70	85.92	74.00	11.92	peak	No limit
2	*	2480.050	52.29	32.70	84.99	54.00	30.99	AVG	No limit
3		2483.500	22.55	32.71	55.26	74.00	-18.74	peak	
4		2483.500	13.31	32.71	46.02	54.00	-7.98	AVG	

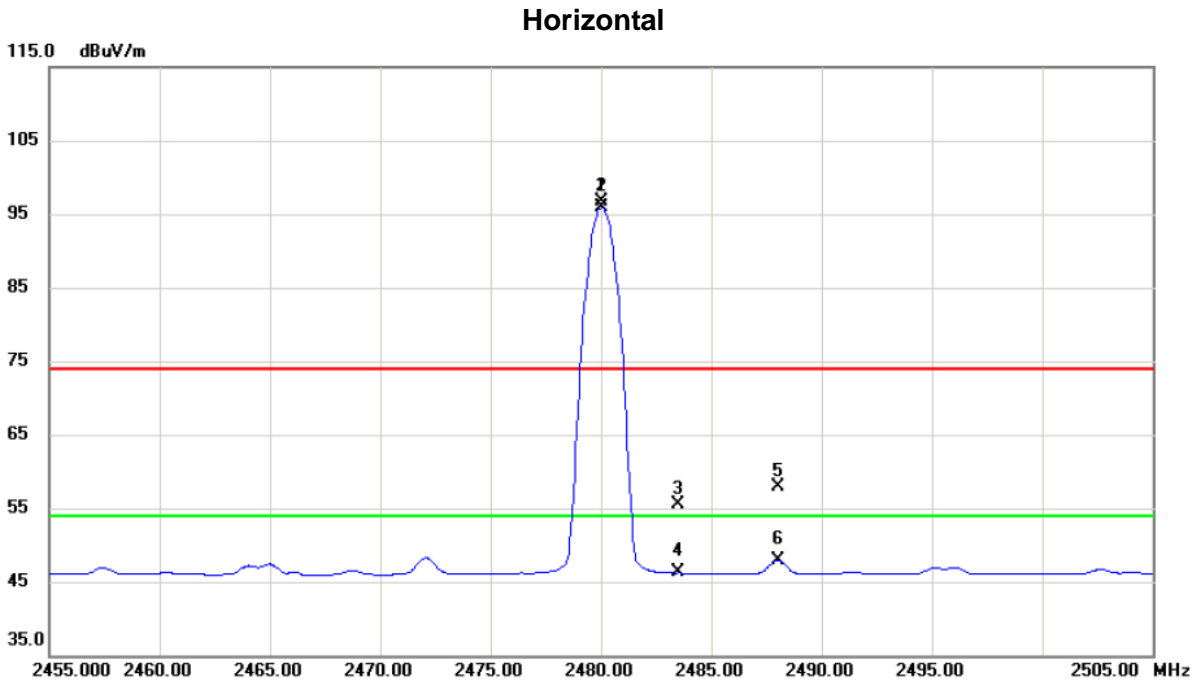
Test Mode	TX Mode_2480 MHz
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4960.543	42.21	5.44	47.65	54.00	-6.35	AVG	
2		4960.822	48.85	5.44	54.29	74.00	-19.71	peak	



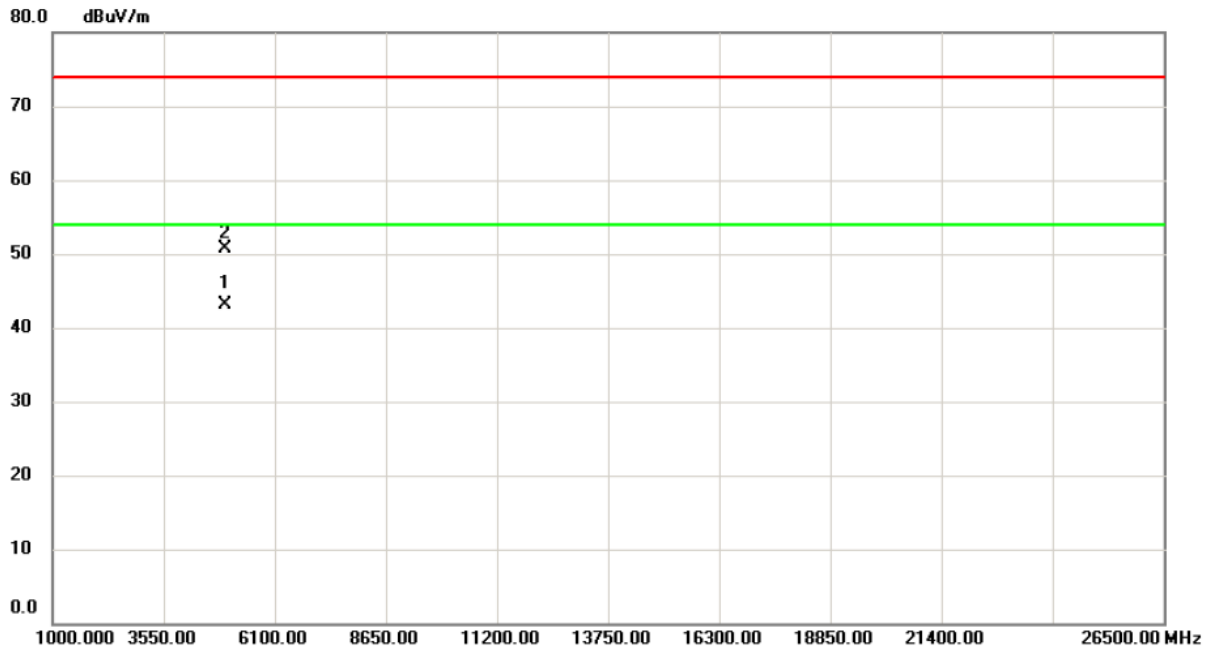
Test Mode TX Mode\_2480 MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2480.000	63.95	32.70	96.65	74.00	22.65	peak	No limit
2	*	2480.050	63.20	32.70	95.90	54.00	41.90	AVG	No limit
3		2483.500	22.73	32.71	55.44	74.00	-18.56	peak	
4		2483.500	13.49	32.71	46.20	54.00	-7.80	AVG	
5		2488.050	25.12	32.73	57.85	74.00	-16.15	peak	
6		2488.050	15.14	32.73	47.87	54.00	-6.13	AVG	

Test Mode	TX Mode_2480 MHz
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### Horizontal



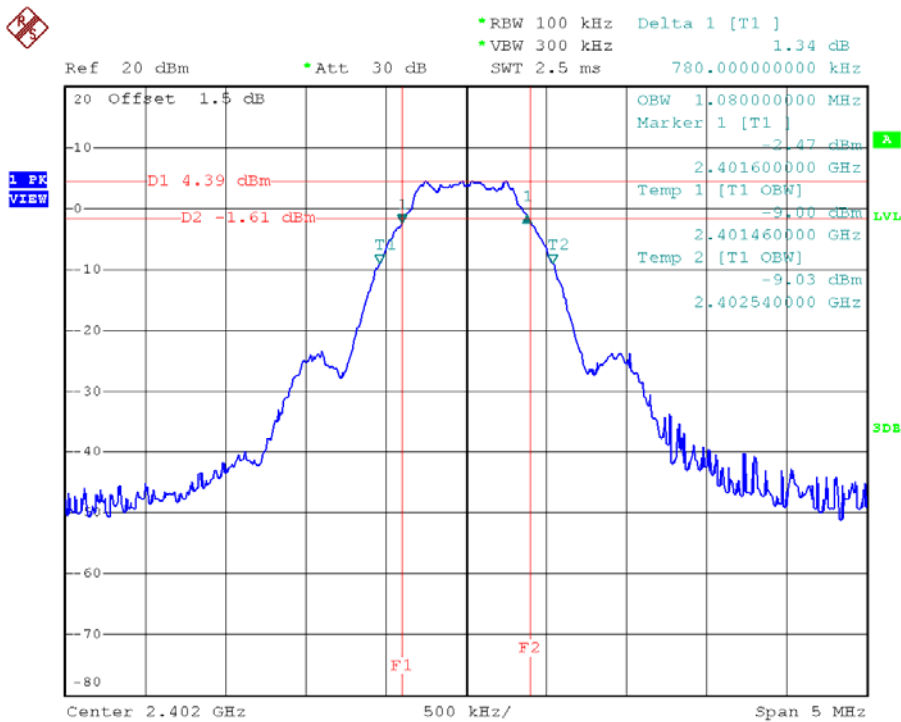
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4960.408	37.64	5.44	43.08	54.00	-10.92	AVG	
2		4960.967	45.25	5.44	50.69	74.00	-23.31	peak	

## ATTACHMENT E - BANDWIDTH

Test Mode:	TX Mode
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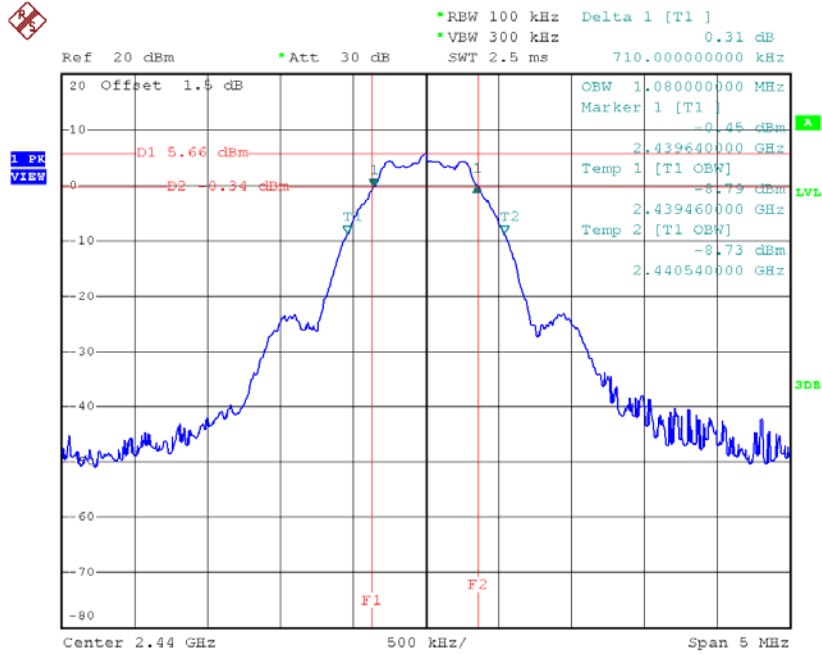
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2402	0.78	1.08	500	Complies
2440	0.71	1.08	500	Complies
2480	0.72	1.08	500	Complies

### TX CH01



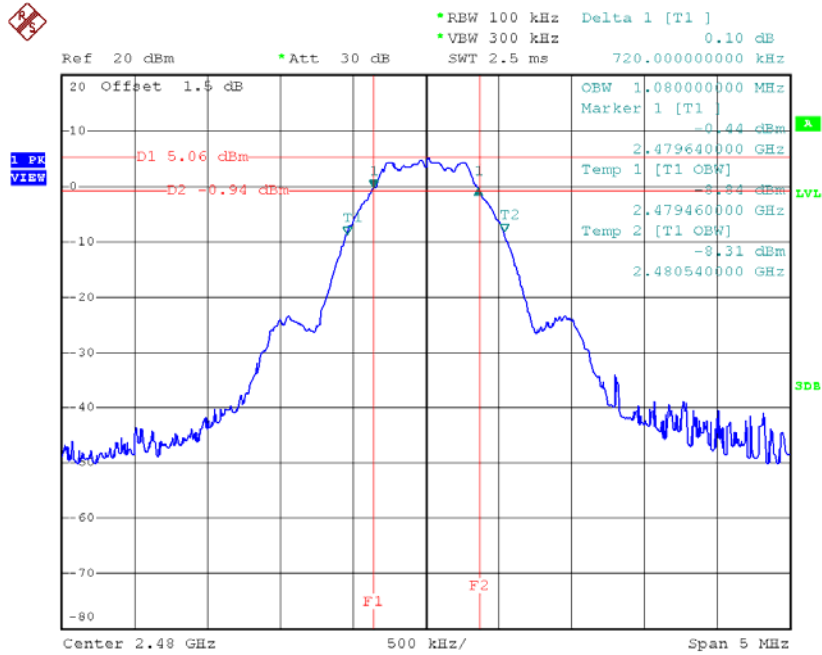
Date: 26.MAY.2017 14:15:19

**TX CH39**



Date: 26.MAY.2017 14:16:07

**TX CH79**

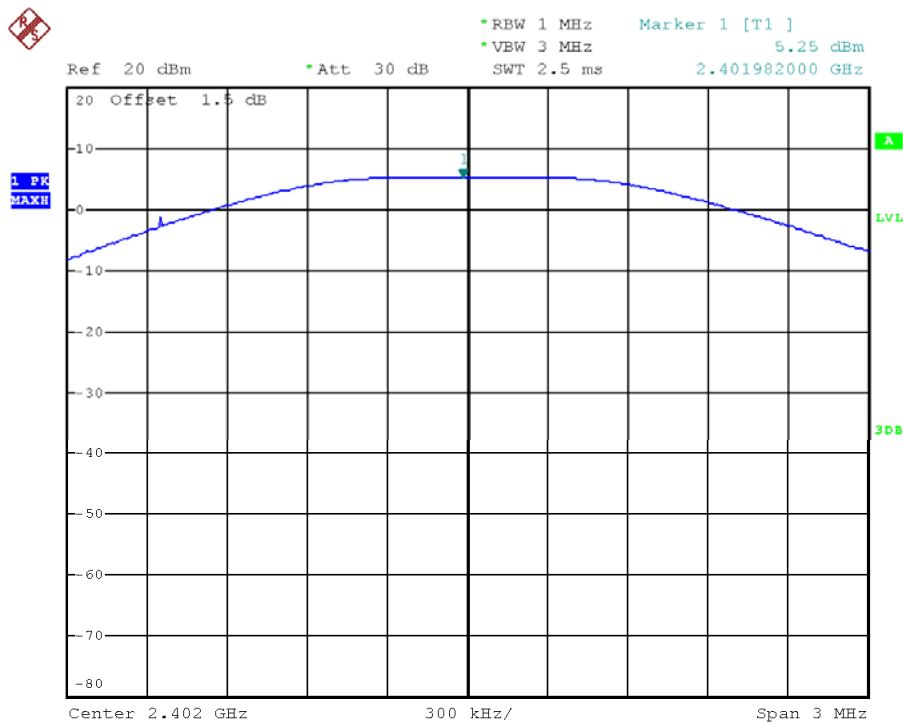


Date: 26.MAY.2017 14:14:09

## ATTACHMENT F - MAXIMUM OUTPUT POWER TEST

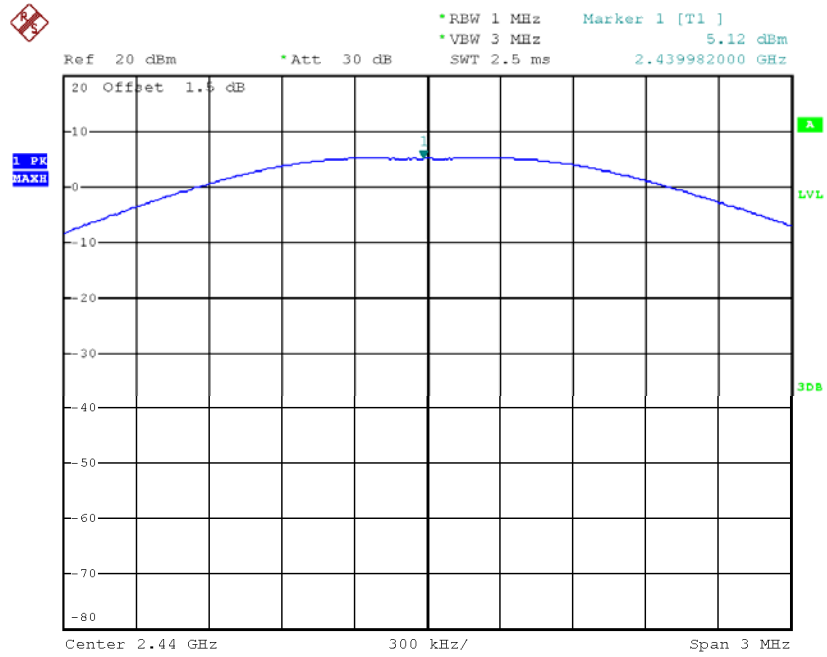
Test Mode					
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2402	5.25	0.0034	30.00	1.00	Complies
2440	5.12	0.0033	30.00	1.00	Complies
2480	5.13	0.0033	30.00	1.00	Complies

### TX CH01



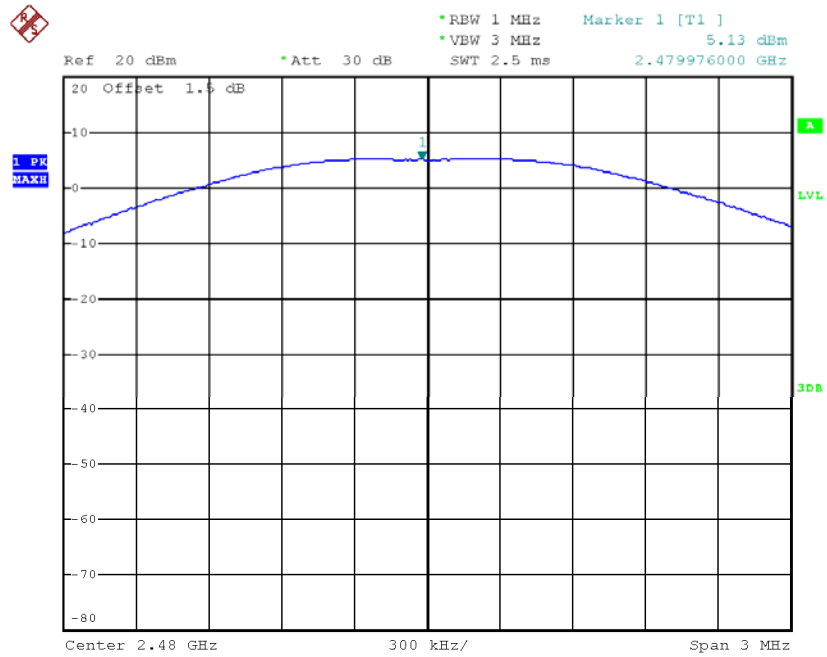
Date: 14.JUN.2017 16:19:08

### TX CH39



Date: 14.JUN.2017 16:20:16

### TX CH79



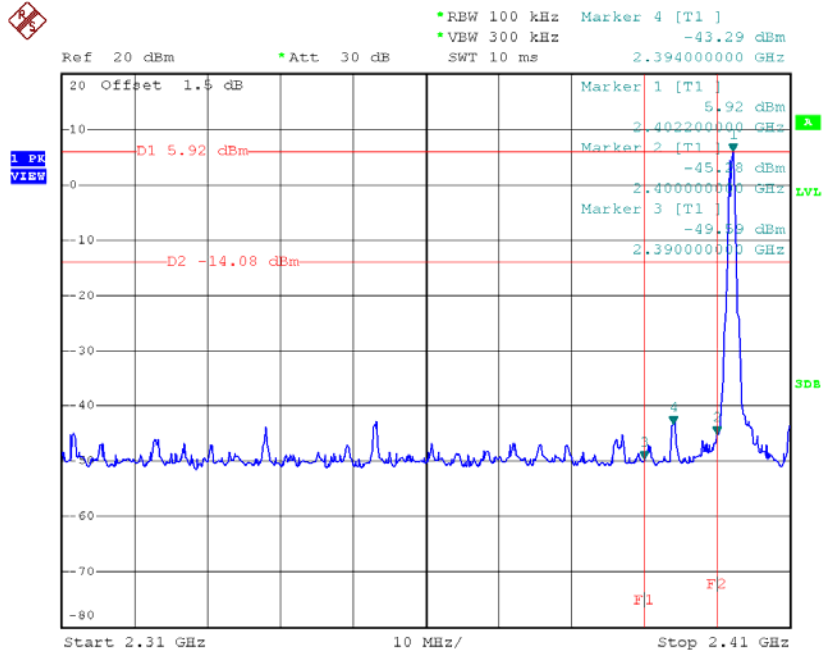
Date: 14.JUN.2017 16:20:38



# ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

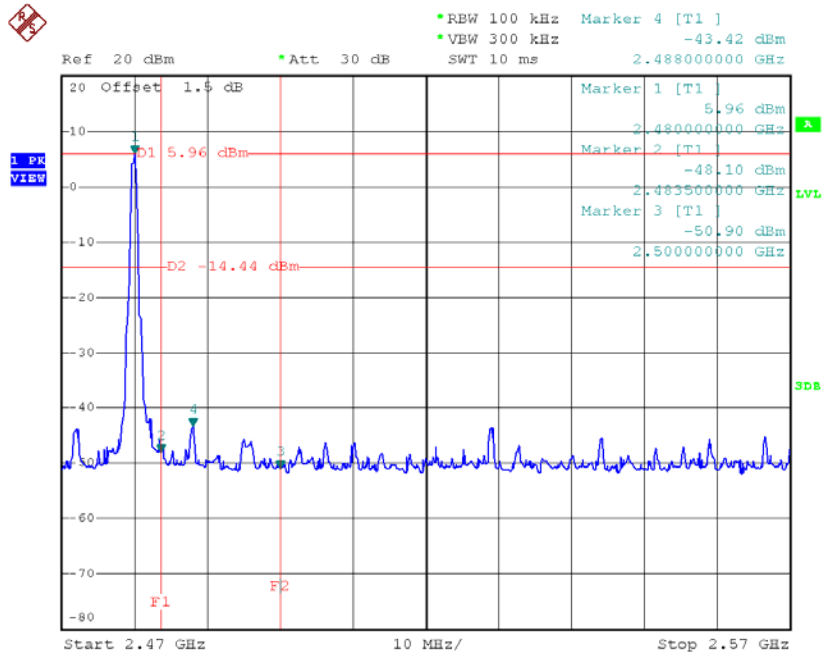
Test Mode : CH01, CH39 , CH79

**CH01 (Lower)**



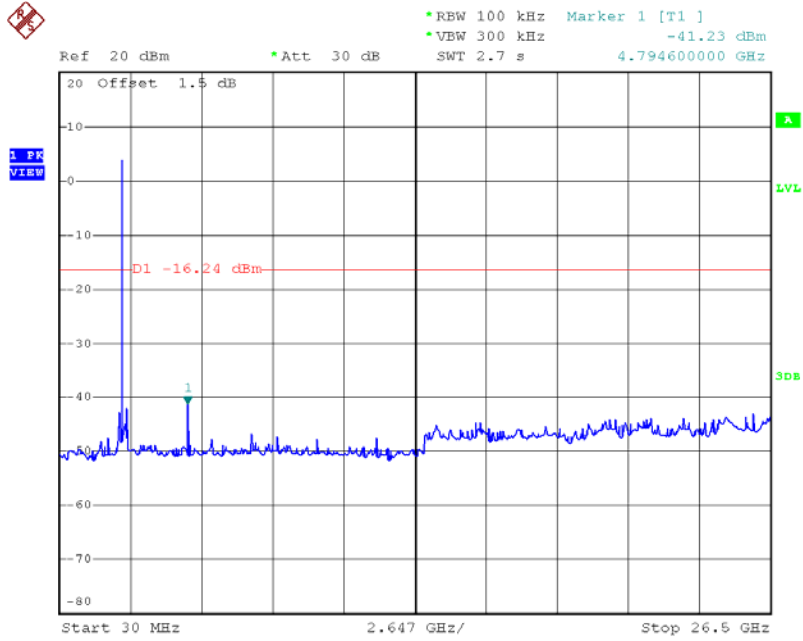
Date: 26.MAY.2017 14:24:19

**CH79 (upper)**



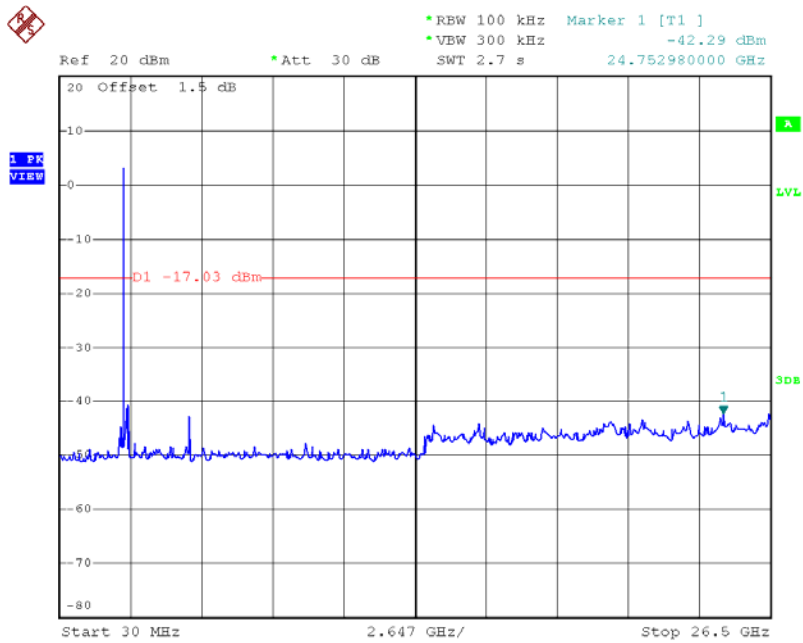
Date: 26.MAY.2017 14:27:39

### CH01 (10 Harmonic of the frequency)



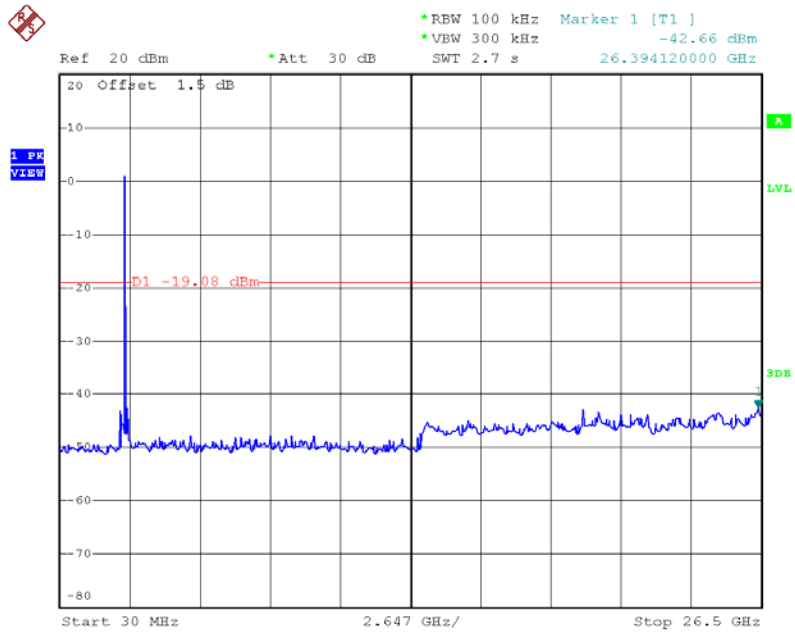
Date: 26.MAY.2017 14:32:08

### CH39 (10 Harmonic of the frequency)



Date: 26.MAY.2017 14:32:39

### CH79 (10 Harmonic of the frequency)



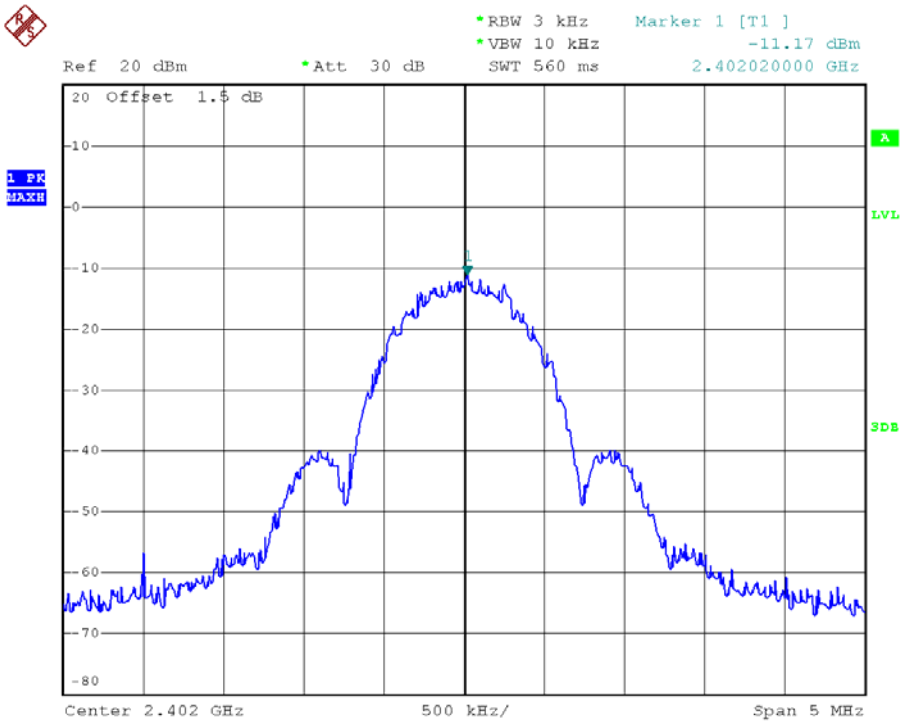
Date: 26.MAY.2017 14:33:17

## ATTACHMENT H - POWER SPECTRAL DENSITY TEST

Test Mode:	TX Mode
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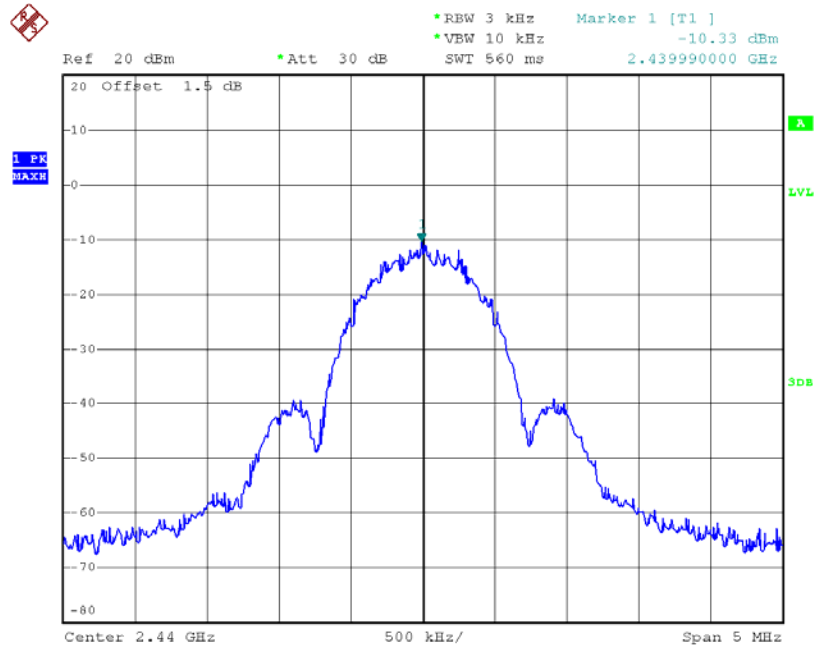
Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2402	-11.17	0.08	8.00	Complies
2440	-10.33	0.09	8.00	Complies
2480	-10.86	0.08	8.00	Complies

### TX CH01



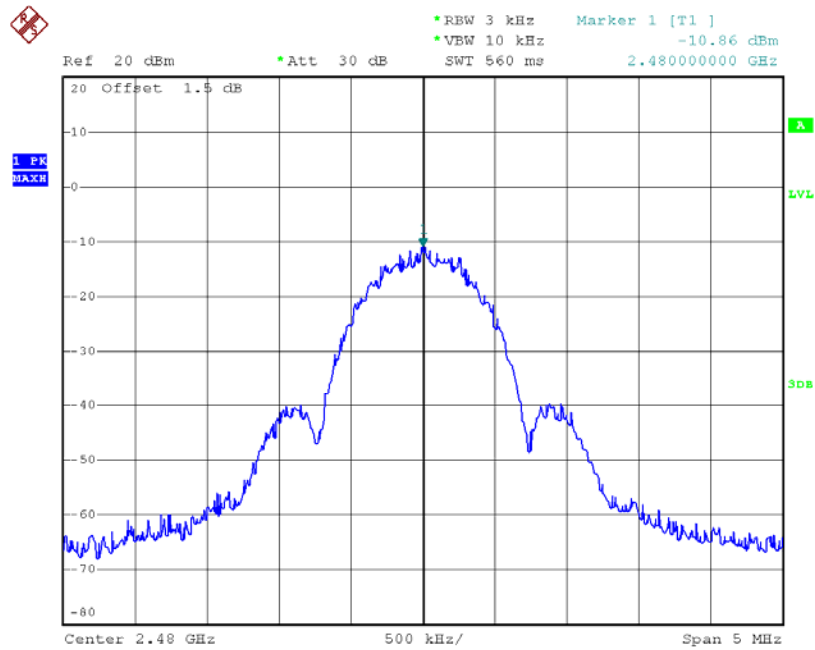
Date: 26.MAY.2017 14:12:05

### TX CH39



Date: 26.MAY.2017 14:12:21

### TX CH79



Date: 26.MAY.2017 14:12:32