

# FCC&IC Radio Test Report

**FCC ID: EMOT332**

**IC: 986B-T332**

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

**Project No.** : 1601C081  
**Equipment** : Bluetooth Dual Alarm AM/FM Clock Radio  
**Model Name for FCC** : T332, T332X, T332XC ("X" denote as color of cabinet)  
**Model Name for IC** : T332  
**Applicant** : SDI TECHNOLOGIES INC.  
**Address** : 1299 Main Street, Rahway, NJ 07065, U.S.A

**Date of Receipt** : Jan. 11, 2016  
**Date of Test** : Jan. 11, 2016 ~ Jan. 20, 2016  
**Issued Date** : Jan. 21, 2016  
**Tested by** : BTL Inc.

**Testing Engineer** : shawn xiao  
(Shawn Xiao)

**Technical Manager** : David Mao  
(David Mao)

**Authorized Signatory** : Steven Lu  
(Steven Lu)

**B T L I N C .**

No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

TEL: +86-769-8318-3000 FAX: +86-769-8319-6000

### **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 **CHINA**, or National Institute of Standards and Technology (**NIST**) of **U.S.A**.

**BTL**'s reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

**BTL**'s report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **BTL-self**, extracts from the test report shall not be reproduced except in full with **BTL**'s authorized written approval.

**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.

Table of Contents	Page
<b>1 . CERTIFICATION</b>	<b>7</b>
<b>2 . SUMMARY OF TEST RESULTS</b>	<b>8</b>
<b>2.1 TEST FACILITY</b>	<b>9</b>
<b>2.2 MEASUREMENT UNCERTAINTY</b>	<b>9</b>
<b>3 . GENERAL INFORMATION</b>	<b>10</b>
<b>3.1 GENERAL DESCRIPTION OF EUT</b>	<b>10</b>
<b>3.2 DESCRIPTION OF TEST MODES</b>	<b>12</b>
<b>3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING</b>	<b>12</b>
<b>3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED</b>	<b>13</b>
<b>3.5 DESCRIPTION OF SUPPORT UNITS</b>	<b>13</b>
<b>4 . EMC EMISSION TEST</b>	<b>14</b>
<b>4.1 CONDUCTED EMISSION MEASUREMENT</b>	<b>14</b>
<b>4.1.1 POWER LINE CONDUCTED EMISSION LIMITS</b>	<b>14</b>
<b>4.1.2 TEST PROCEDURE</b>	<b>14</b>
<b>4.1.3 DEVIATION FROM TEST STANDARD</b>	<b>14</b>
<b>4.1.4 TEST SETUP</b>	<b>15</b>
<b>4.1.5 EUT OPERATING CONDITIONS</b>	<b>15</b>
<b>4.1.6 EUT TEST CONDITIONS</b>	<b>15</b>
<b>4.1.7 TEST RESULTS</b>	<b>15</b>
<b>4.2 RADIATED EMISSION MEASUREMENT</b>	<b>16</b>
<b>4.2.1 RADIATED EMISSION LIMITS</b>	<b>16</b>
<b>4.2.2 TEST PROCEDURE</b>	<b>17</b>
<b>4.2.3 DEVIATION FROM TEST STANDARD</b>	<b>17</b>
<b>4.2.4 TEST SETUP</b>	<b>18</b>
<b>4.2.5 EUT OPERATING CONDITIONS</b>	<b>19</b>
<b>4.2.6 EUT TEST CONDITIONS</b>	<b>19</b>
<b>4.2.7 TEST RESULTS (9KHZ TO 30MHZ)</b>	<b>19</b>
<b>4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)</b>	<b>20</b>
<b>4.2.9 TEST RESULTS (ABOVE 1000 MHZ)</b>	<b>20</b>
<b>5 . NUMBER OF HOPPING CHANNEL</b>	<b>21</b>
<b>5.1 APPLIED PROCEDURES</b>	<b>21</b>
<b>5.1.1 TEST PROCEDURE</b>	<b>21</b>
<b>5.1.2 DEVIATION FROM STANDARD</b>	<b>21</b>
<b>5.1.3 TEST SETUP</b>	<b>21</b>
<b>5.1.4 EUT OPERATION CONDITIONS</b>	<b>21</b>
<b>5.1.5 EUT TEST CONDITIONS</b>	<b>21</b>
<b>5.1.6 TEST RESULTS</b>	<b>21</b>

Table of Contents	Page
<b>6 . AVERAGE TIME OF OCCUPANCY</b>	<b>22</b>
<b>6.1 APPLIED PROCEDURES / LIMIT</b>	<b>22</b>
<b>6.1.1 TEST PROCEDURE</b>	22
<b>6.1.2 DEVIATION FROM STANDARD</b>	22
<b>6.1.3 TEST SETUP</b>	22
<b>6.1.4 EUT OPERATION CONDITIONS</b>	23
<b>6.1.5 EUT TEST CONDITIONS</b>	23
<b>6.1.6 TEST RESULTS</b>	23
<b>7 . HOPPING CHANNEL SEPARATION MEASUREMENT</b>	<b>24</b>
<b>7.1 APPLIED PROCEDURES / LIMIT</b>	<b>24</b>
<b>7.1.1 TEST PROCEDURE</b>	24
<b>7.1.2 DEVIATION FROM STANDARD</b>	24
<b>7.1.3 TEST SETUP</b>	24
<b>7.1.4 EUT TEST CONDITIONS</b>	24
<b>7.1.5 TEST RESULTS</b>	24
<b>8 . BANDWIDTH TEST</b>	<b>25</b>
<b>8.1 APPLIED PROCEDURES</b>	<b>25</b>
<b>8.1.1 TEST PROCEDURE</b>	25
<b>8.1.2 DEVIATION FROM STANDARD</b>	25
<b>8.1.3 TEST SETUP</b>	25
<b>8.1.4 EUT OPERATION CONDITIONS</b>	25
<b>8.1.5 EUT TEST CONDITIONS</b>	25
<b>8.1.6 TEST RESULTS</b>	25
<b>9 . PEAK OUTPUT POWER TEST</b>	<b>26</b>
<b>9.1 APPLIED PROCEDURES / LIMIT</b>	<b>26</b>
<b>9.1.1 TEST PROCEDURE</b>	26
<b>9.1.2 DEVIATION FROM STANDARD</b>	26
<b>9.1.3 TEST SETUP</b>	26
<b>9.1.4 EUT OPERATION CONDITIONS</b>	26
<b>9.1.5 EUT TEST CONDITIONS</b>	26
<b>9.1.6 TEST RESULTS</b>	26
<b>10 . ANTENNA CONDUCTED SPURIOUS EMISSION</b>	<b>27</b>
<b>10.1 APPLIED PROCEDURES / LIMIT</b>	<b>27</b>
<b>10.1.1 TEST PROCEDURE</b>	27
<b>10.1.2 DEVIATION FROM STANDARD</b>	27
<b>10.1.3 TEST SETUP</b>	27
<b>10.1.4 EUT OPERATION CONDITIONS</b>	27
<b>10.1.5 EUT TEST CONDITIONS</b>	27
<b>10.1.6 TEST RESULTS</b>	27
<b>11 . MEASUREMENT INSTRUMENTS LIST</b>	<b>28</b>

Table of Contents	Page
<b>12 . EUT TEST PHOTO</b>	<b>30</b>
<b>ATTACHMENT A - CONDUCTED EMISSION</b>	<b>34</b>
<b>ATTACHMENT B - RADIATED EMISSION (9KHZ-30MHZ)</b>	<b>37</b>
<b>ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)</b>	<b>39</b>
<b>ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)</b>	<b>46</b>
<b>ATTACHMENT E - NUMBER OF HOPPING CHANNEL</b>	<b>71</b>
<b>ATTACHMENT F - AVERAGE TIME OF OCCUPANCY</b>	<b>73</b>
<b>ATTACHMENT G - HOPPING CHANNEL SEPARATION MEASUREMENT</b>	<b>86</b>
<b>ATTACHMENT H - BANDWIDTH</b>	<b>91</b>
<b>ATTACHMENT I - PEAK OUTPUT POWER</b>	<b>96</b>
<b>ATTACHMENT J - ANTENNA CONDUCTED SPURIOUS EMISSION</b>	<b>101</b>

**REPORT ISSUED HISTORY**

Issued No.	Description	Issued Date
BTL-FICP-1-1601C081	Original Issue.	Jan. 21, 2016

## 1. CERTIFICATION

Equipment : Bluetooth Dual Alarm AM/FM Clock Radio  
Brand Name : TIMEX  
Model Name : T332, T332X, T332XC ("X" denote as color of cabinet)  
for FCC  
Model Name : T332  
for IC  
Applicant : SDI TECHNOLOGIES INC.  
Manufacturer : SDI TECHNOLOGIES INC.  
Address : 1299 Main Street, Rahway, NJ 07065, U.S.A  
Date of Test : Jan. 11, 2016 ~ Jan. 20, 2016  
Test Sample : Engineering Sample  
Standard(s) : FCC Part15, Subpart C (15.247)/ ANSI C63.10-2013  
RSS-247 Issue 1, May 2015  
RSS-GEN Issue 4, Nov 2014

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-FICP-1-1601C081) 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):

<b>Applied Standard(s): 47 CFR Part 15, Subpart C RSS-247 Issue 1, May 2015, RSS-GEN Issue 4, Nov 2014</b>				
Standard(s) Section		Test Item	Judgment	Remark
FCC	IC			
15.207	RSS-GEN 8.8	Conducted Emission	PASS	
15.247(d)	RSS-247 5.5	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)	RSS-247 5.1 (2)	Hopping Channel Separation	PASS	
15.247(a)(1)	RSS-247 5.1 (1)	Bandwidth	PASS	
15.247 (b)(1)	RSS-247 5.4 (2)	Peak Output Power	PASS	
15.247(d) 15.209	RSS-247 5.5	Radiated Spurious Emission	PASS	
15.247 (a)(1)(iii)	RSS-247 5.1 (4)	Number of Hopping Frequency	PASS	
15.247 (a)(1)(iii)	RSS-247 5.1 (4)	Dwell Time	PASS	
15.205	RSS-GEN 8.10	Restricted Bands	PASS	
15.203	-	Antenna Requirement	PASS	

Note:

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

## 2.1 TEST FACILITY

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

BTL's test firm number for FCC: 319330

BTL's test firm number for IC: 4428B-1

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

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 (3m)	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	Bluetooth Dual Alarm AM/FM Clock Radio	
Brand Name	TIMEX	
Model Name for FCC	T332, T332X, T332XC	
Model Name for IC	T332	
Model Difference	"X" denote as color of cabinet	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK(1Mbps) $\pi/4$ -DQPSK(2Mbps) 8-DPSK(3Mbps)
	Bit Rate of Transmitter	
	Output Power Max.	-0.16 dBm(1Mbps) -1.29 dBm(3Mbps)
Power Source	#1 AC Mains #2 Supplied from 2*AAA battery.	
Power Rating	#1 AC 120V/60Hz #2 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)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

## 3 Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed	N/A	1.3

### 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>

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

For Conducted Emission	
Final Test Mode	Description
Mode 1	TX Mode

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

**Note:**

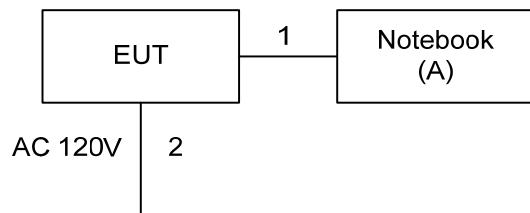
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

### 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 FHSS

Test Software Version	BK3256 RF Test_V1.3		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	3.00	3.00	3.00
Parameters(3Mbps)	3.00	3.00	3.00

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



Note: EUT connects to notebook via fixture cable for setup only.

### 3.5 DESCRIPTION OF SUPPORT UNITS

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

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
A	Notebook	DELL	INSPIRON 1420	DOC	JX193A01SDC2

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.5m	AC Cable
2	NO	NO	0.45m	Fixture 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

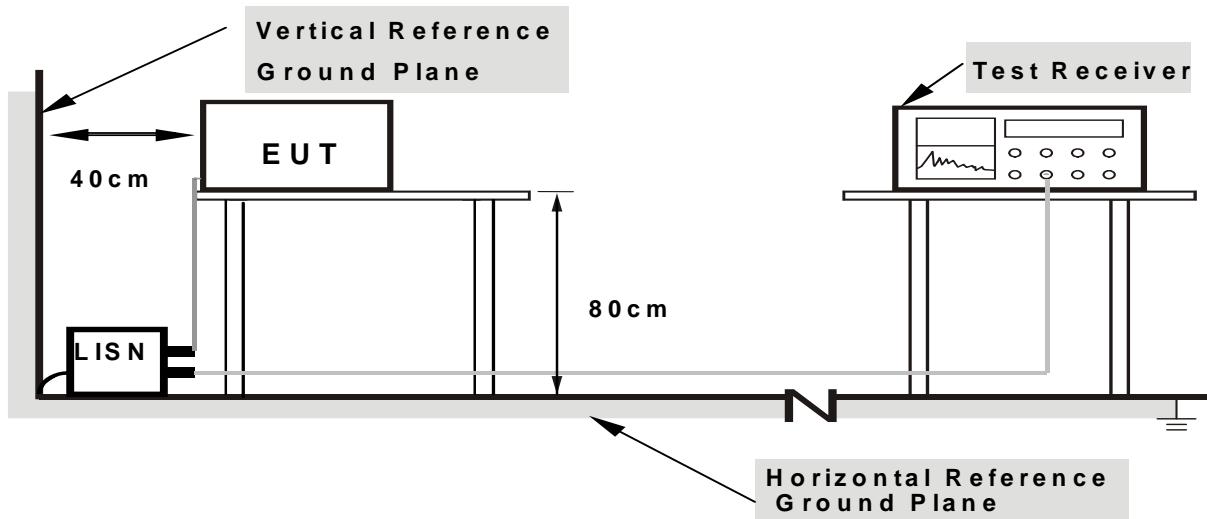
#### 4.1.2 TEST PROCEDURE

- 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 equipment 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 function (as a customer would normally use it), EUT was programmed to be in continuously transmitting/receiving data or hopping on mode.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: 20°C   Relative Humidity: 65%   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.

## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9KHz -1000MHz)

In case the emission fall within the restricted band specified on 15.205(a) & RSS-247 5.5, then the 15.209(a) & RSS-Gen limit in the table below has to be followed.

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)	dB(uV/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 (dB<sub>B</sub>uV/m) = 20log Emission level (uV/m).
- (4) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)

Margin Level = Measurement Value - Limit Value

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

Spectrum 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

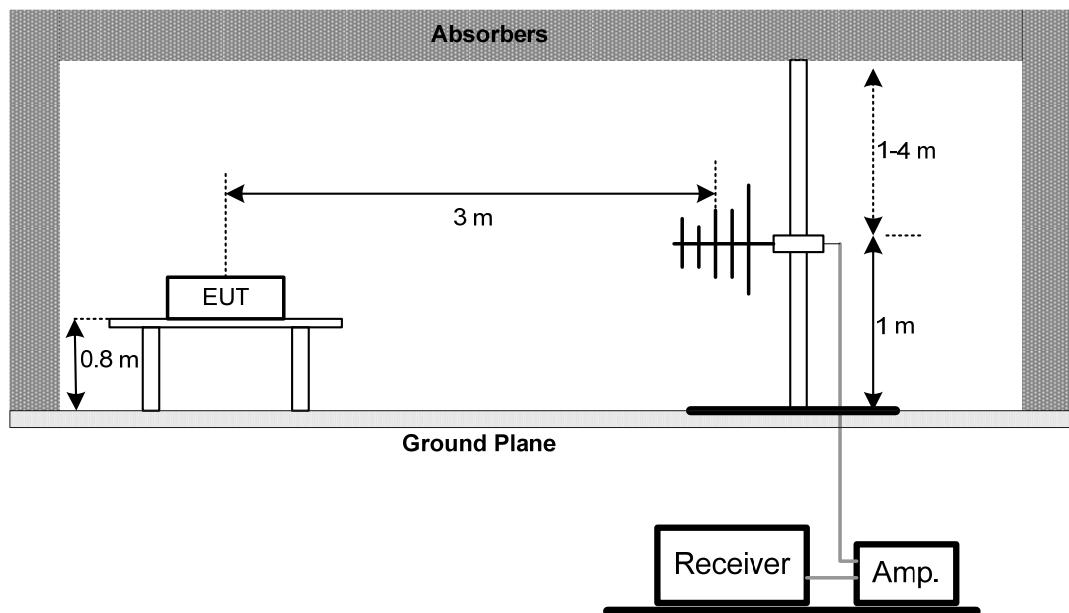
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of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

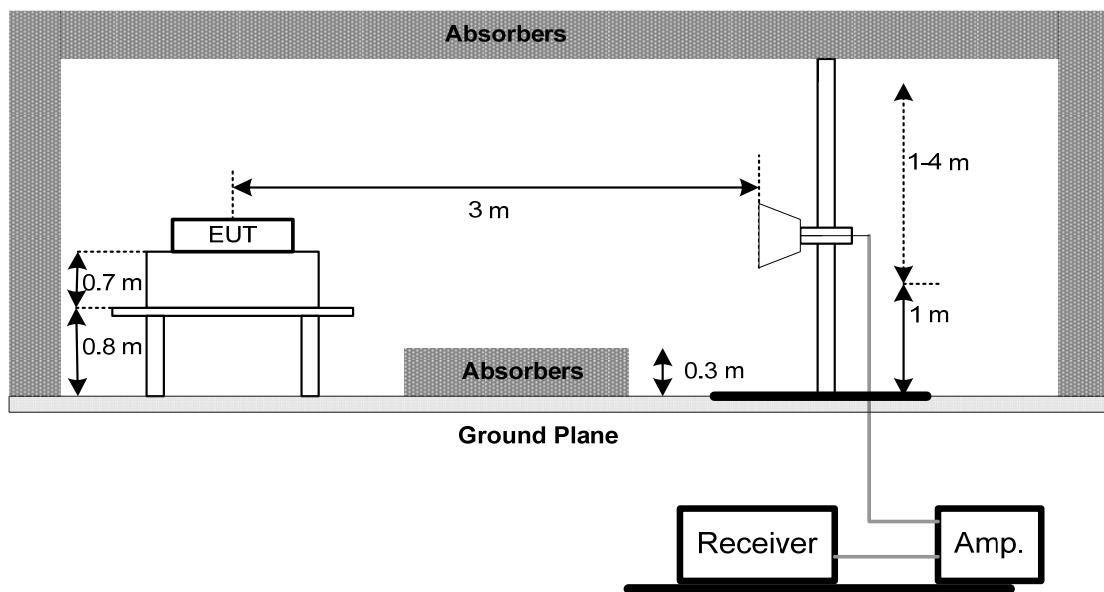
No deviation

#### 4.2.4 TEST SETUP

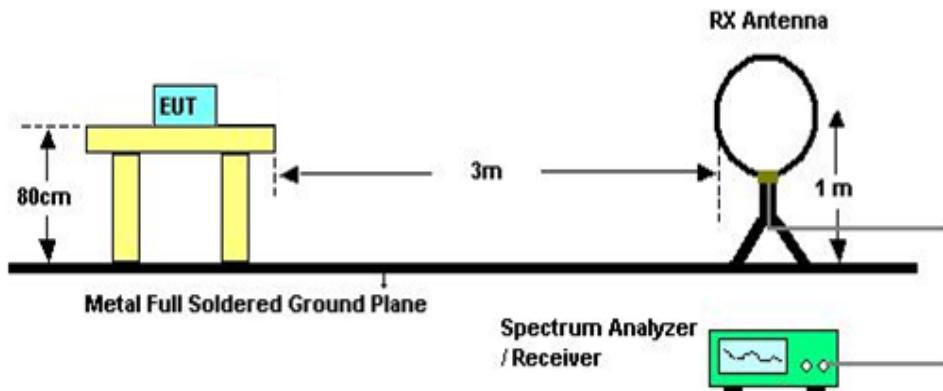
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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: 20°C   Relative Humidity: 65%   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) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
- (2) 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.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) 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) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (2) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (3) EUT Orthogonal Axis:  
"X" - denotes Laid on Table; "Y" - denotes Vertical Stand; "Z" - denotes Side Stand
- (4) 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
- (5) No limit: This is fundamental signal, the judgment is not applicable.  
For fundamental signal judgment was referred to Peak output test.

## 5. NUMBER OF HOPPING CHANNEL

### 5.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C/ RSS-GEN and RSS-247

Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(1)(iii) RSS-247 5.1 (4)	Number of Hopping Channel	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RBW	100 KHz
VBW	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

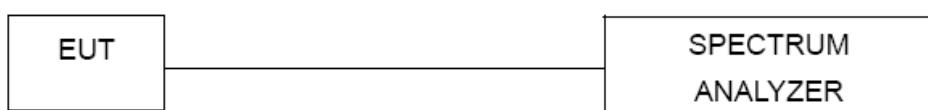
#### 5.1.1 TEST PROCEDURE

- 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=100KHz, Sweep time = Auto.

#### 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: 20°C   Relative Humidity: 65%   Test Voltage: AC 120V/60Hz

#### 5.1.6 TEST RESULTS

Please refer to the Attachment E

## 6. AVERAGE TIME OF OCCUPANCY

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/ RSS-GEN and RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)(iii) RSS-247 5.1 (4)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

#### 6.1.1 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum  $1600 / 79 / 6 = 3.37$  hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times  $3.37 \times 31.6 = 106.6$  within 31.6 seconds.
- j. DH3 Packet permit maximum  $1600 / 79 / 4 = 5.06$  hops per second in each channel (3 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times  $5.06 \times 31.6 = 160$  within 31.6 seconds.
- k. DH1 Packet permit maximum  $1600 / 79 / 2 = 10.12$  hops per second in each channel (1 time slot TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times  $10.12 \times 31.6 = 320$  within 31.6 seconds.

#### 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: 20°C   Relative Humidity: 65%   Test Voltage: AC 120V/60Hz

#### **6.1.6 TEST RESULTS**

Please refer to the Attachment F

## 7. HOPPING CHANNEL SEPARATION MEASUREMENT

### 7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 KHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RBW	30 KHz
VBW	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

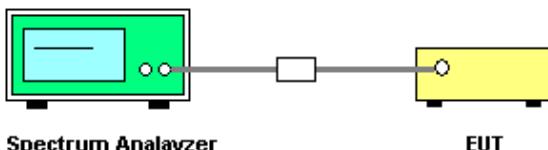
#### 7.1.1 TEST PROCEDURE

- a. The EUT must have its hopping function enabled
- b. Span = wide enough to capture the peaks of two adjacent channels
  - Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span
  - Video (or Average) Bandwidth (VBW)  $\geq$  RBW
  - Sweep = Auto
  - Detector function = Peak
  - Trace = Max Hold

#### 7.1.2 DEVIATION FROM STANDARD

No deviation.

#### 7.1.3 TEST SETUP



#### 7.1.4 EUT TEST CONDITIONS

Temperature: 20°C   Relative Humidity: 65%   Test Voltage: AC 120V/60Hz

#### 7.1.5 TEST RESULTS

Please refer to the Attachment G

## 8. BANDWIDTH TEST

### 8.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C/ RSS-GEN and RSS-247		
Section	Test Item	Frequency Range (MHz)
15.247(a)(2) RSS-GEN 6.6 RSS-247 5.1 (1)	Bandwidth	2400-2483.5

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RBW	30 KHz (20dB Bandwidth) / 30 KHz (Channel Separation)
VBW	100 KHz (20dB Bandwidth) / 100 KHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 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= 30KHz, VBW=100KHz, 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: 20°C   Relative Humidity: 65%   Test Voltage: AC 120V/60Hz

#### 8.1.6 TEST RESULTS

Please refer to the Attachment H

## 9. PEAK OUTPUT POWER TEST

### 9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/ RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1) RSS-247 5.4 (2)	Peak Output Power	1 Watt or 30dBm ( hopping channel >75) 0.125Watt or 21dBm (hopping channel <75)	2400-2483.5	PASS

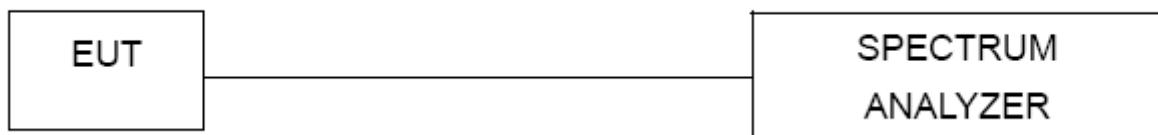
#### 9.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 1MHz/3MHz, VBW= 1MHz/3MHz, Sweep time = Auto.

#### 9.1.2 DEVIATION FROM STANDARD

No deviation.

#### 9.1.3 TEST SETUP



#### 9.1.4 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.

#### 9.1.5 EUT TEST CONDITIONS

Temperature: 20°C   Relative Humidity: 65%   Test Voltage: AC 120V/60Hz

#### 9.1.6 TEST RESULTS

Please refer to the Attachment I

## 10. ANTENNA CONDUCTED SPURIOUS EMISSION

### 10.1 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.

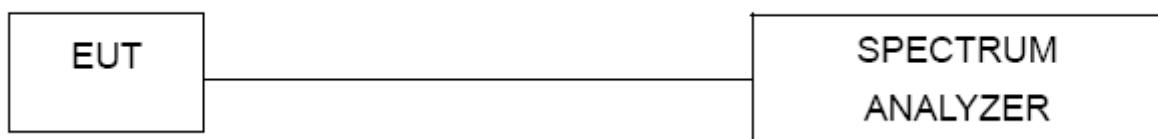
#### 10.1.1 TEST PROCEDURE

- 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=100KHz, Sweep time = Auto.
- c. Offset=antenna gain+cable loss

#### 10.1.2 DEVIATION FROM STANDARD

No deviation.

#### 10.1.3 TEST SETUP



#### 10.1.4 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.

#### 10.1.5 EUT TEST CONDITIONS

Temperature: 20°C   Relative Humidity: 65%   Test Voltage: AC 120V/60Hz

#### 10.1.6 TEST RESULTS

Please refer to the Attachment J

## 11. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	0052765	Mar. 28, 2016
2	LISN	R&S	ENV216	101447	Mar. 28, 2016
3	Test Cable	emci	RG223(9KHz-30MHz)	C_17	Mar. 13, 2016
4	EMI Test Receiver	R&S	ESCS30	826547/022	Mar. 28, 2016
5	50Ω Terminator	SHX	TF2-3G-A	08122901	Mar. 28, 2016
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. 28, 2016
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. 28, 2016
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. 28, 2016
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2016
9	Receiver	AGILENT	N9038A	MY52130039	Oct. 11, 2016
10	Test Cable	emci	EMC104-SM-SM-100 00(1GHz-26.5GHz)	C-68	Jun. 28, 2016
11	Controller	CT	SC100	N/A	N/A
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 28, 2016
13	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2016

Number of Hopping Channel					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016
2	Test Cable	emci	EMC104-SM-SM-900 0(0.01GHz-26.5GHz)	C-100	N/A

Average Time of Occupancy					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016
2	Test Cable	emci	EMC104-SM-SM-900 0(0.01GHz-26.5GHz)	C-100	N/A

Hopping Channel Separation Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016
2	Test Cable	emci	EMC104-SM-SM-900 0(0.01GHz-26.5GHz)	C-100	N/A

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016
2	Test Cable	emci	EMC104-SM-SM-900 0(0.01GHz-26.5GHz)	C-100	N/A

Peak Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016
2	Test Cable	emci	EMC104-SM-SM-900 0(0.01GHz-26.5GHz)	C-100	N/A

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016
2	Test Cable	emci	EMC104-SM-SM-900 0(0.01GHz-26.5GHz)	C-100	N/A

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

All calibration period of equipment list is one year.

**12. EUT TEST PHOTO****Conducted Measurement Photos**

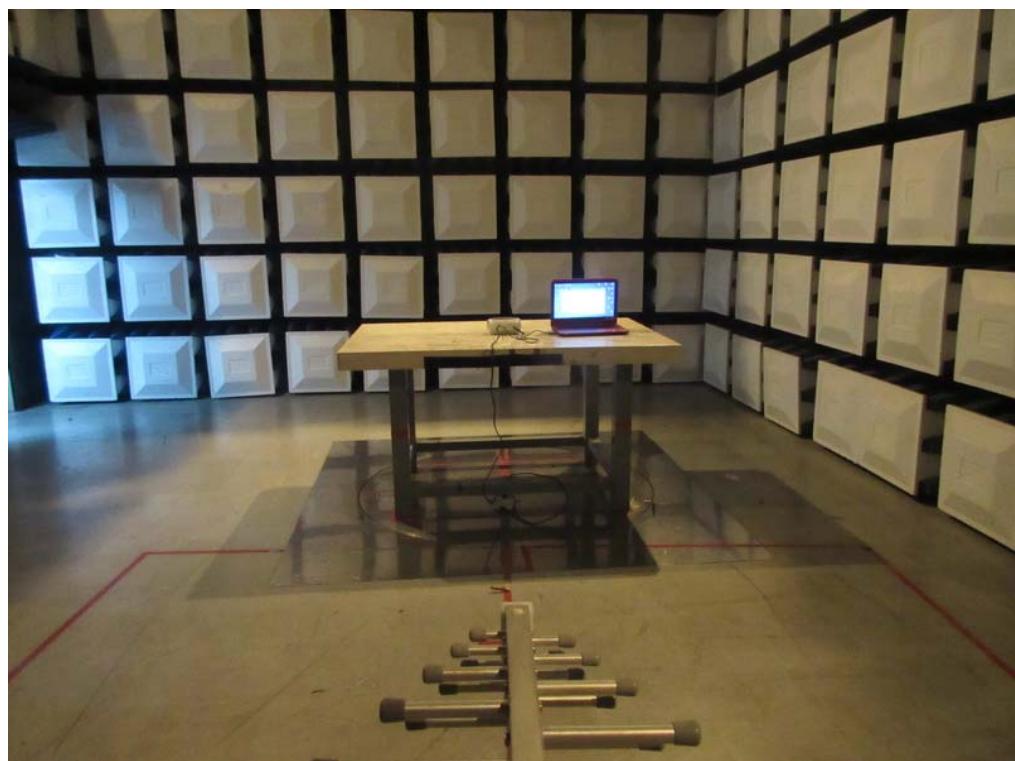
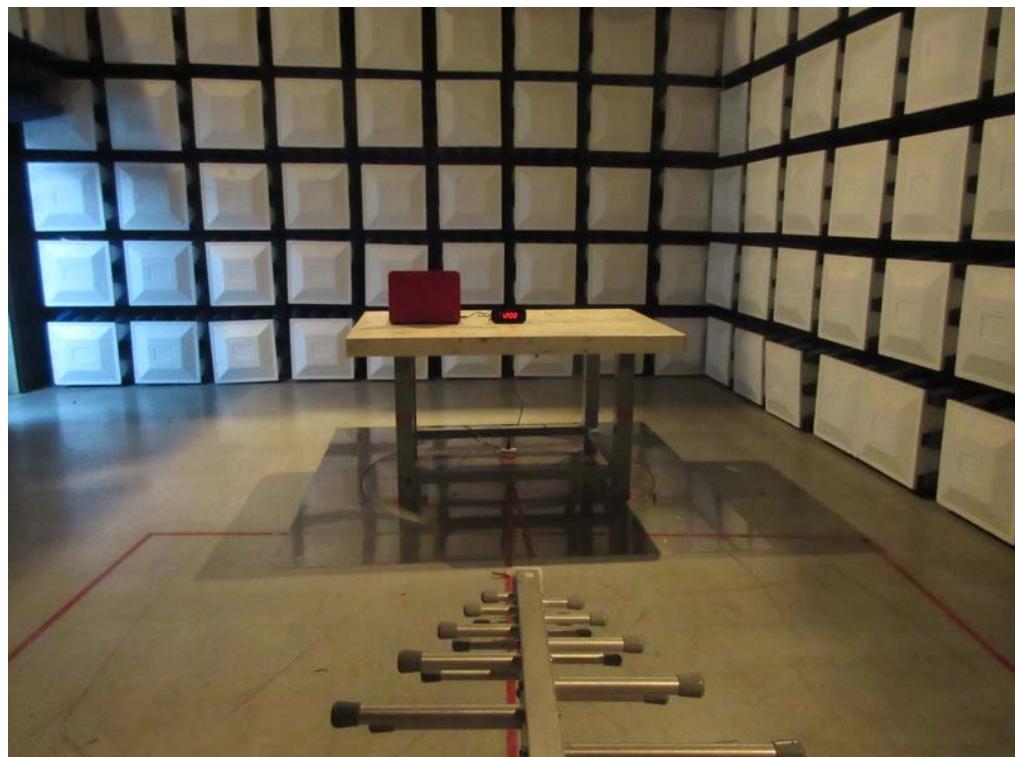
## Radiated Measurement Photos

**9KHz to 30MHz**



## Radiated Measurement Photos

30MHz to 1000MHz



## Radiated Measurement Photos

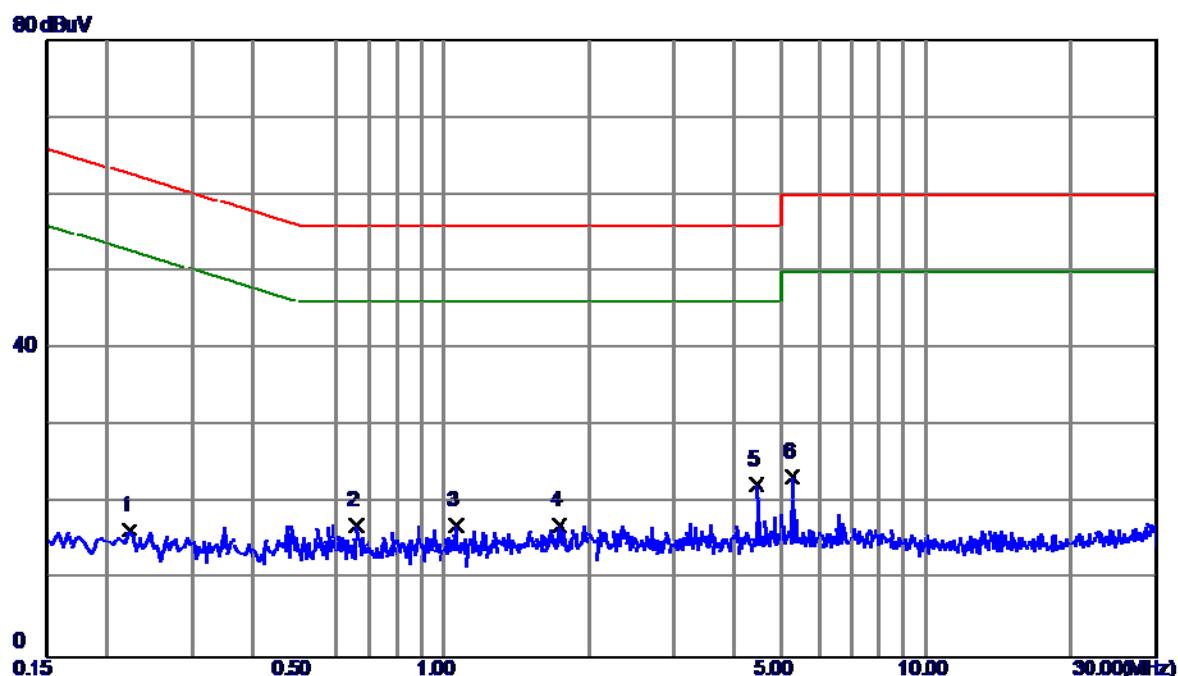
### Above 1000MHz



## ATTACHMENT A - CONDUCTED EMISSION

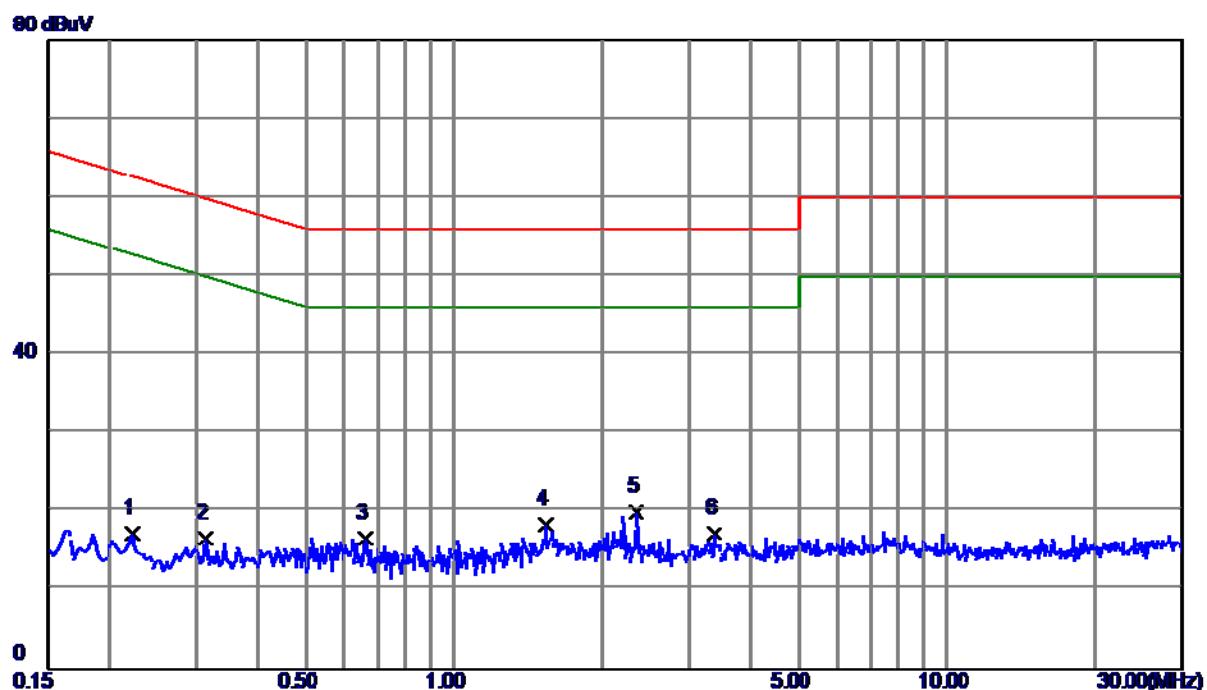
Test Mode: TX Mode

## Line



No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Margin Detector	Comment
1	0.2220	6.95	9.59	16.54	62.74	-46.20	Peak
2	0.6580	7.45	9.73	17.18	56.00	-38.82	Peak
3	1.0580	7.38	9.80	17.18	56.00	-38.82	Peak
4	1.7340	7.21	9.88	17.09	56.00	-38.91	Peak
5	4.4620	12.39	9.98	22.37	56.00	33.63	Peak
6	5.2940	13.35	9.98	23.33	60.00	-36.67	Peak

Test Mode: TX Mode

**Neutral**

No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2220	7.76	9.51	17.27	62.74	-45.47	Peak	
2	0.3140	7.13	9.53	16.66	59.86	-43.20	Peak	
3	0.6620	7.10	9.54	16.64	56.00	-39.36	Peak	
4	1.5339	8.69	9.66	18.35	56.00	-37.65	Peak	
5	2.3420	10.26	9.75	20.01	56.00	-35.99	Peak	
6	3.3740	7.42	9.85	17.27	56.00	-38.73	Peak	

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

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

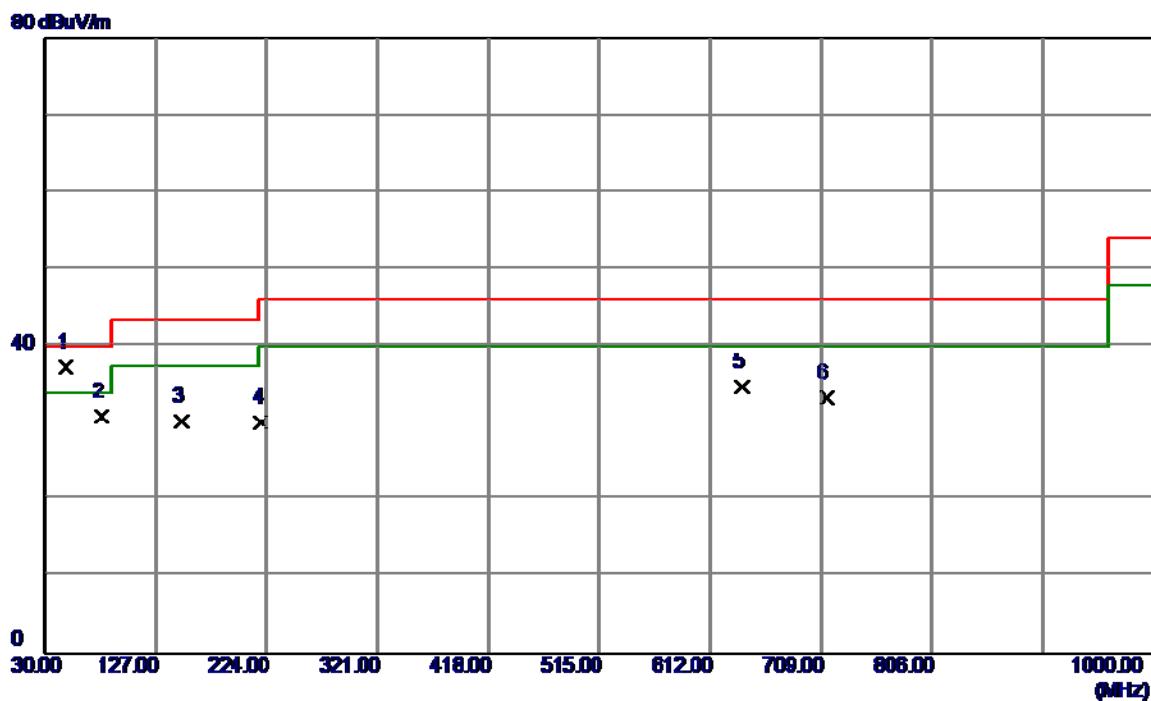
Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0101	0°	11.38	24.93	36.31	127.52	-91.21	AVG
0.0101	0°	13.35	24.93	38.28	147.52	-109.24	PEAK
0.0268	0°	6.84	23.87	30.71	119.04	-88.33	AVG
0.0268	0°	8.14	23.87	32.01	139.04	-107.03	PEAK
0.0383	0°	3.27	23.14	26.41	115.94	-89.53	AVG
0.0383	0°	5.35	23.14	28.49	135.94	-107.45	PEAK
0.0597	0°	1.01	22.21	23.22	112.08	-88.87	AVG
0.0597	0°	2.39	22.21	24.60	132.08	-107.49	PEAK
0.5195	0°	19.76	19.86	39.62	73.29	-33.67	QP
1.9376	0°	23.41	19.51	42.92	69.54	-26.62	QP

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0112	90°	13.17	24.30	37.47	126.62	-89.15	AVG
0.0112	90°	14.56	24.30	38.86	146.62	-107.76	PEAK
0.0266	90°	7.43	23.88	31.31	119.11	-87.79	AVG
0.0266	90°	8.54	23.88	32.42	139.11	-106.68	PEAK
0.0431	90°	5.21	22.84	28.05	114.91	-86.87	AVG
0.0431	90°	6.34	22.84	29.18	134.91	-105.74	PEAK
0.0587	90°	1.59	22.23	23.82	112.23	-88.42	AVG
0.0587	90°	2.84	22.23	25.07	132.23	-107.17	PEAK
0.6372	90°	22.37	20.24	42.61	71.52	-28.91	QP
2.0132	90°	24.49	19.49	43.98	69.54	-25.56	QP

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

Test Mode: TX 2402MHz \_CH00\_1Mbps

### Vertical

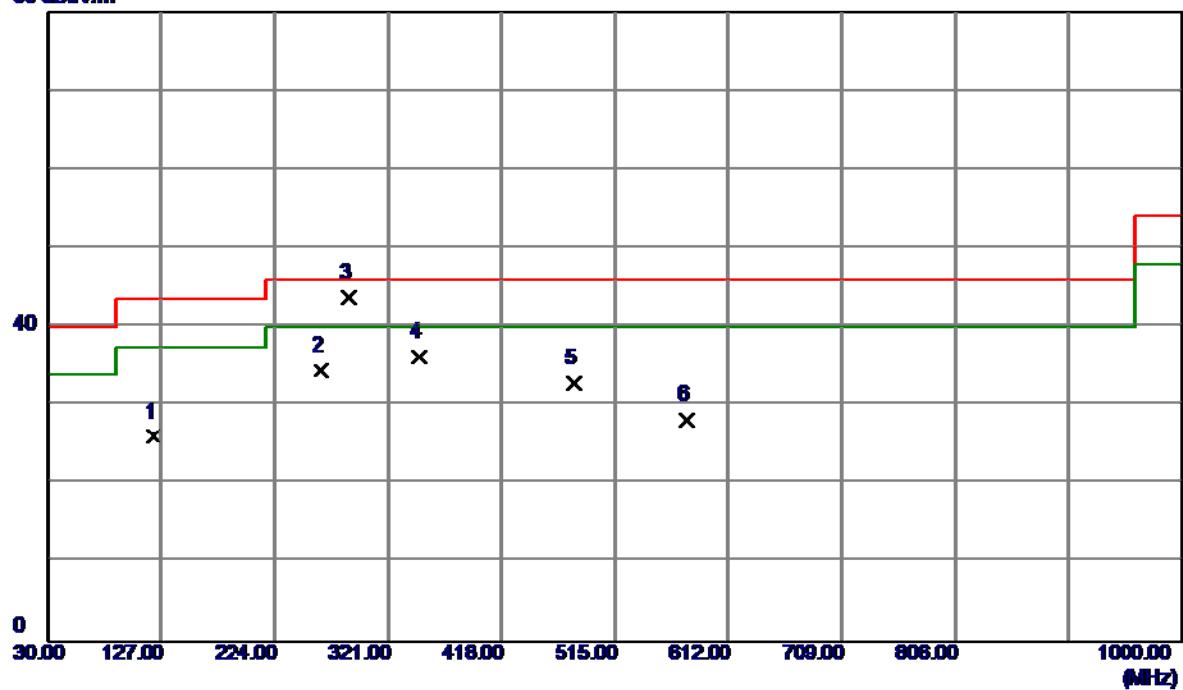


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	48.4300	51.09	-13.80	37.29	40.00	-2.71	QP	
2	79.4700	47.54	-16.65	30.89	40.00	-9.11	Peak	
3	149.3100	43.38	-13.08	30.30	43.50	-13.20	Peak	
4	219.1500	44.48	-14.35	30.13	46.00	-15.87	Peak	
5	640.1300	40.42	-5.65	34.77	46.00	-11.23	Peak	
6	713.8500	37.65	-4.31	33.34	46.00	-12.66	Peak	

Test Mode: TX 2402MHz\_CH00\_1Mbps

## Horizontal

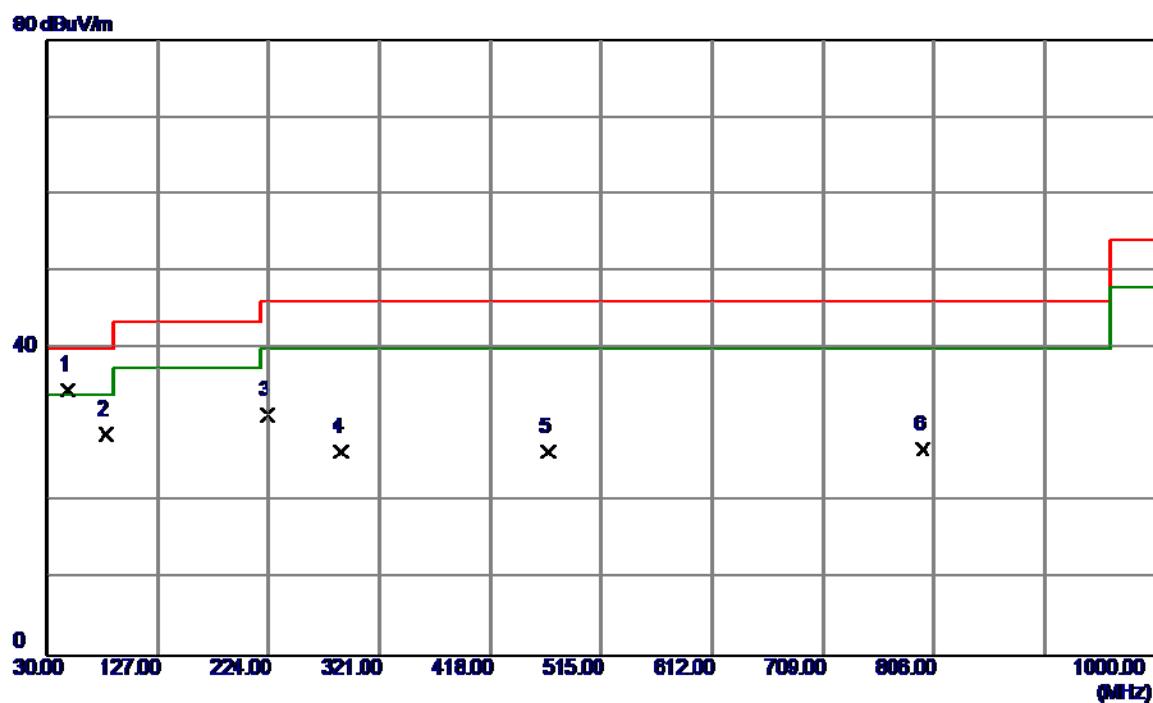
80 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	120.2100	40.00	-14.00	26.00	43.50	-17.50	Peak	
2	263.7700	48.43	-14.06	34.37	46.00	-11.63	Peak	
3	288.0200	54.95	-11.25	43.70	46.00	-2.30	Peak	
4	348.1600	47.41	-11.31	36.10	46.00	-9.90	Peak	
5	480.0800	42.09	-9.22	32.87	46.00	-13.13	Peak	
6	576.1100	34.73	-6.56	28.17	46.00	-17.83	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

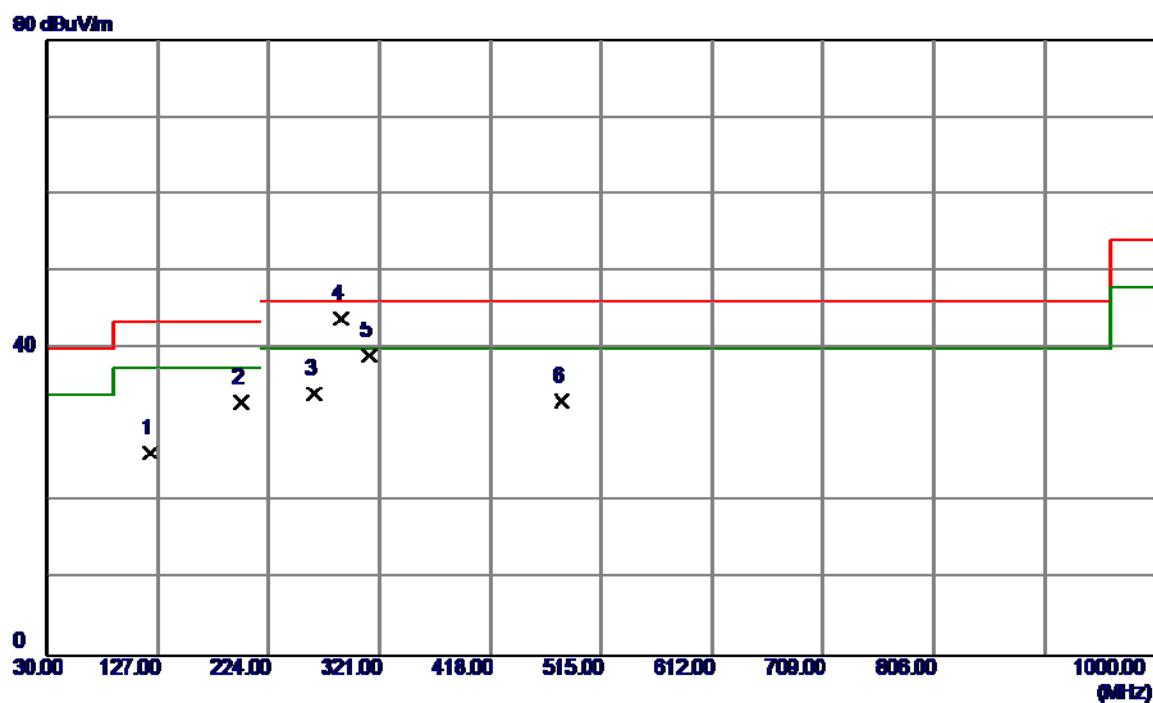
### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	48.4300	48.37	-13.80	34.57	40.00	-5.43	Peak	
2	81.4100	45.57	-16.72	28.85	40.00	-11.15	Peak	
3	223.0300	45.72	-14.32	31.40	46.00	-14.60	Peak	
4	288.0200	37.74	-11.25	26.49	46.00	-19.51	Peak	
5	468.4400	35.34	-8.77	26.57	46.00	-19.43	Peak	
6	796.3000	29.14	-2.26	26.88	46.00	-19.12	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

### Horizontal

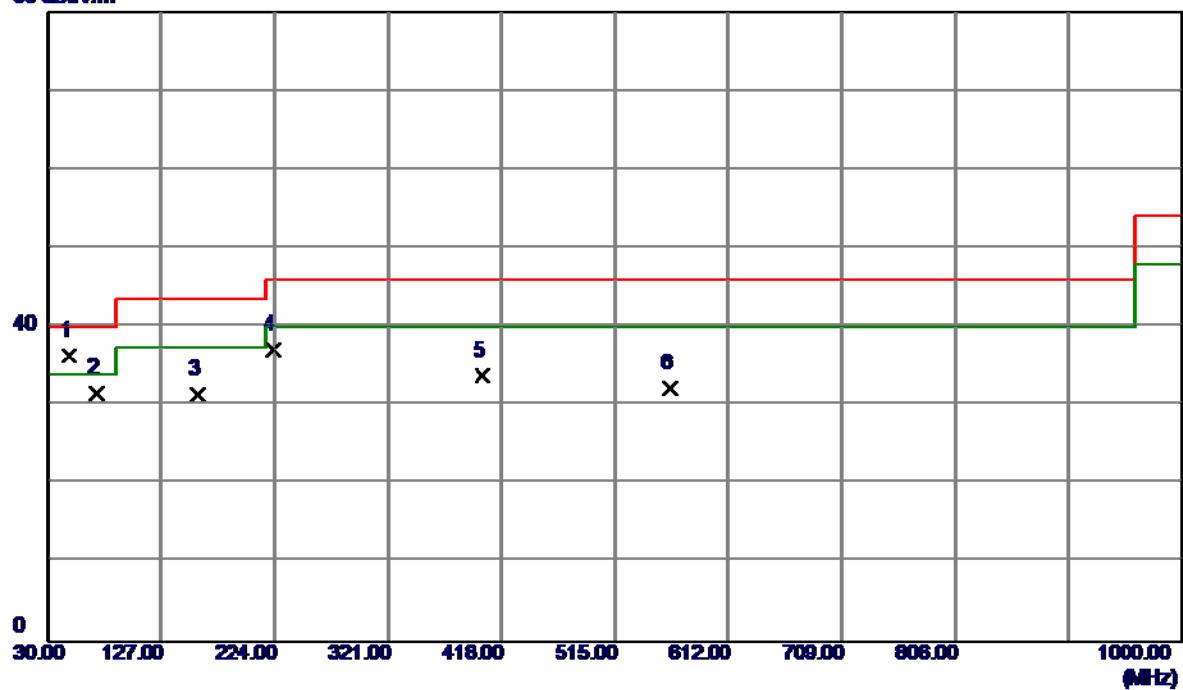


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit		Margin	Detector	Comment
					MHz	dBuV/m			
1	120.2100	40.38	-14.00	26.38	43.50	-17.12	Peak		
2	200.7200	48.12	-15.12	33.00	43.50	-10.50	Peak		
3	263.7700	48.21	-14.06	34.15	46.00	-11.85	Peak		
4	288.0200	55.05	-11.25	43.80	46.00	-2.20	Peak		
5	312.2700	49.69	-10.71	38.98	46.00	-7.02	Peak		
6	480.0800	42.40	-9.22	33.18	46.00	-12.82	Peak		

Test Mode: TX 2480MHz \_CH78\_1Mbps

### Vertical

80 dBuV/m

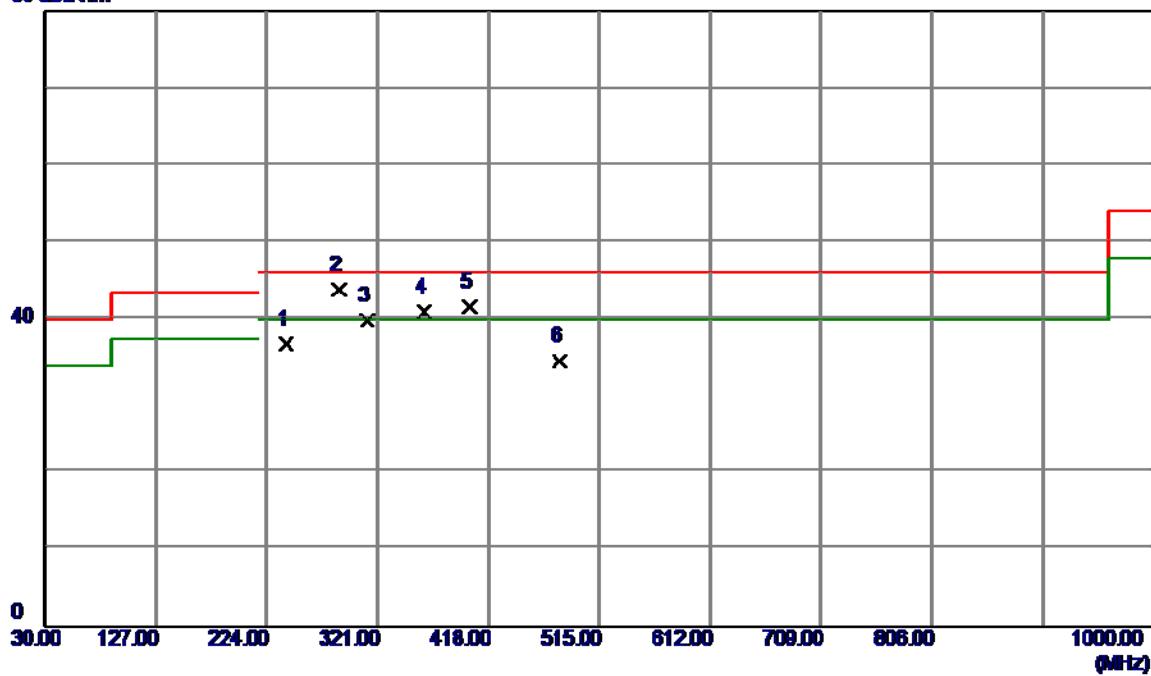


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	48.4300	50.07	-13.80	36.27	40.00	-3.73	Peak	
2	71.7100	47.48	-16.03	31.45	40.00	-8.55	Peak	
3	158.0399	43.95	-12.54	31.41	43.50	-12.09	Peak	
4	223.0300	51.50	-14.32	37.18	46.00	-8.82	Peak	
5	401.5100	43.01	-9.28	33.73	46.00	-12.27	Peak	
6	562.5300	38.05	-5.82	32.23	46.00	-13.77	Peak	

Test Mode: TX 2480MHz \_CH78\_1Mbps

### Horizontal

80 dBuV/m

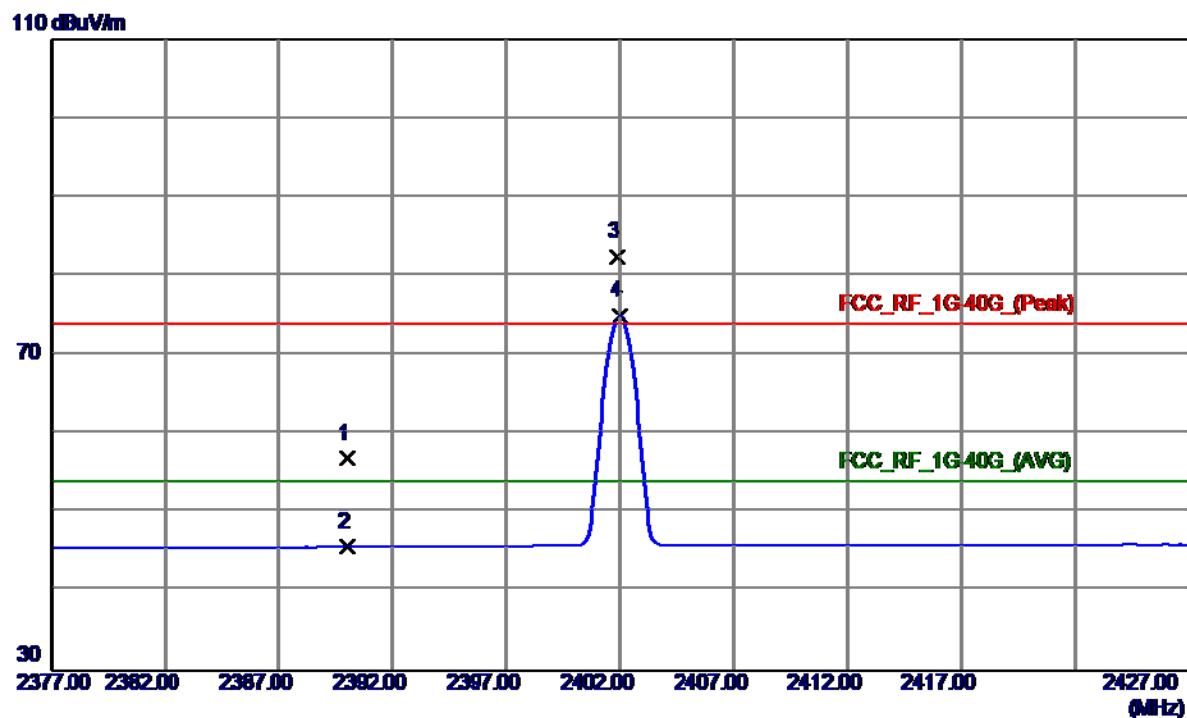


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Comment	
							Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	241.4600	50.98	-14.16	36.82	46.00	-9.18	Peak	
2	288.0200	55.02	-11.25	43.77	46.00	-2.23	QP	
3	312.2700	50.62	-10.71	39.91	46.00	-6.09	Peak	
4	361.7400	51.76	-10.87	40.89	46.00	-5.11	Peak	
5	401.5100	50.92	-9.28	41.64	46.00	-4.36	Peak	
6	480.0800	43.77	-9.22	34.55	46.00	-11.45	Peak	

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

Test Mode : TX 2402MHz \_CH00\_1Mbps

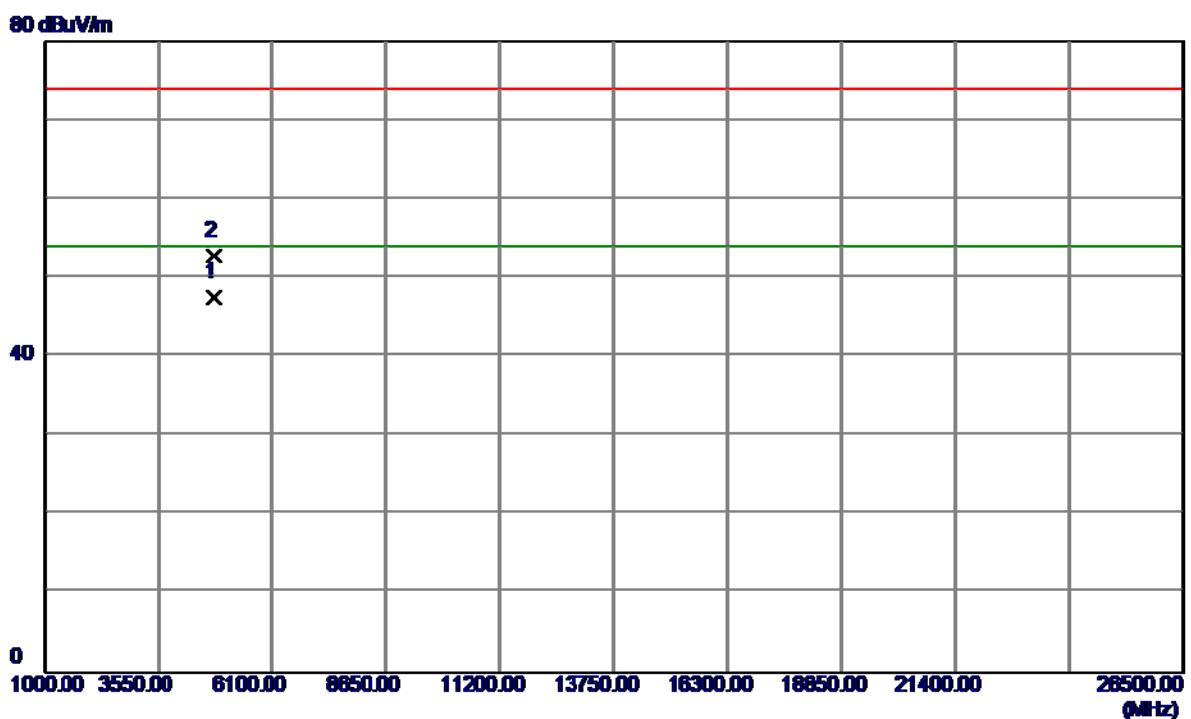
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2390.0000	24.20	32.68	56.88	74.00	-17.12	Peak	
2	2390.0000	12.95	32.68	45.63	54.00	-8.37	AVG	
3	2401.9000	49.85	32.69	82.54	74.00	8.54	Peak	NO LIMIT
4	2402.0000	42.33	32.69	75.02	54.00	21.02	AVG	NO LIMIT

Test Mode : TX 2402MHz \_CH00\_1Mbps

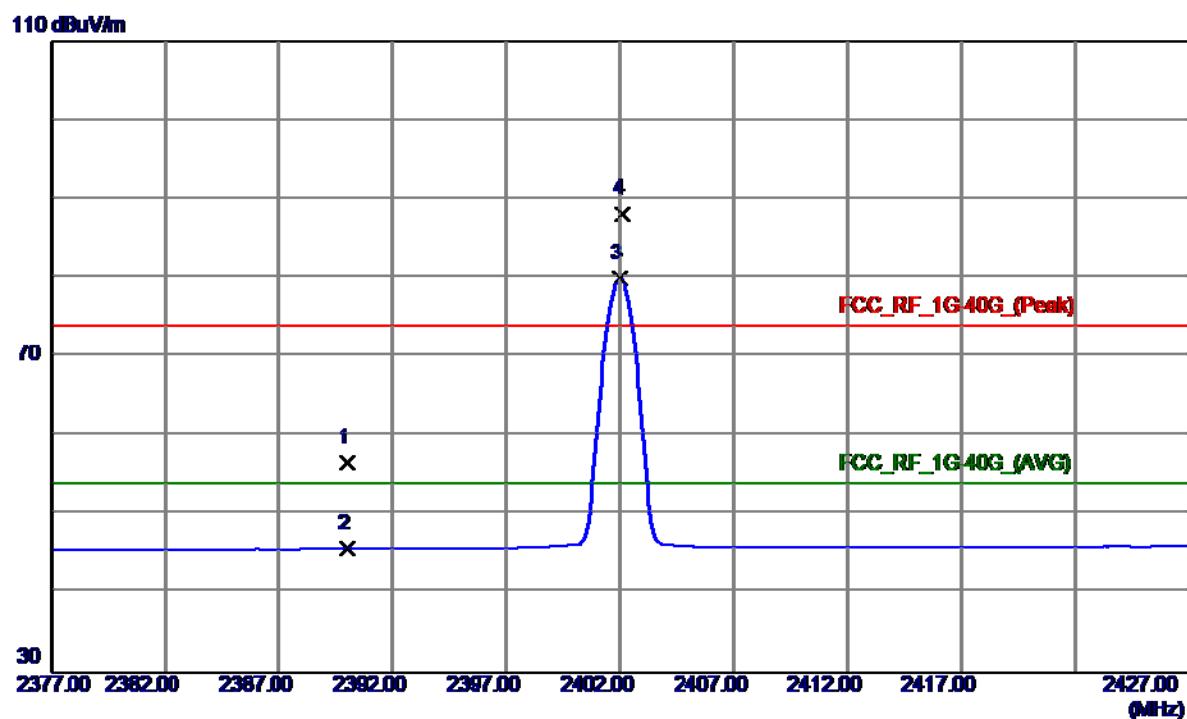
## Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4803.9500	41.64	5.82	47.46	54.00	-6.54	AVG	
2	4803.6000	46.99	5.82	52.81	74.00	-21.19	Peak	

Test Mode : TX 2402MHz \_CH00\_1Mbps

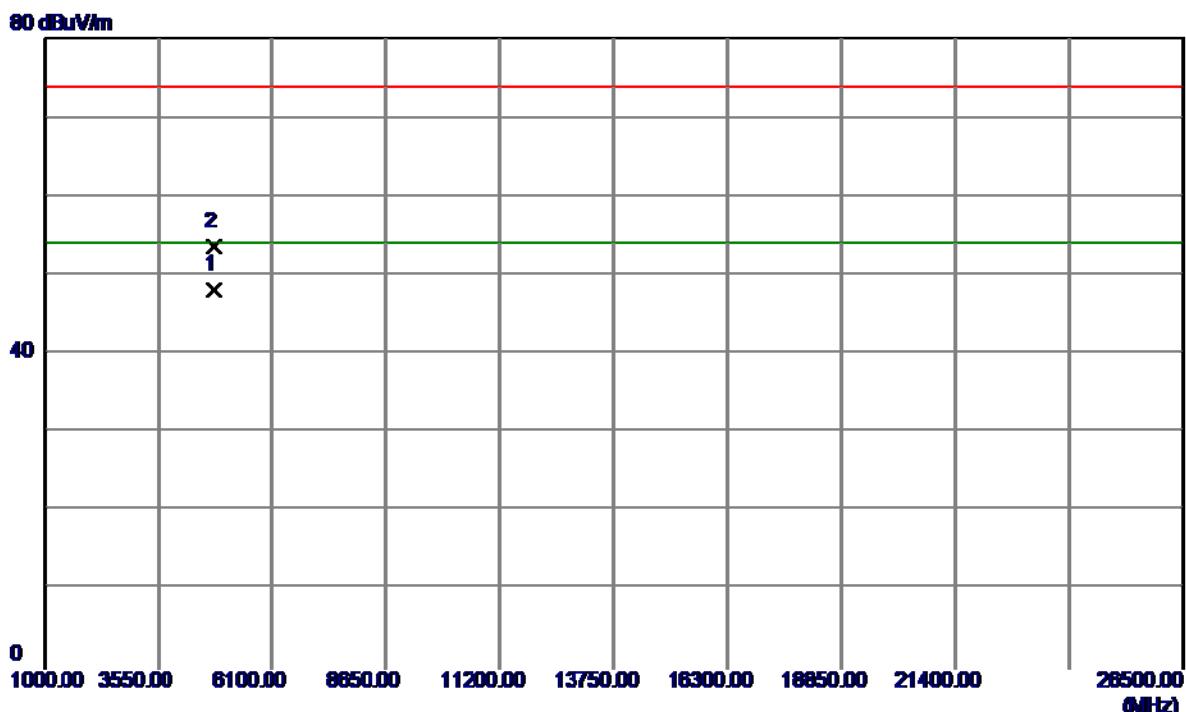
**Horizontal**



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment				
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2390.0000	23.93	32.68	56.61	74.00	-17.39	Peak	
2	2390.0000	12.95	32.68	45.63	54.00	-8.37	AVG	
3	2402.0000	47.16	32.69	79.85	54.00	25.85	AVG	NO LIMIT
4	2402.1000	55.39	32.69	88.08	74.00	14.08	Peak	NO LIMIT

Test Mode : TX 2402MHz \_CH00\_1Mbps

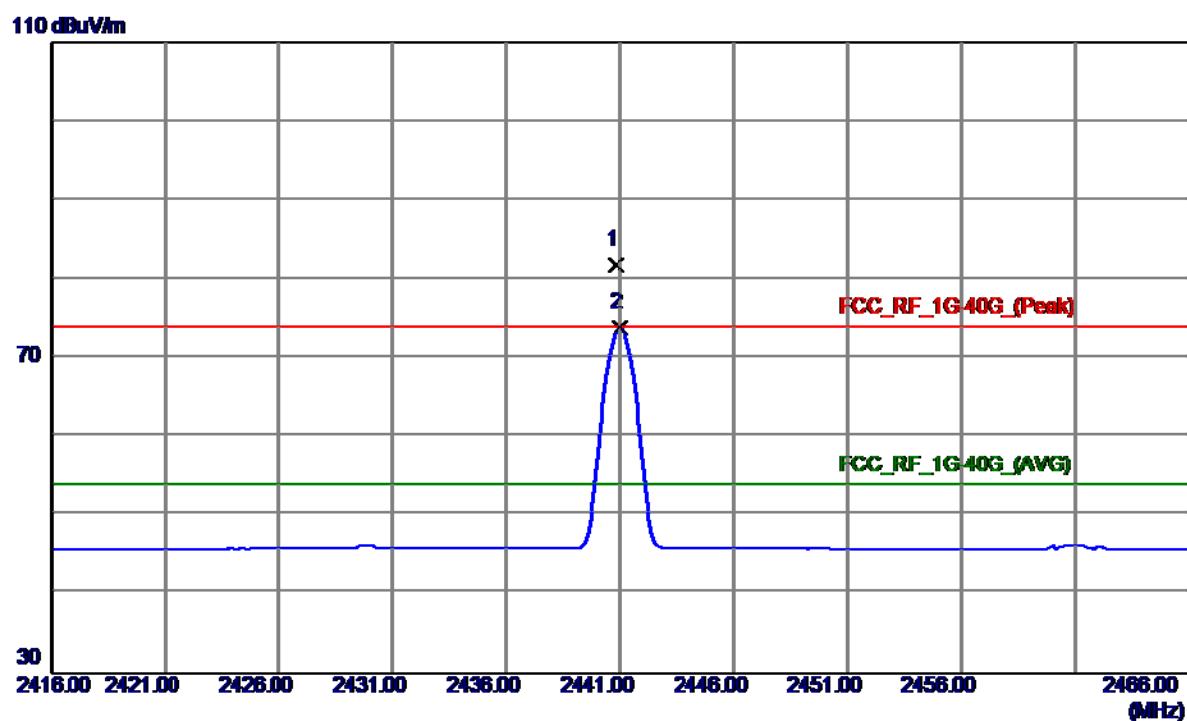
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4803.9700	42.40	5.82	48.22	54.00	-5.78	AVG	
2	4804.2300	47.79	5.82	53.61	74.00	-20.39	Peak	

Test Mode : TX 2441MHz \_CH39\_1Mbps

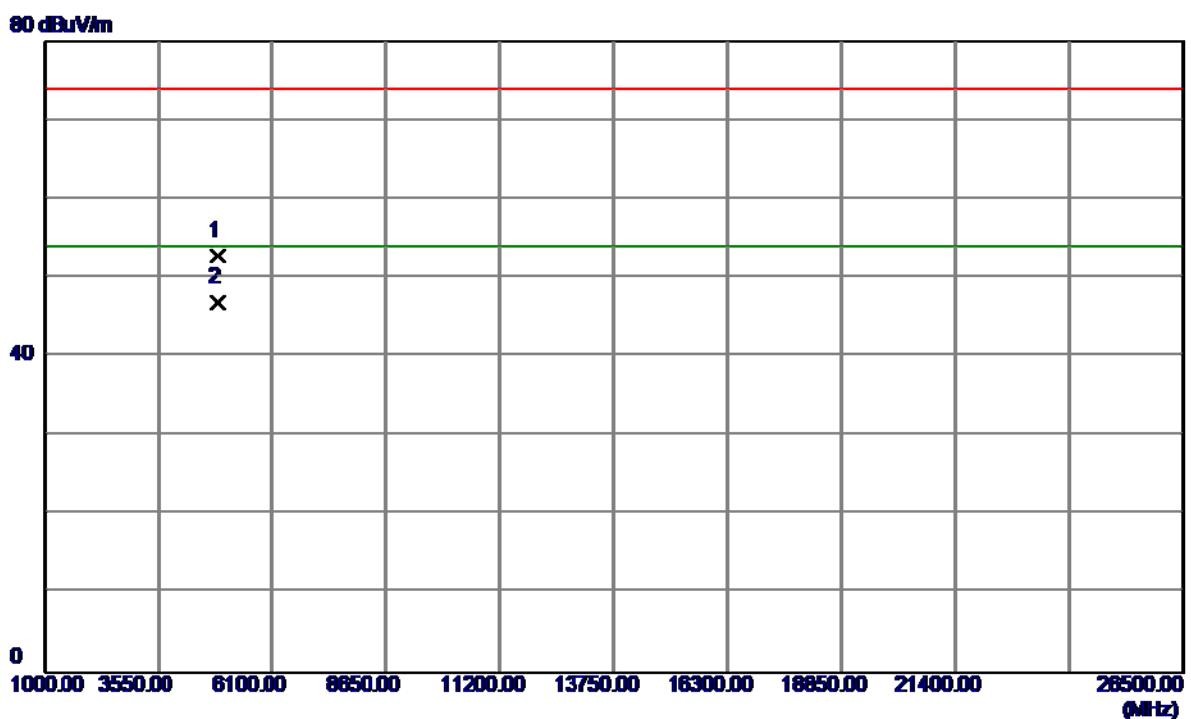
Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	2440.8500	49.02	32.75	81.77	74.00	7.77	Peak	NO LIMIT
2	2441.0000	41.02	32.75	73.77	54.00	19.77	AVG	NO LIMIT

Test Mode : TX 2441MHz \_CH39\_1Mbps

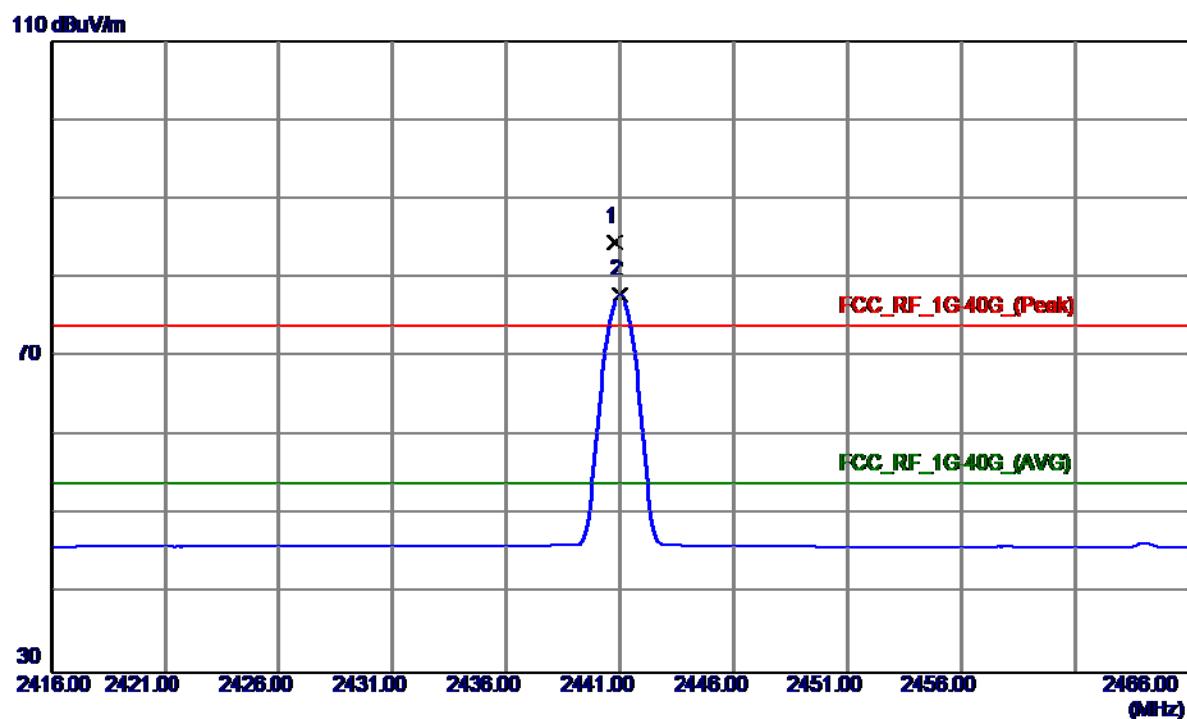
## Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4884.1200	46.77	6.03	52.80	74.00	-21.20	Peak	
2	4884.8270	40.90	6.03	46.93	54.00	-7.07	AVG	

Test Mode : TX 2441MHz \_CH39\_1Mbps

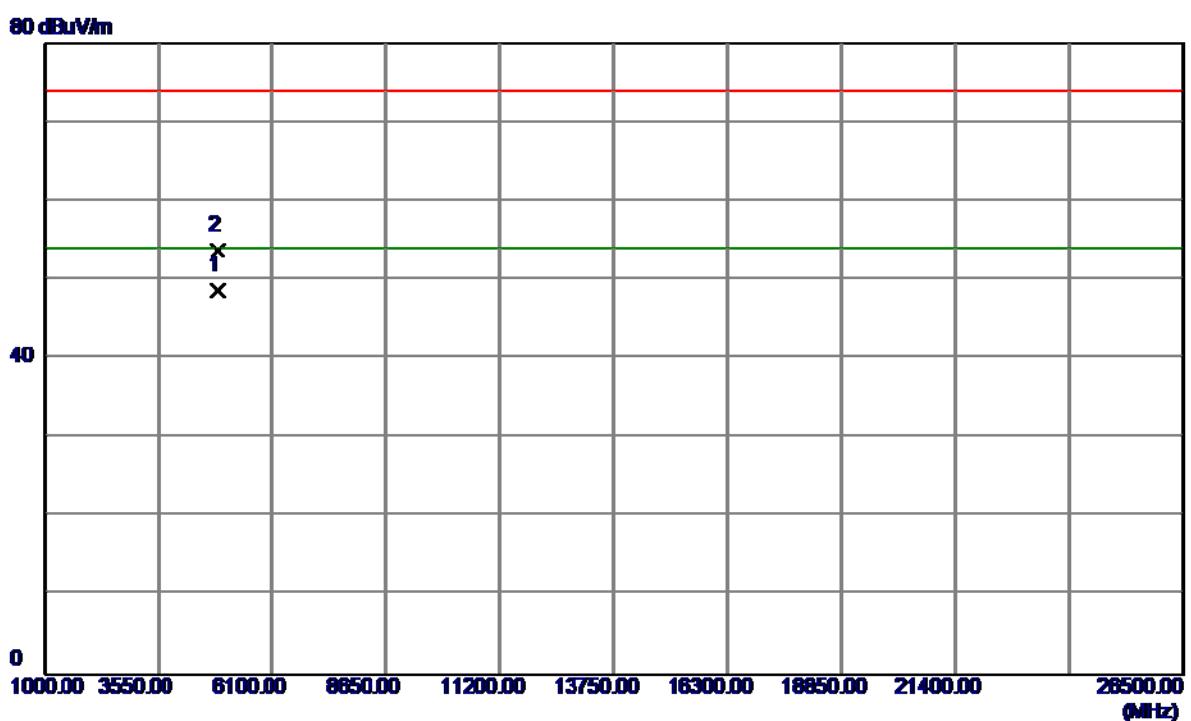
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	2440.8000	51.81	32.75	84.56	74.00	10.56	Peak	NO LIMIT
2	2441.0000	45.09	32.75	77.84	54.00	23.84	AVG	NO LIMIT

Test Mode : TX 2441MHz \_CH39\_1Mbps

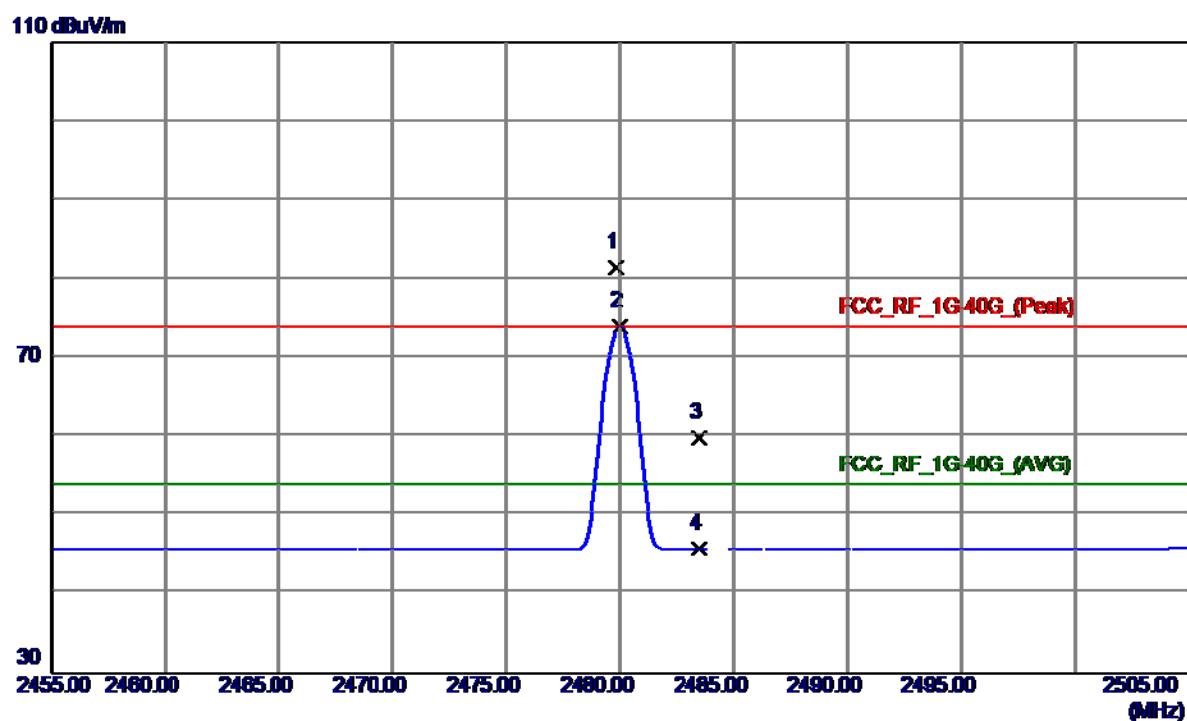
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4884.2700	42.59	6.03	48.62	54.00	-5.38	AVG	
2	4884.0610	47.71	6.03	53.74	74.00	-20.26	Peak	

Test Mode : TX 2480MHz \_CH78\_1Mbps

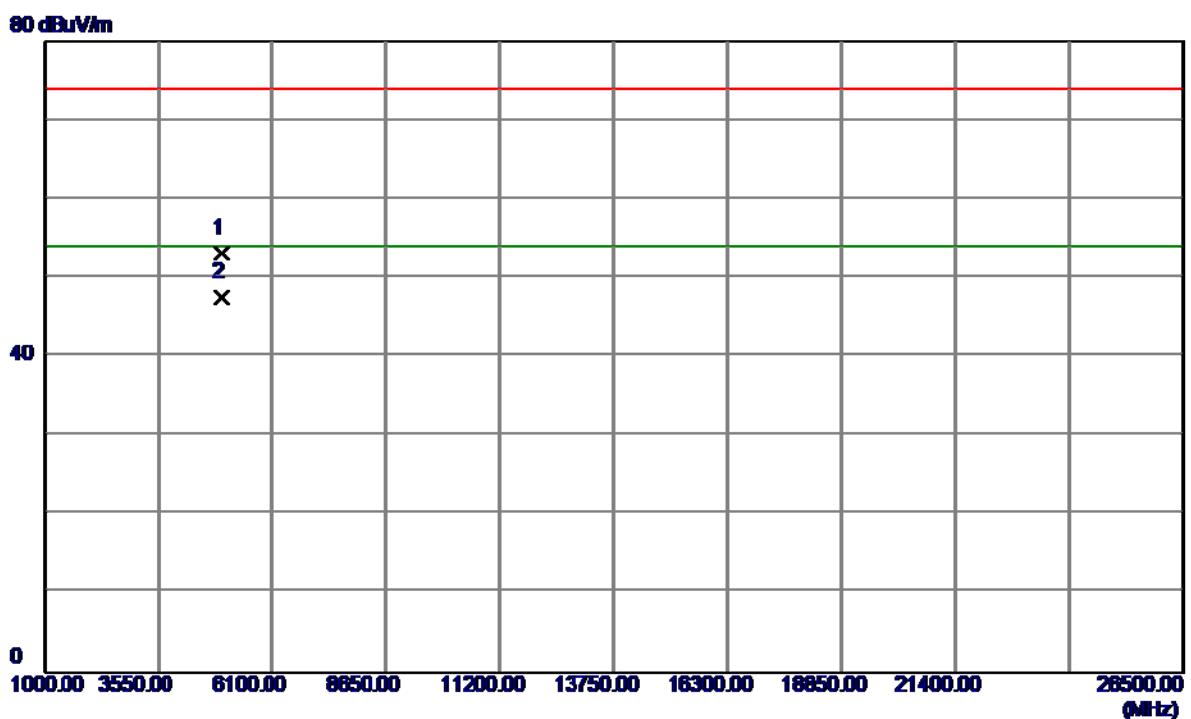
Vertical



No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2479.8500	48.68	32.80	81.48	74.00	7.48	Peak	NO LIMIT
2	2480.0000	41.17	32.80	73.97	54.00	19.97	AVG	NO LIMIT
3	2483.5000	27.17	32.81	59.98	74.00	-14.02	Peak	
4	2483.5000	12.96	32.81	45.77	54.00	-8.23	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

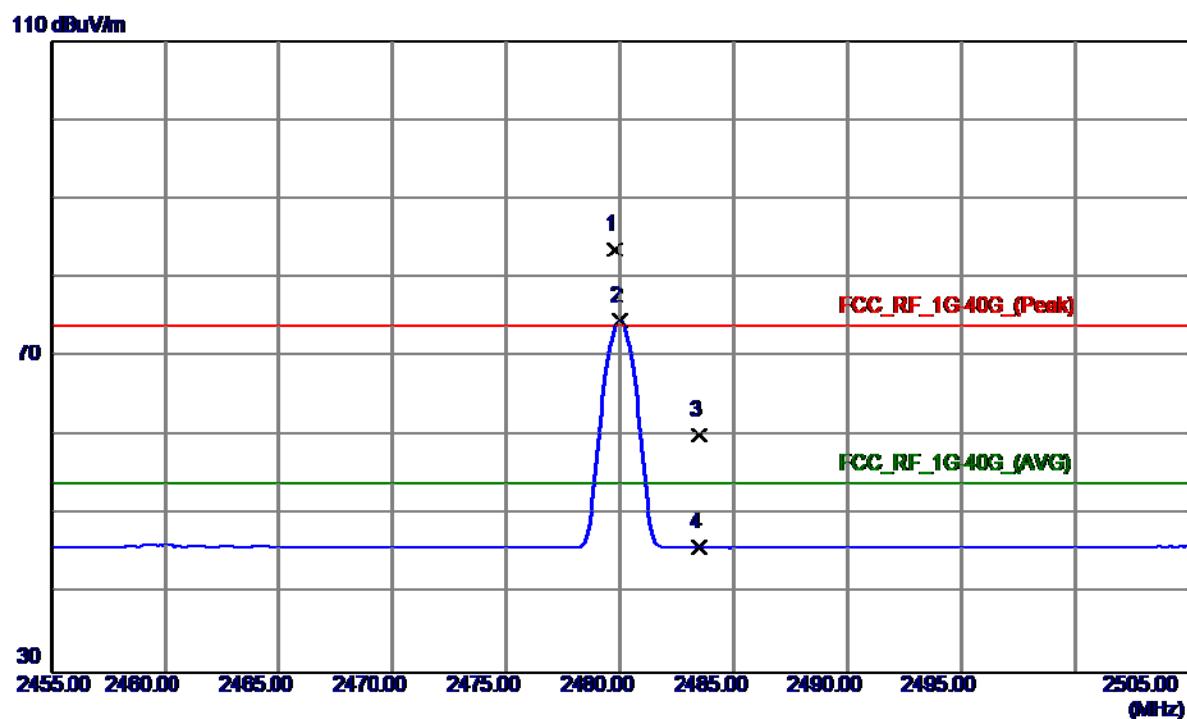
## Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4961.8610	46.83	6.24	53.07	74.00	-20.93	Peak	
2	4962.5790	41.22	6.24	47.46	54.00	-6.54	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

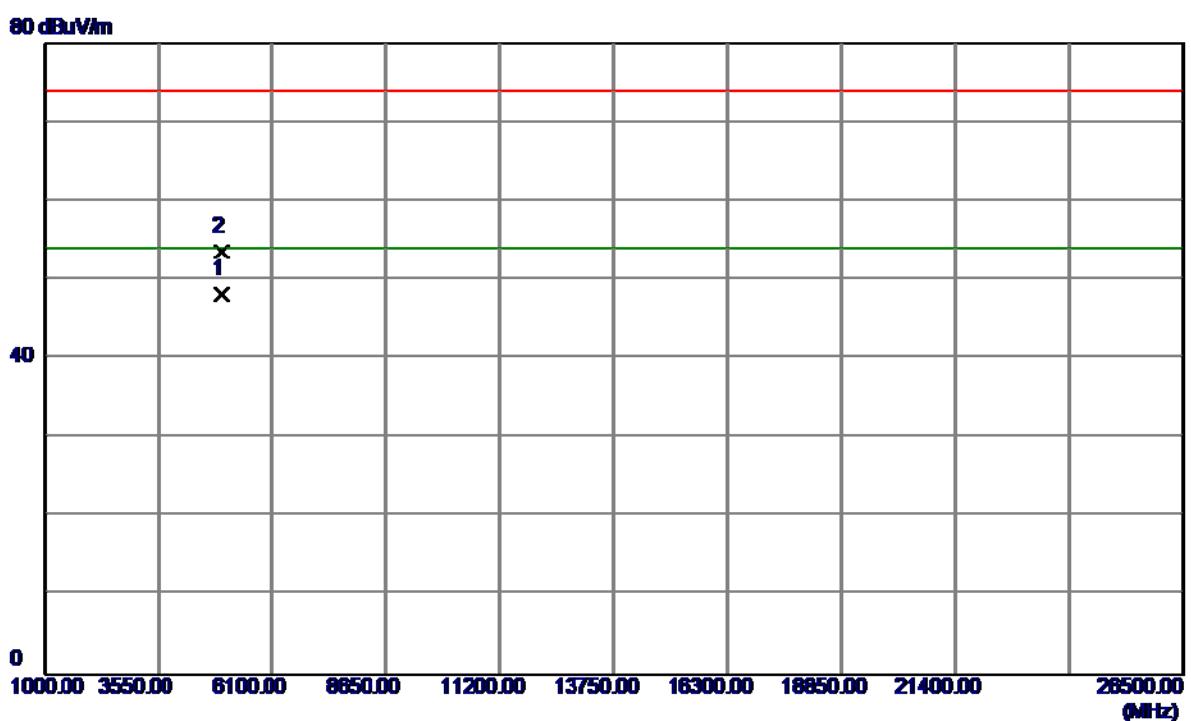
Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment				
1	2479.8000	50.81	32.80	83.61	74.00	9.61	Peak	NO LIMIT
2	2480.0000	41.76	32.80	74.56	54.00	20.56	AVG	NO LIMIT
3	2483.5000	27.32	32.81	60.13	74.00	-13.87	Peak	
4	2483.5000	12.97	32.81	45.78	54.00	-8.22	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

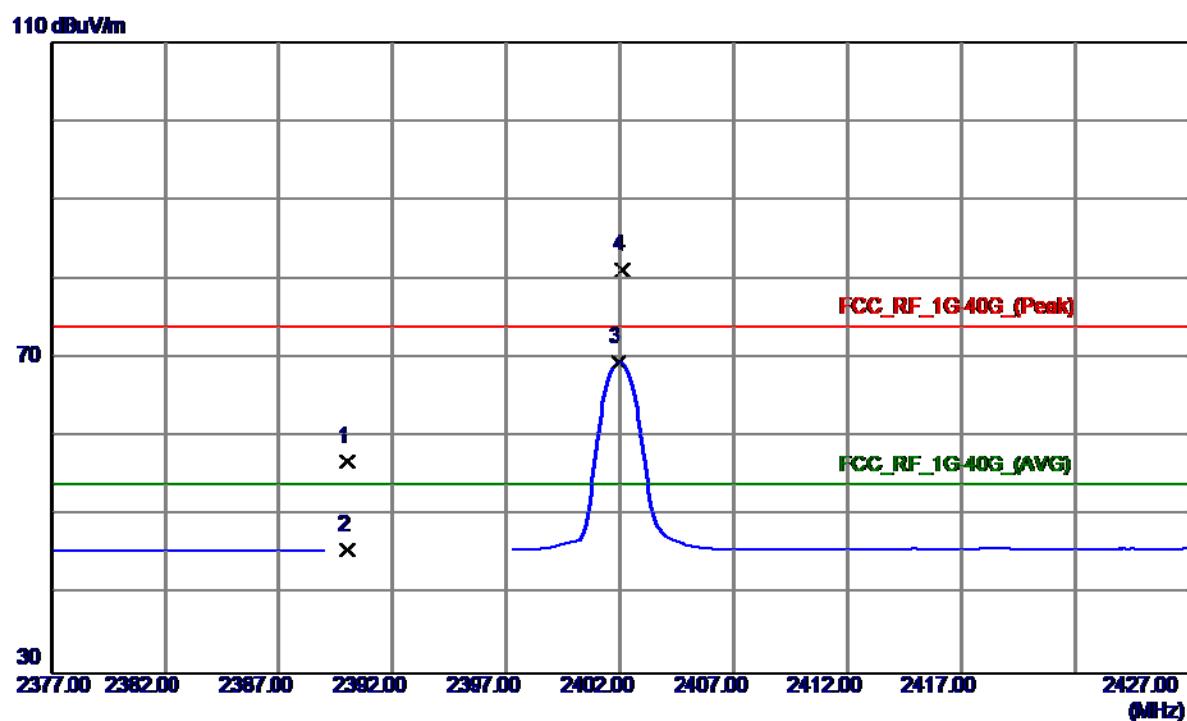
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4961.6800	41.89	6.24	48.13	54.00	-5.87	AVG	
2	4962.7719	47.37	6.24	53.61	74.00	-20.39	Peak	

Test Mode : TX 2402MHz \_CH00\_3Mbps

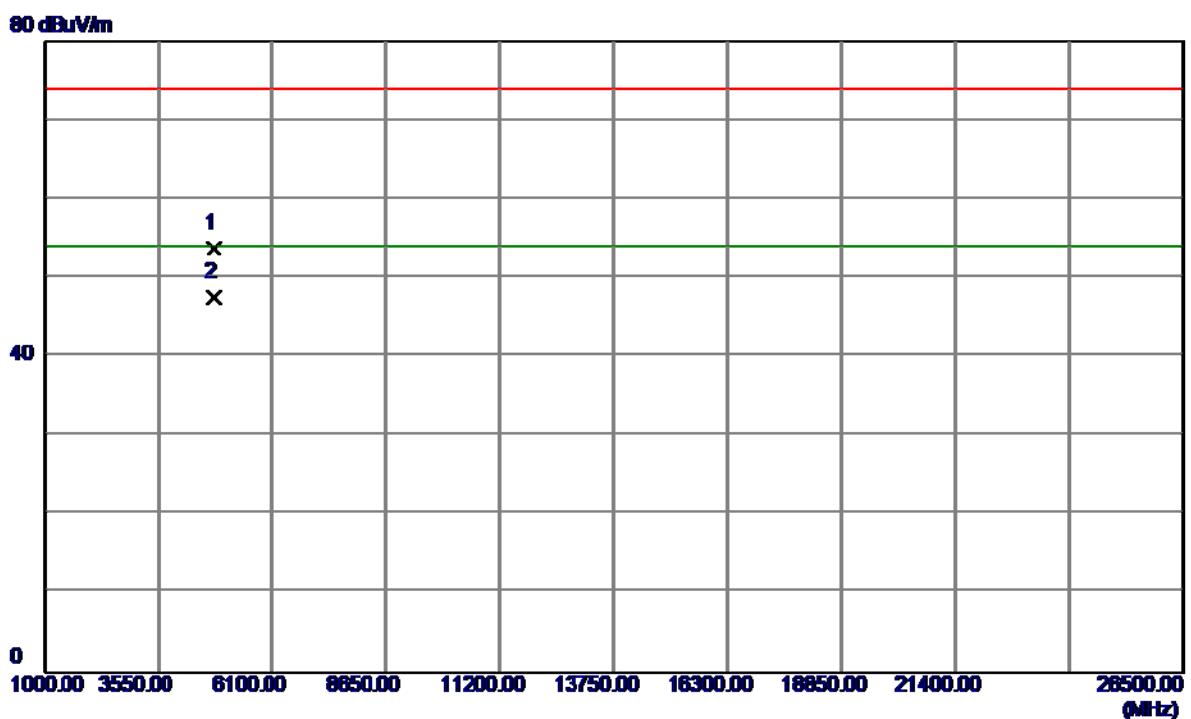
Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	24.22	32.68	56.90	74.00	-17.10	Peak	
2	2390.0000	12.95	32.68	45.63	54.00	-8.37	AVG	
3	2401.9500	36.80	32.69	69.49	54.00	15.49	AVG	NO LIMIT
4	2402.1000	48.50	32.69	81.19	74.00	7.19	Peak	NO LIMIT

Test Mode : TX 2402MHz \_CH00\_3Mbps

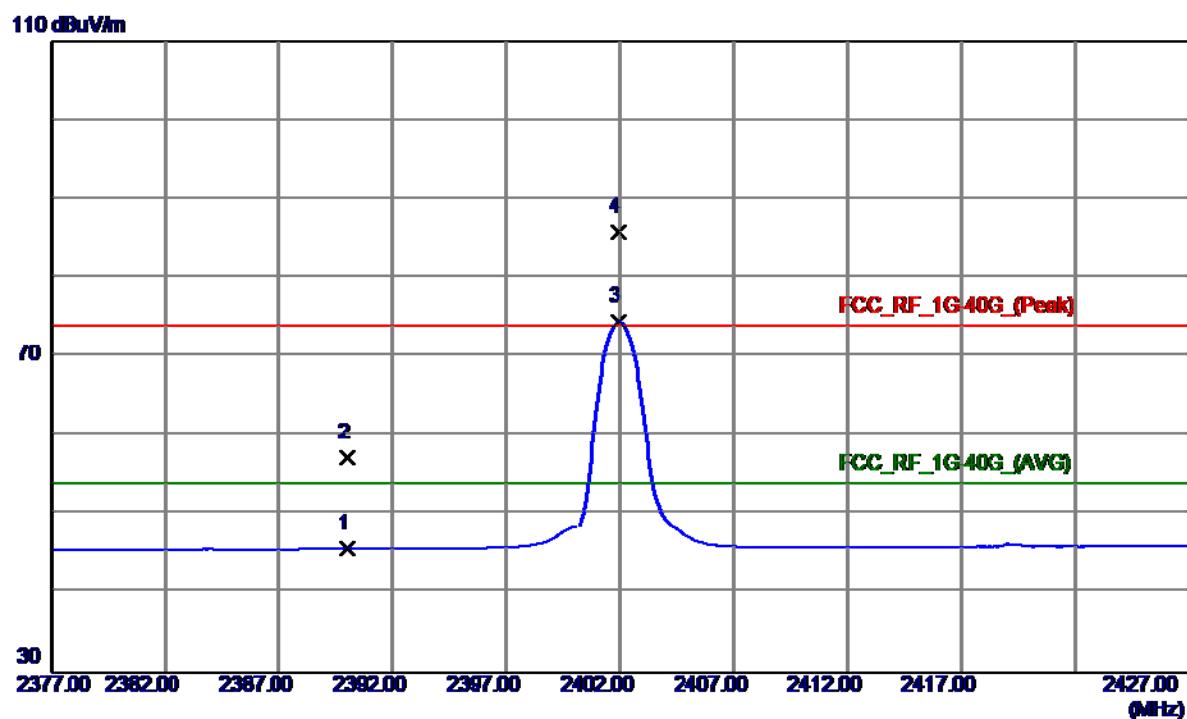
## Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4803.5700	47.98	5.82	53.80	74.00	-20.20	Peak	
2	4804.0200	41.64	5.82	47.46	54.00	-6.54	AVG	

Test Mode : TX 2402MHz \_CH00\_3Mbps

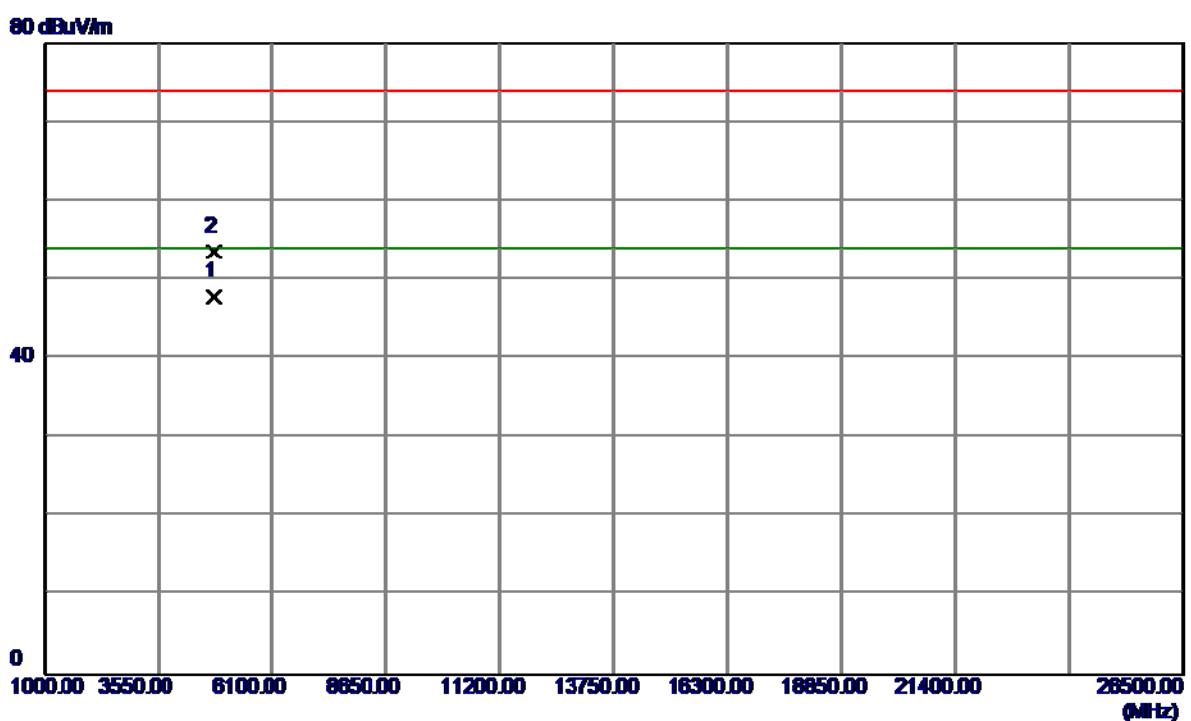
**Horizontal**



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment				
1	2390.0000	12.97	32.68	45.65	54.00	-8.35	AVG	
2	2390.0000	24.54	32.68	57.22	74.00	-16.78	Peak	
3	2401.9500	41.76	32.69	74.45	54.00	20.45	AVG	NO LIMIT
4	2401.9500	53.18	32.69	85.87	74.00	11.87	Peak	NO LIMIT

Test Mode : TX 2402MHz \_CH00\_3Mbps

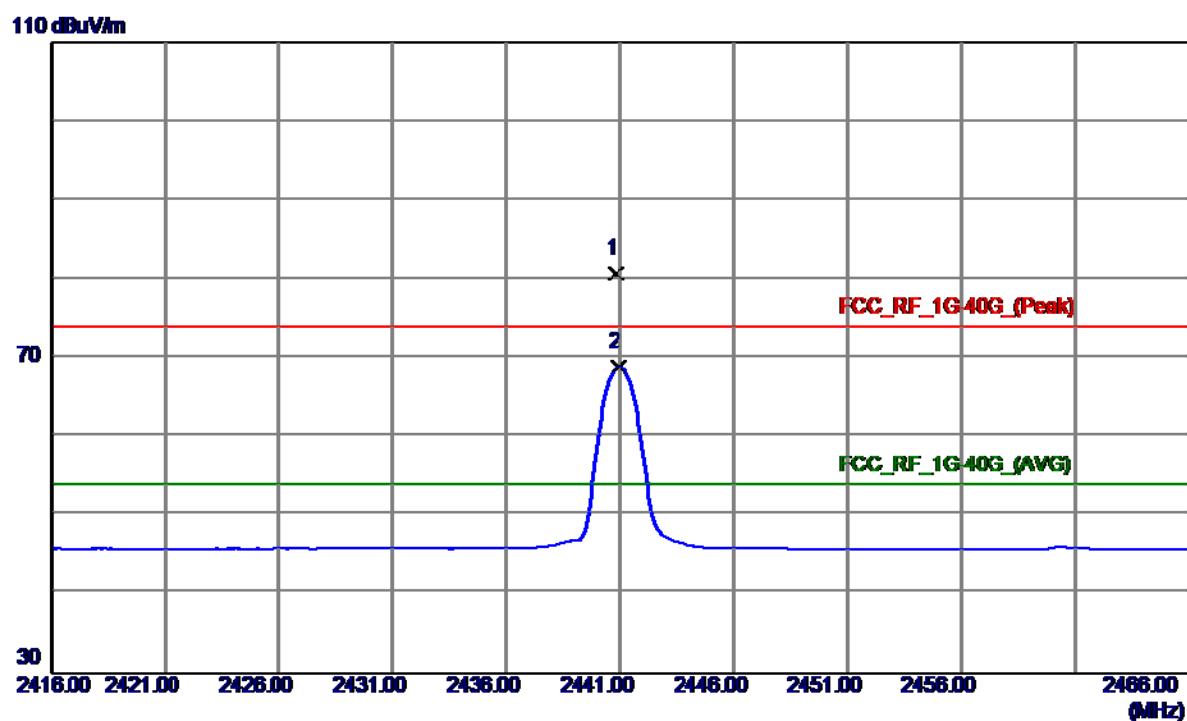
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4803.8200	42.03	5.82	47.85	54.00	-6.15	AVG	
2	4804.4100	47.79	5.82	53.61	74.00	-20.39	Peak	

Test Mode : TX 2441MHz \_CH39\_3Mbps

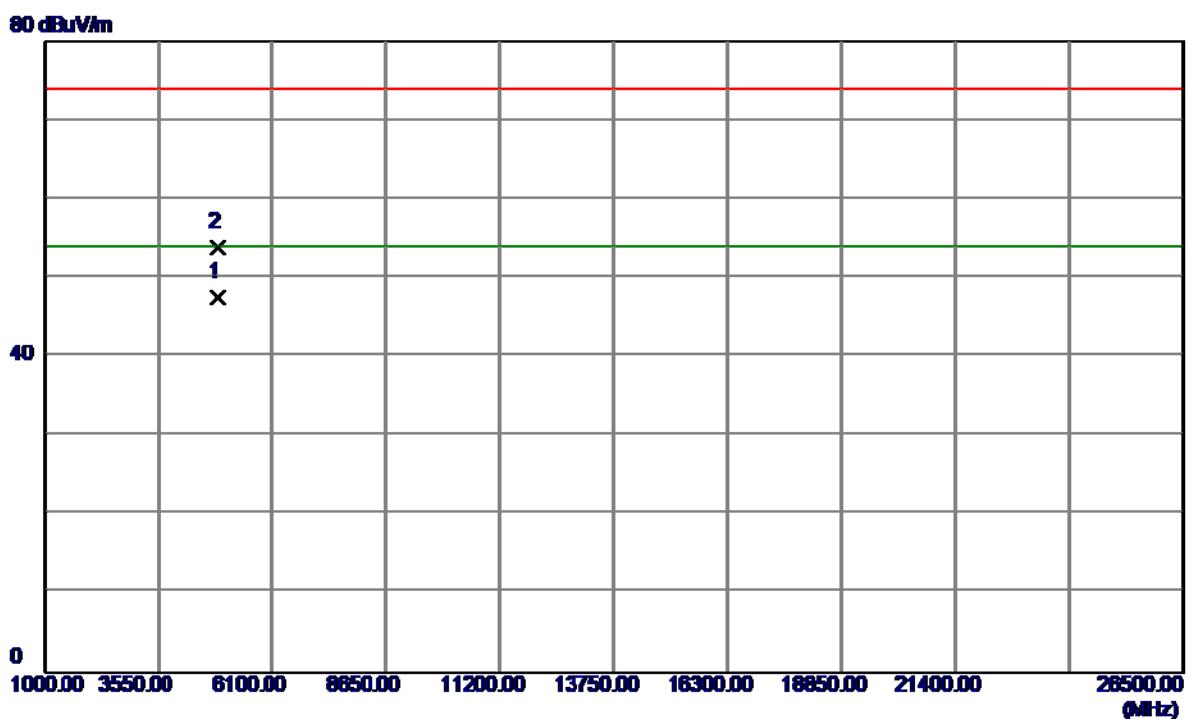
Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	2440.8500	47.93	32.75	80.68	74.00	6.68	Peak	NO LIMIT
2	2440.9500	36.19	32.75	68.94	54.00	14.94	AVG	NO LIMIT

Test Mode : TX 2441MHz \_CH39\_3Mbps

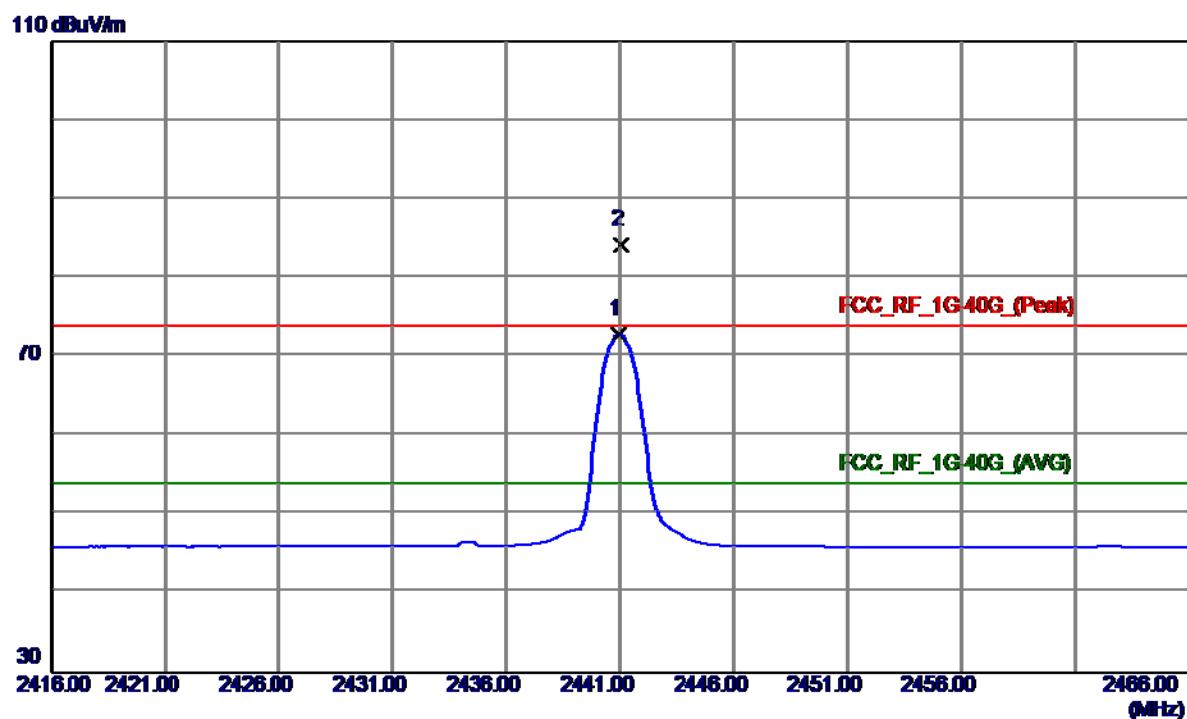
## Vertical



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4883.7200	41.56	6.03	47.59	54.00	-6.41	AVG	
2	4884.2100	47.89	6.03	53.92	74.00	-20.08	Peak	

Test Mode : TX 2441MHz \_CH39\_3Mbps

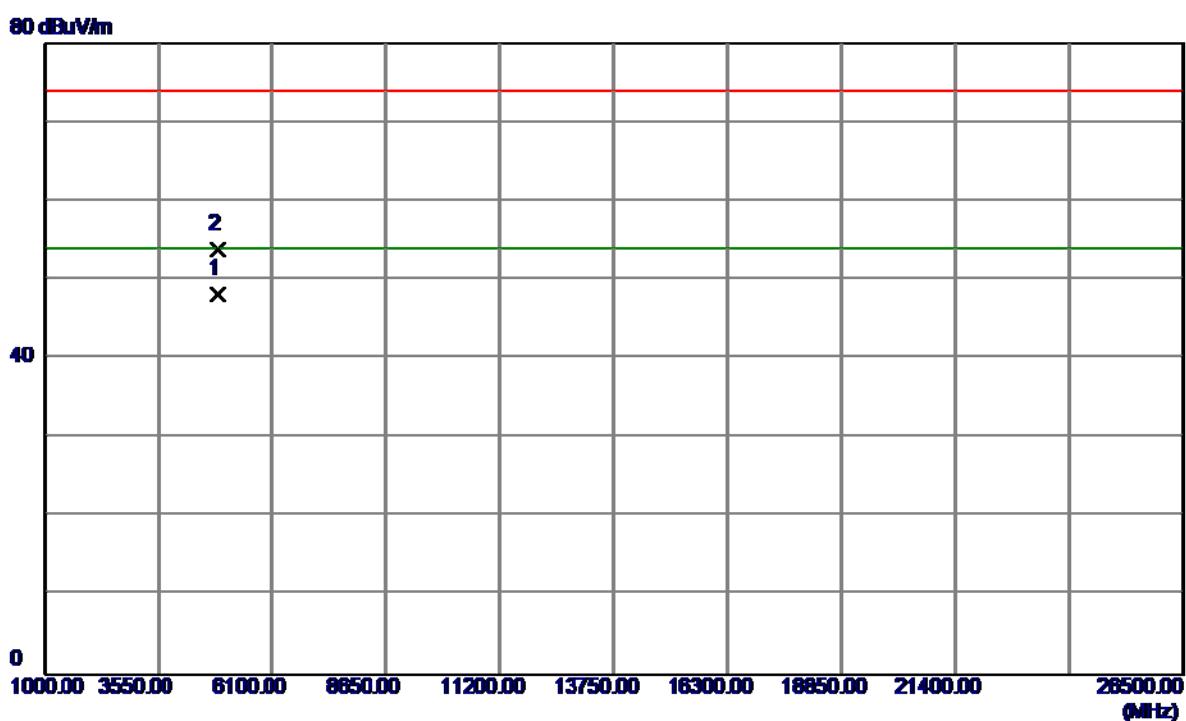
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	2440.9500	40.18	32.75	72.93	54.00	18.93	AVG	NO LIMIT
2	2441.0500	51.51	32.75	84.26	74.00	10.26	Peak	NO LIMIT

Test Mode : TX 2441MHz \_CH39\_3Mbps

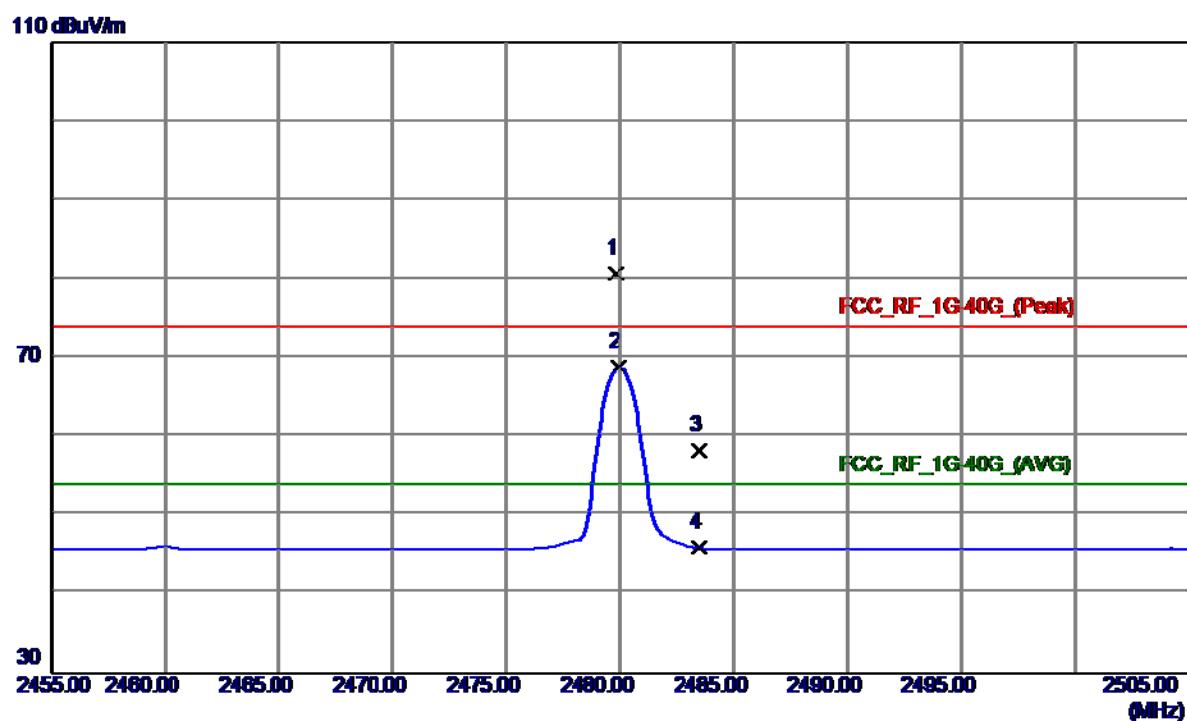
## Horizontal



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	dBuV/m	dBuV/m	dB		
1	4883.1700	42.19	6.03	48.22	54.00	-5.78	AVG	
2	4884.6100	47.85	6.03	53.88	74.00	-20.12	Peak	

Test Mode : TX 2480MHz \_CH78\_3Mbps

Vertical

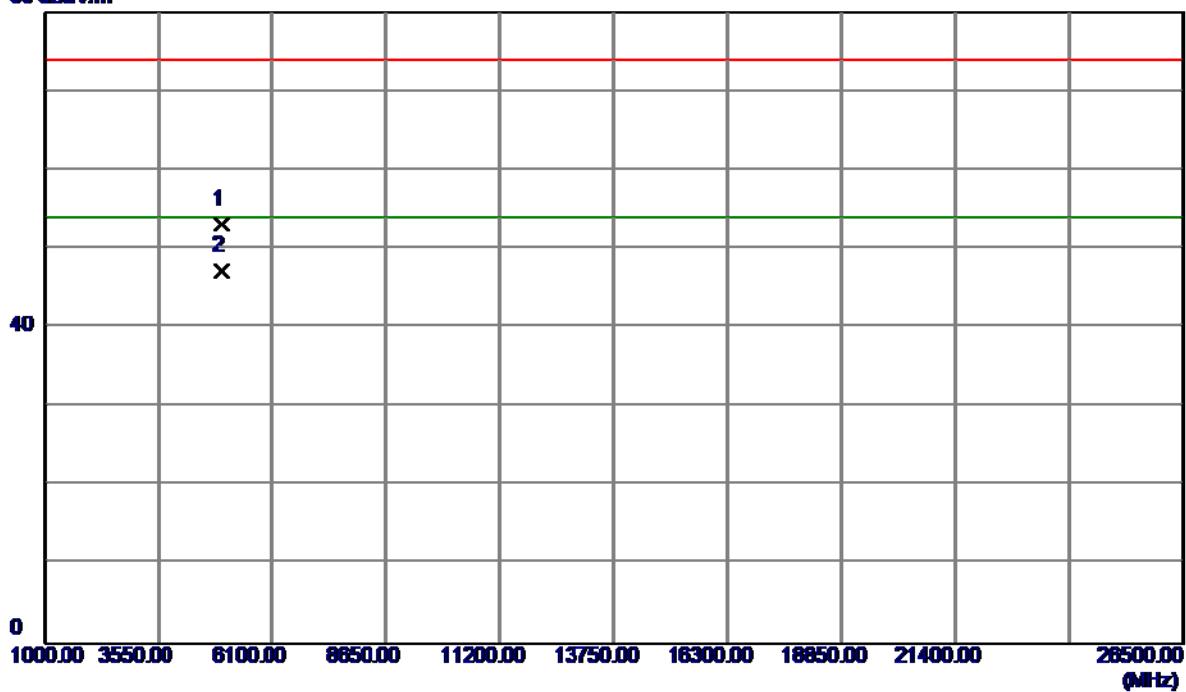


No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2479.8500	47.86	32.80	80.66	74.00	6.66	Peak	NO LIMIT
2	2479.9500	36.02	32.80	68.82	54.00	14.82	AVG	NO LIMIT
3	2483.5000	25.48	32.81	58.29	74.00	-15.71	Peak	
4	2483.5000	13.16	32.81	45.97	54.00	-8.03	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

## Vertical

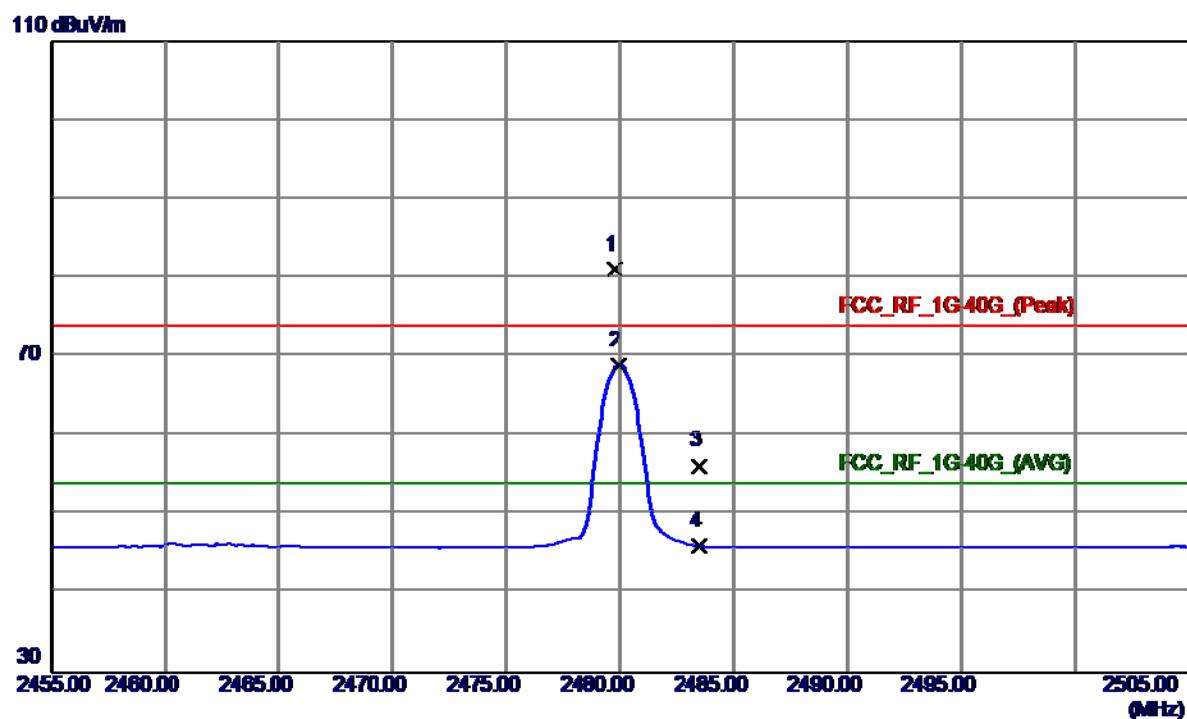
80 dBuV/m



No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4961.6100	46.95	6.24	53.19	74.00	-20.81	Peak	
2	4962.7900	41.02	6.24	47.26	54.00	-6.74	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

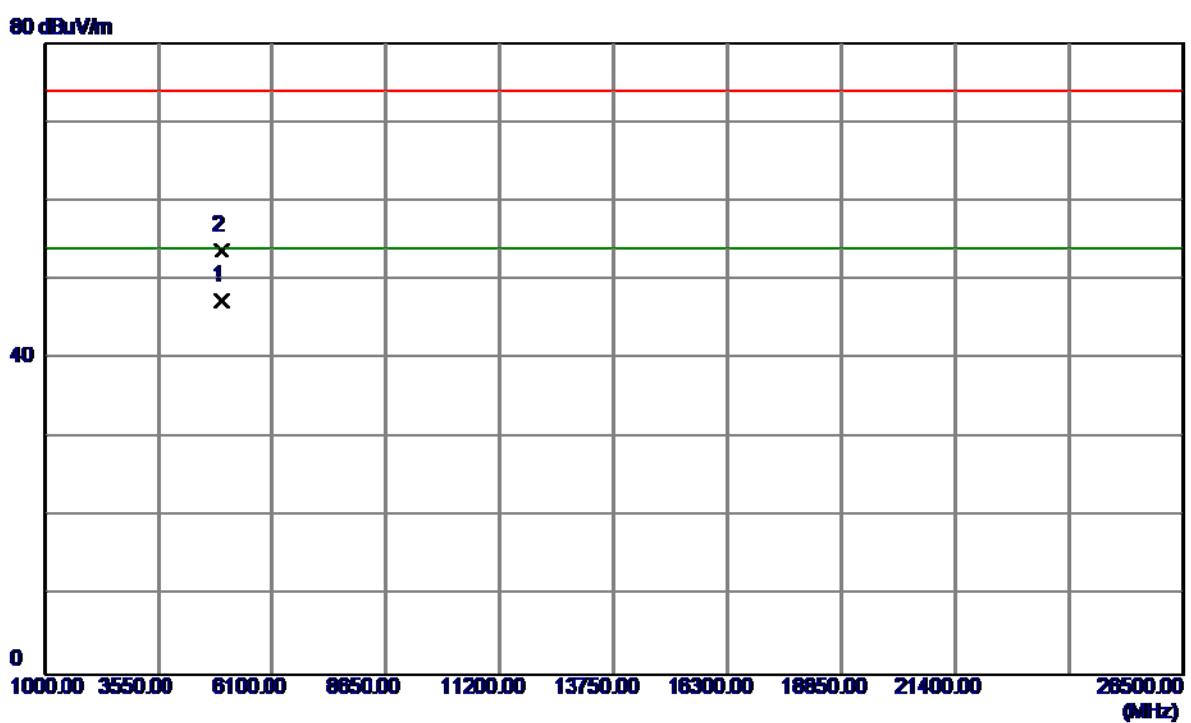
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2479.8000	48.28	32.80	81.08	74.00	7.08	Peak	NO LIMIT
2	2479.9500	36.14	32.80	68.94	54.00	14.94	AVG	NO LIMIT
3	2483.5000	23.35	32.81	56.16	74.00	-17.84	Peak	
4	2483.5000	13.15	32.81	45.96	54.00	-8.04	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

## Horizontal



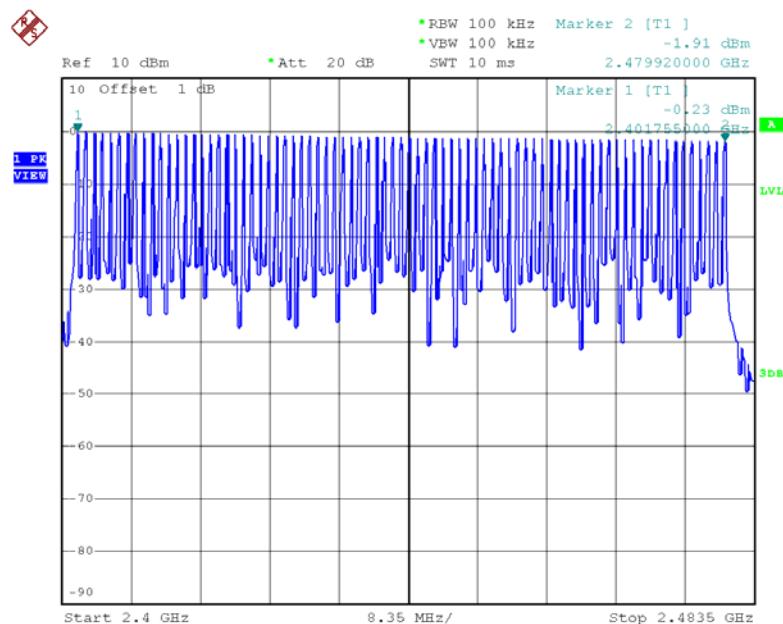
No.	Freq.	Reading	Correct	Measure	Limit	Margin	Detector	Comment
		Level	Factor	ment	dBuV/m	dB		
1	4961.7500	41.06	6.24	47.30	54.00	-6.70	AVG	
2	4962.7200	47.53	6.24	53.77	74.00	-20.23	Peak	

## ATTACHMENT E - NUMBER OF HOPPING CHANNEL

**Test Mode****Hopping Mode\_1Mbps**

Number of Hopping Channel

79

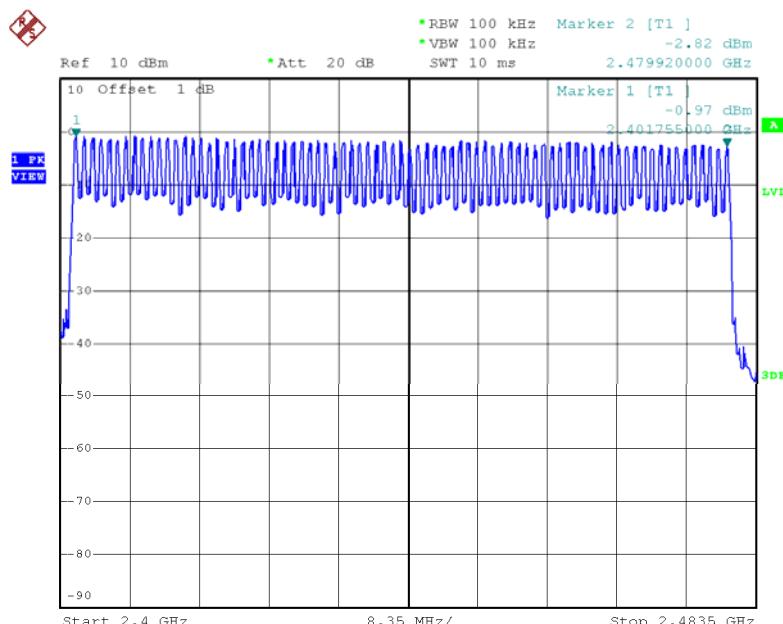


Date: 17.JAN.2016 12:38:34

**Test Mode****Hopping Mode\_3Mbps**

Number of Hopping Channel

79



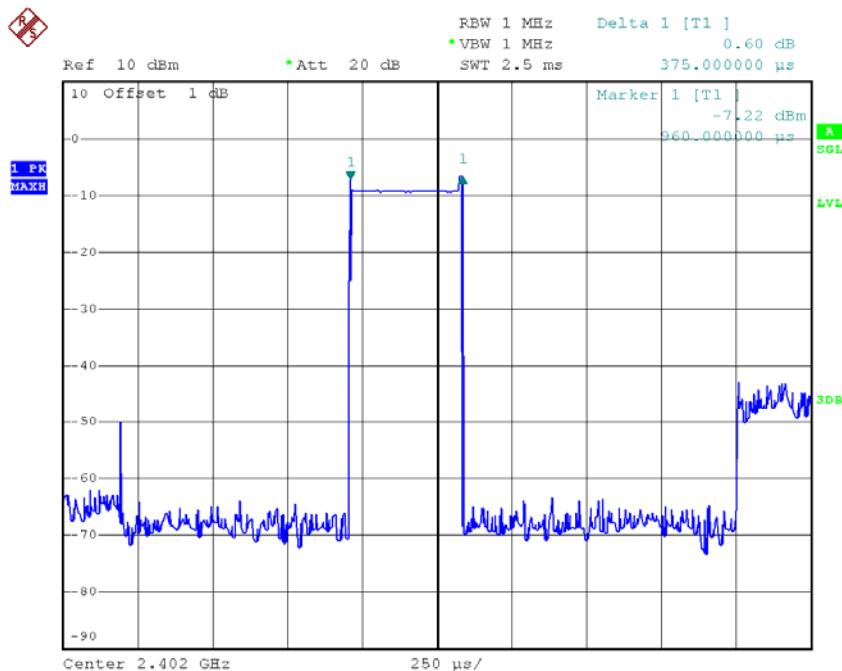
Date: 17.JAN.2016 13:01:30

## ATTACHMENT F - AVERAGE TIME OF OCCUPANCY

Test Mode :	TX Mode_1Mbps
-------------	---------------

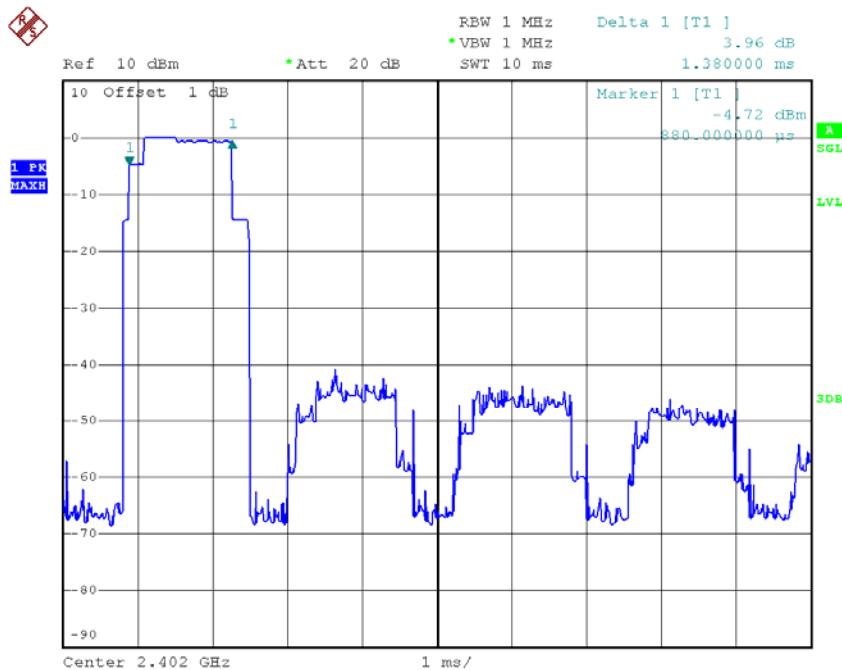
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.5600	0.2731	0.4000	Pass
DH3	2402	1.3800	0.1472	0.4000	Pass
DH1	2402	0.3750	0.0400	0.4000	Pass
DH5	2441	2.5200	0.2688	0.4000	Pass
DH3	2441	1.3400	0.1429	0.4000	Pass
DH1	2441	0.3750	0.0400	0.4000	Pass
DH5	2480	2.3600	0.2517	0.4000	Pass
DH3	2480	1.3800	0.1472	0.4000	Pass
DH1	2480	0.3750	0.0400	0.4000	Pass

## CH00-DH1



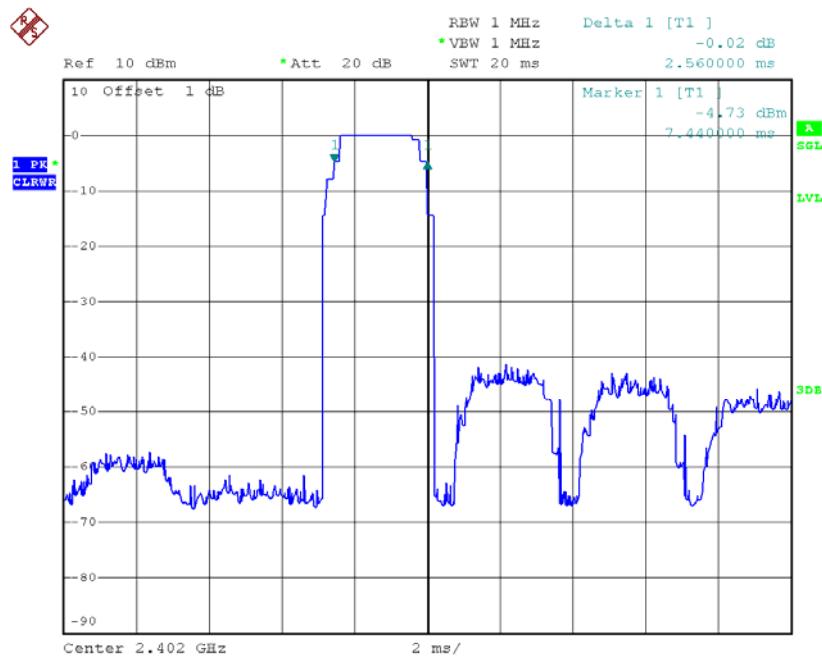
Date: 17.JAN.2016 12:12:48

## CH00-DH3



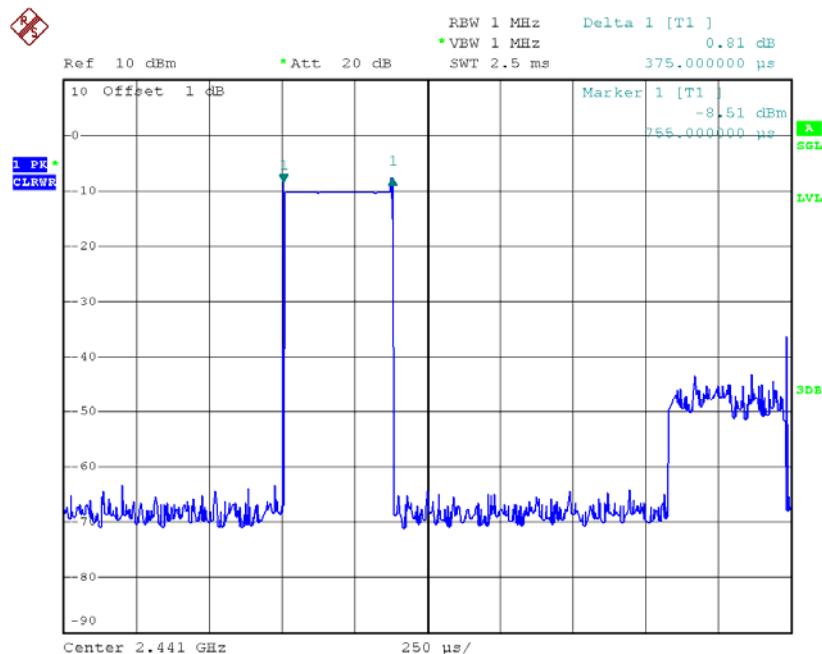
Date: 17.JAN.2016 12:42:52

## CH00-DH5



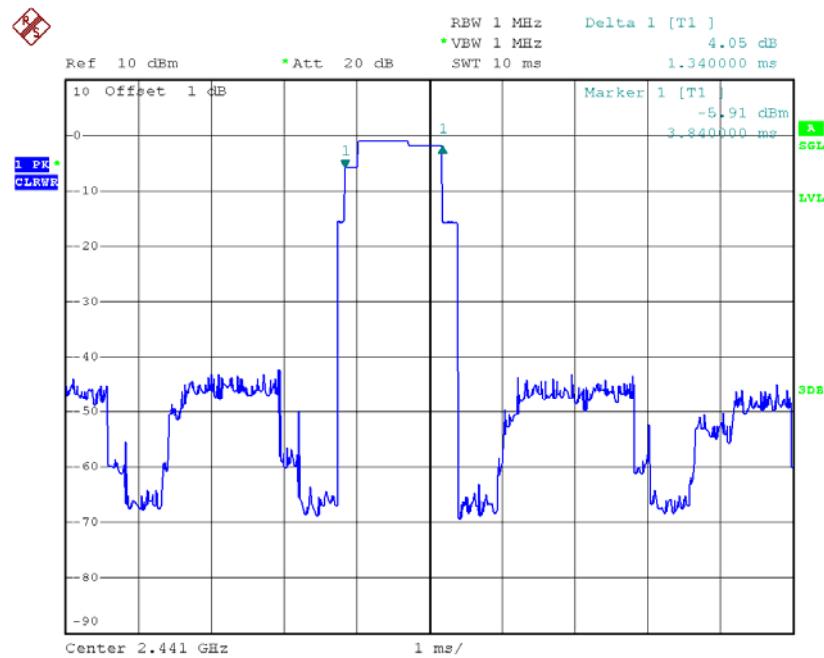
Date: 17.JAN.2016 12:43:16

## CH39-DH1



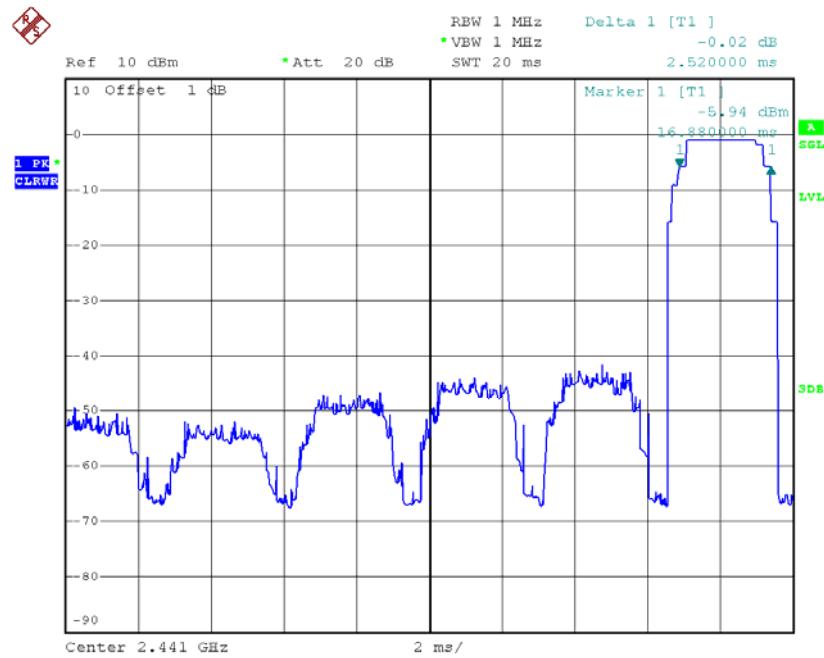
Date: 17.JAN.2016 12:12:58

## CH39-DH3



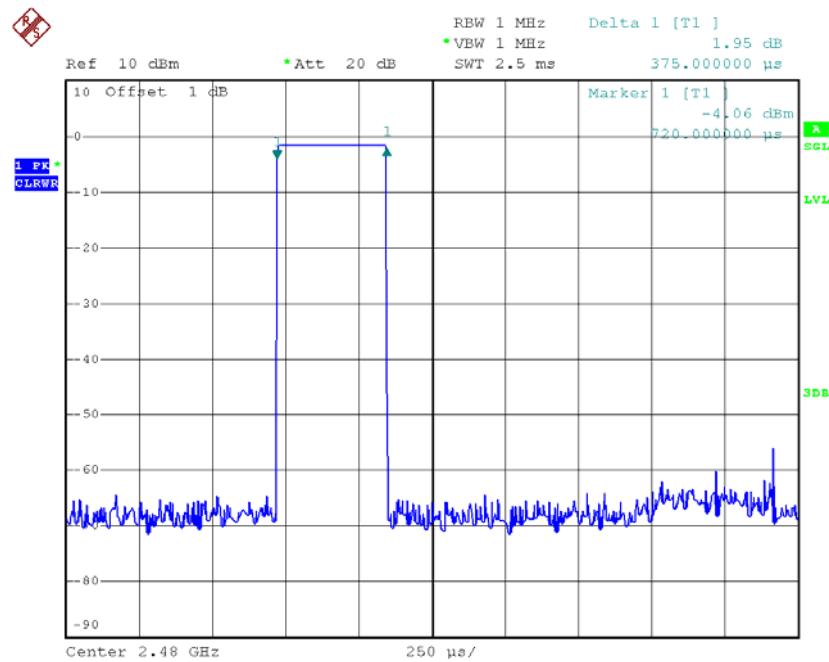
Date: 17.JAN.2016 12:42:58

## CH39-DH5



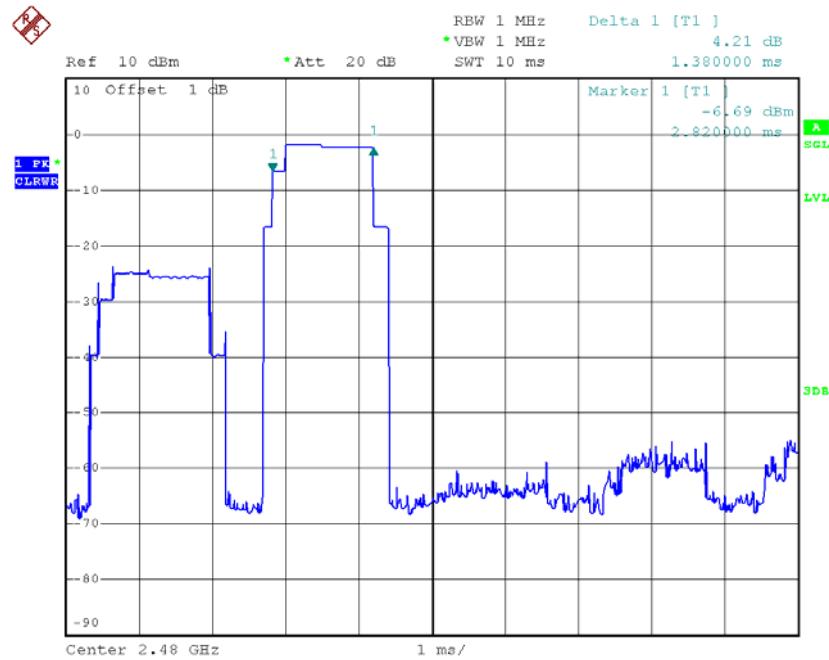
Date: 17.JAN.2016 12:43:21

## CH78-DH1



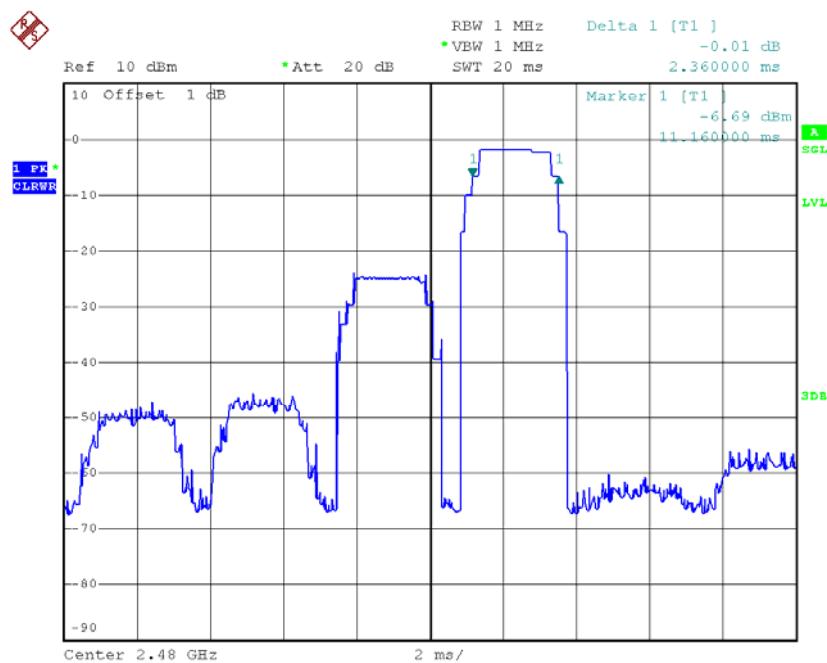
Date: 17.JAN.2016 12:13:17

## CH78-DH3



Date: 17.JAN.2016 12:43:04

## CH78-DH5

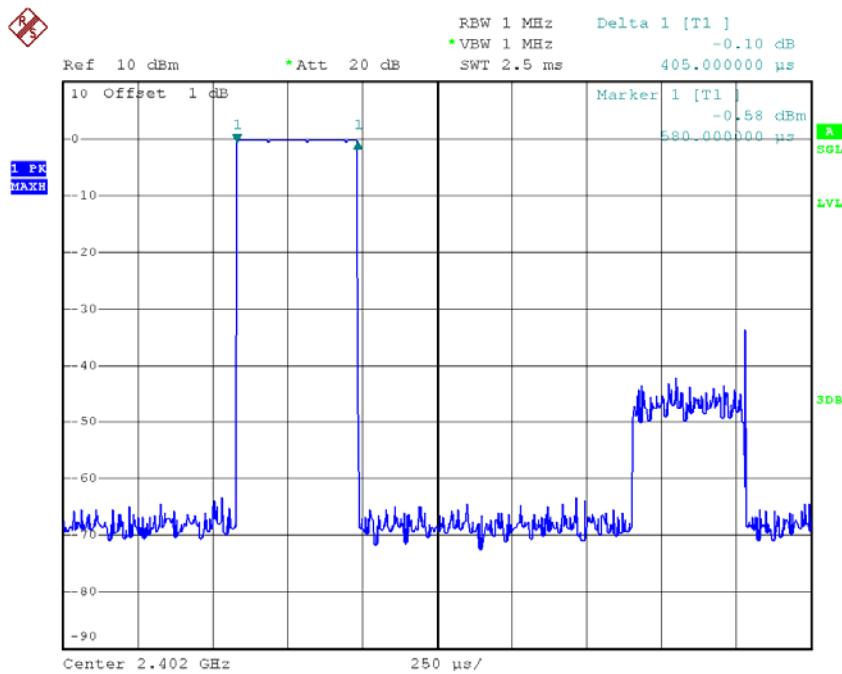


Date: 17.JAN.2016 12:43:29

Test Mode :	TX Mode_3Mbps
-------------	---------------

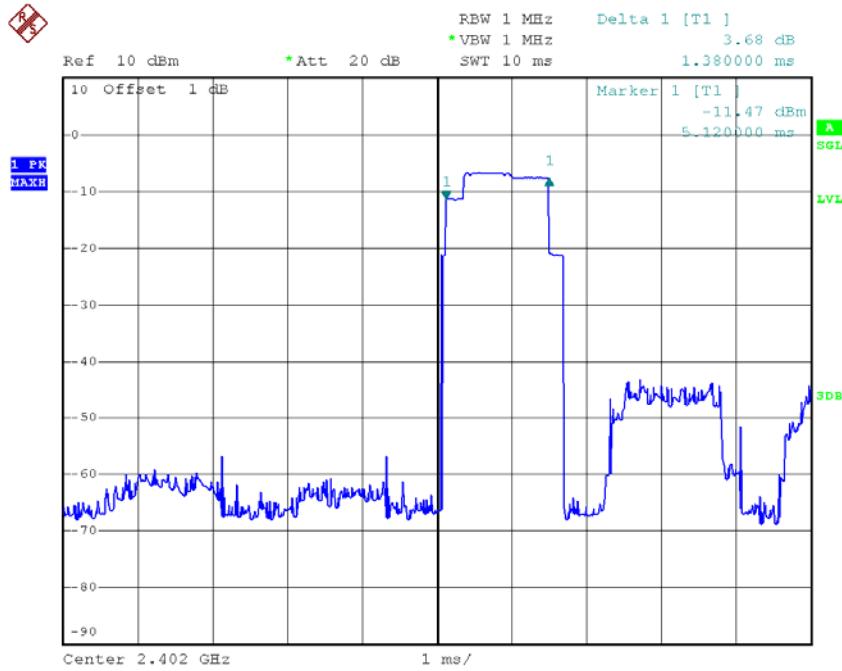
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.5200	0.2688	0.4000	Pass
DH3	2402	1.3800	0.1472	0.4000	Pass
DH1	2402	0.4050	0.0432	0.4000	Pass
DH5	2441	2.3600	0.2517	0.4000	Pass
DH3	2441	1.3600	0.1451	0.4000	Pass
DH1	2441	0.5750	0.0613	0.4000	Pass
DH5	2480	2.3600	0.2517	0.4000	Pass
DH3	2480	1.4600	0.1557	0.4000	Pass
DH1	2480	0.4050	0.0432	0.4000	Pass

CH00-DH1



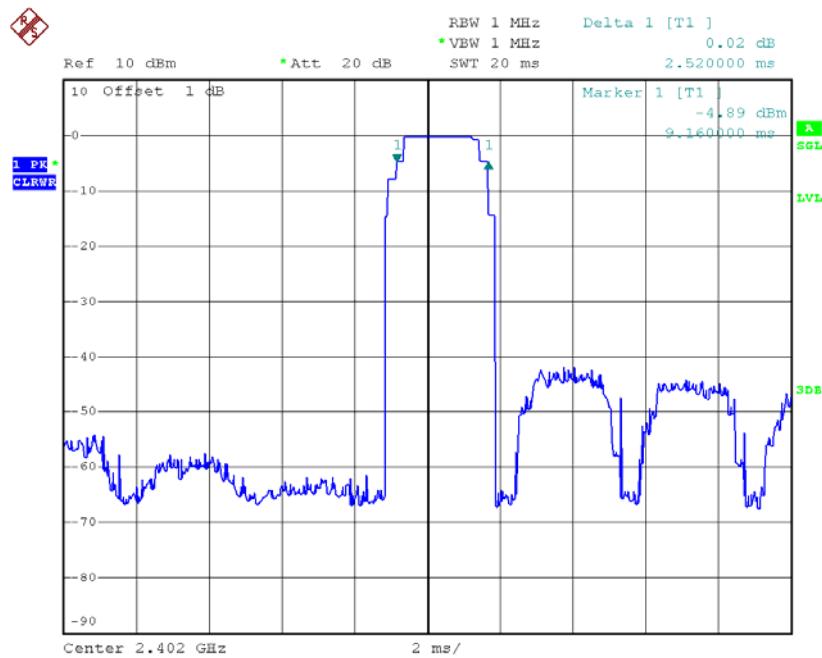
Date: 17.JAN.2016 12:51:43

**CH00-DH3**



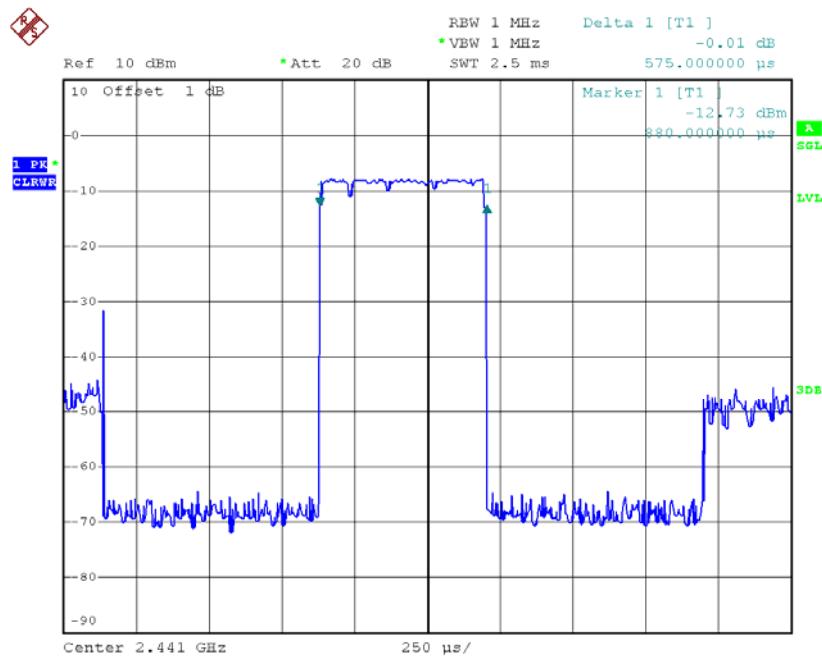
Date: 17.JAN.2016 13:04:02

**CH00-DH5**



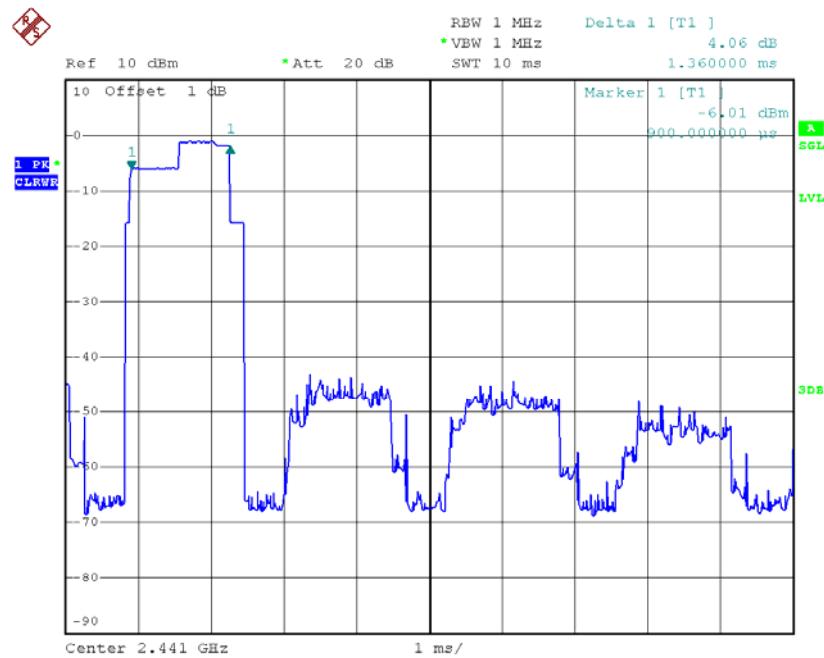
Date: 17.JAN.2016 13:04:32

CH39-DH1



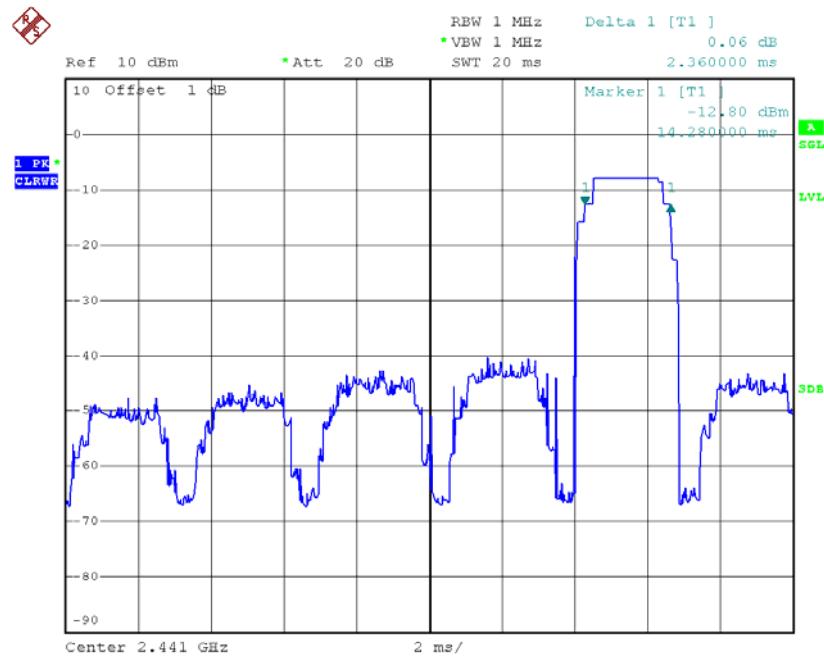
Date: 17.JAN.2016 12:51:49

## CH39-DH3



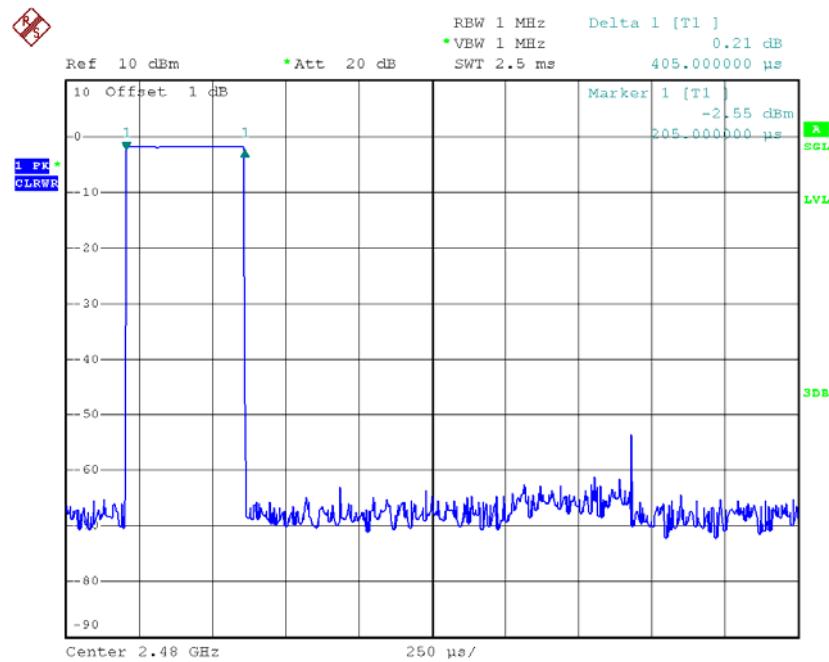
Date: 17.JAN.2016 13:04:06

## CH39-DH5



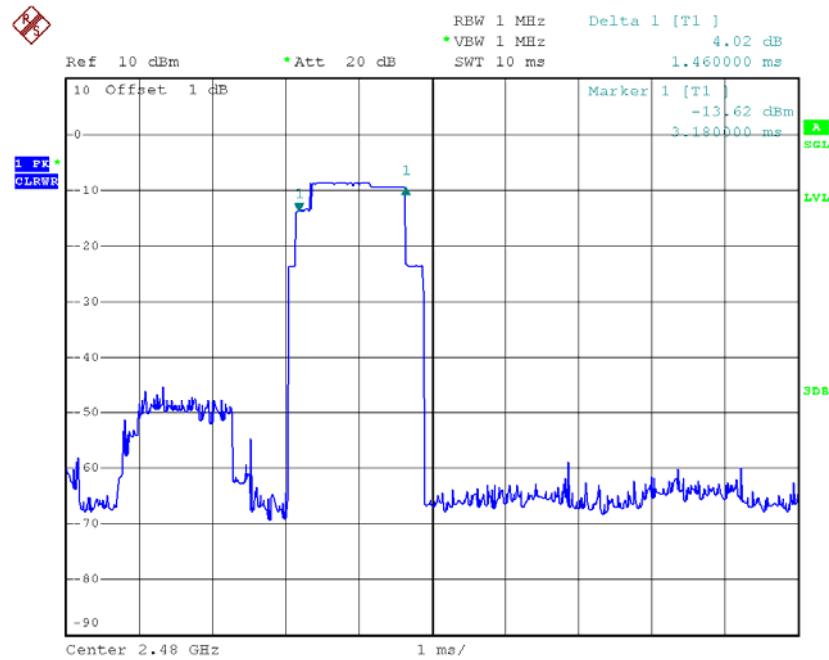
Date: 17.JAN.2016 13:04:36

## CH78-DH1



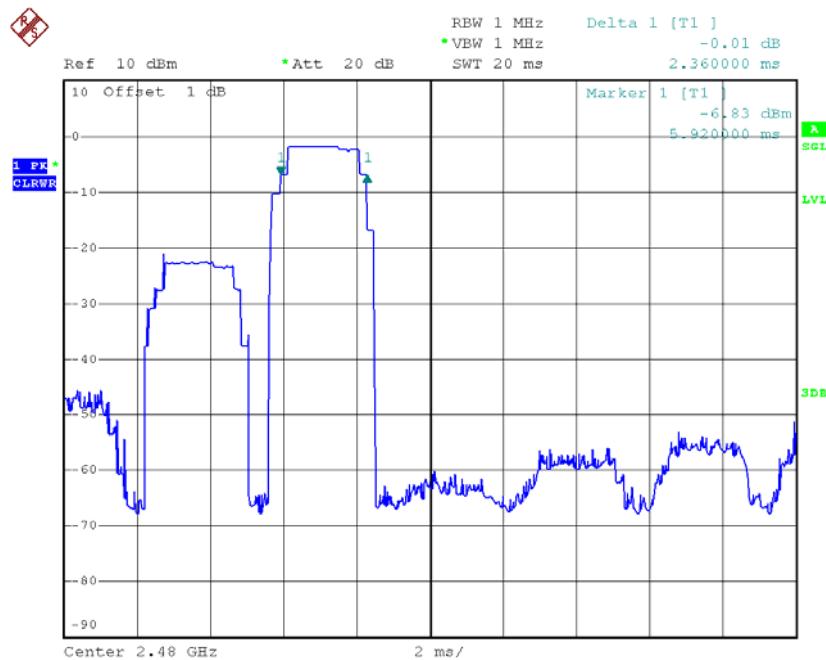
Date: 17.JAN.2016 12:52:16

## CH78-DH3



Date: 17.JAN.2016 13:04:10

## CH78-DH5

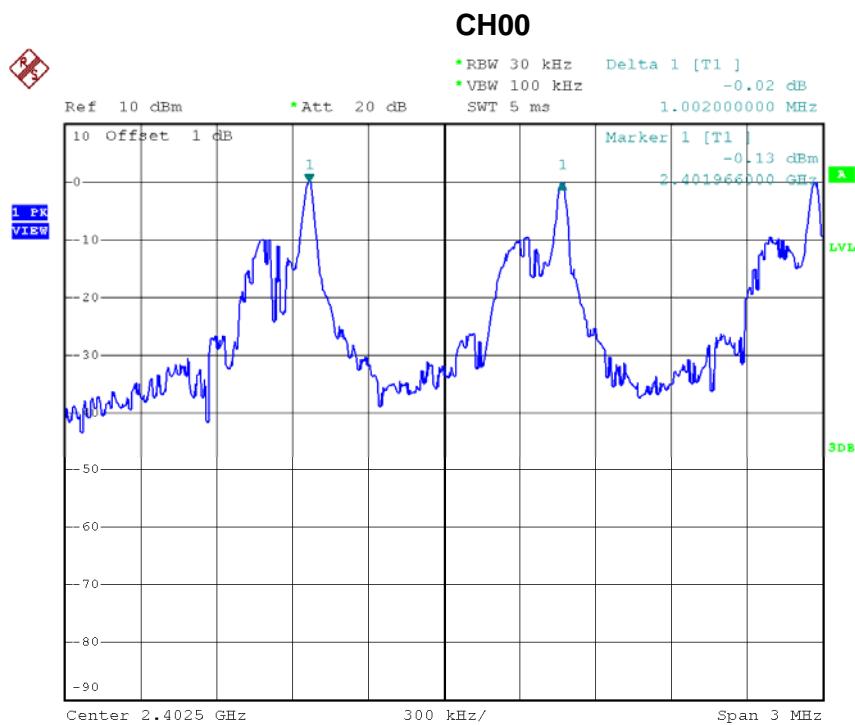


Date: 17.JAN.2016 13:04:41

## **ATTACHMENT G - HOPPING CHANNEL SEPARATION MEASUREMENT**

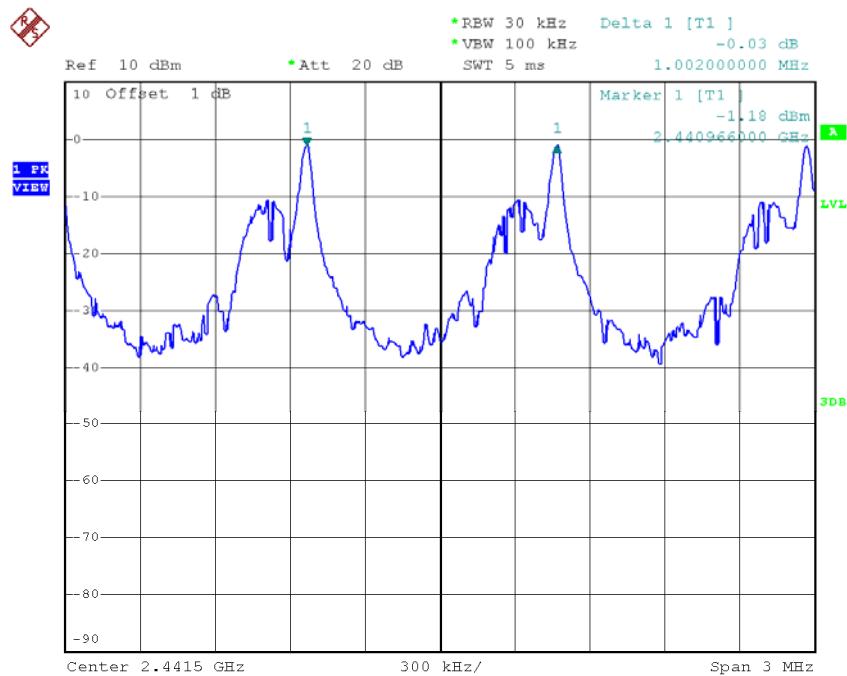
Test Mode : Hopping on \_1Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	1.002	0.695	Pass
2441	1.002	0.696	Pass
2480	1.002	0.692	Pass

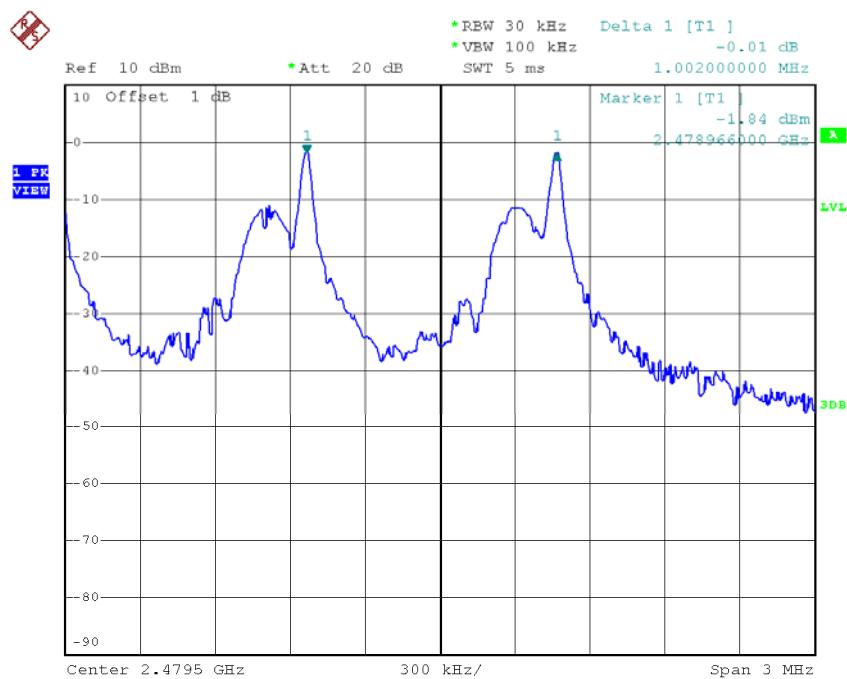


Date: 17.JAN.2016 12:26:50

## CH39

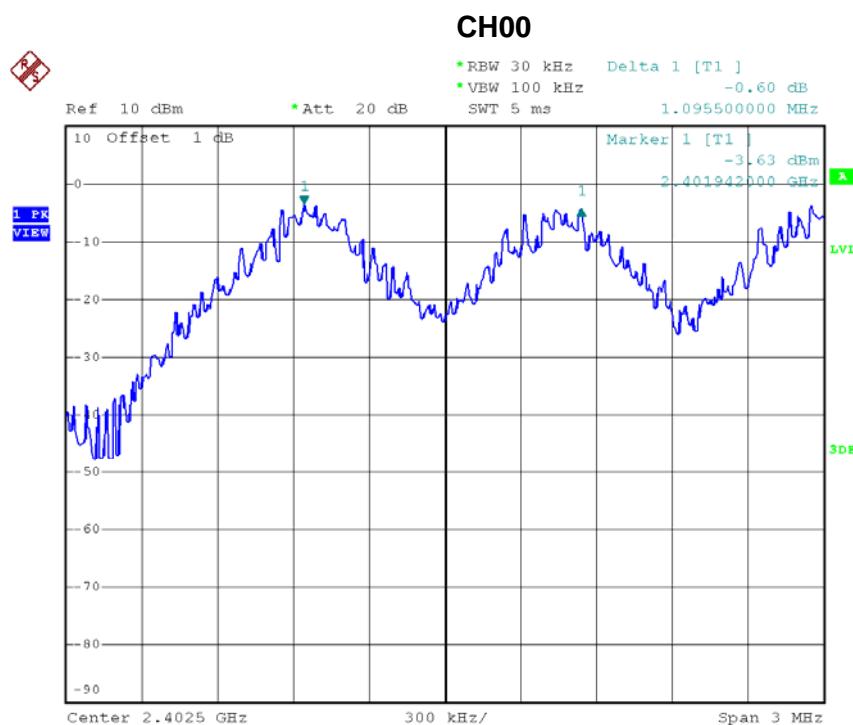


## CH78



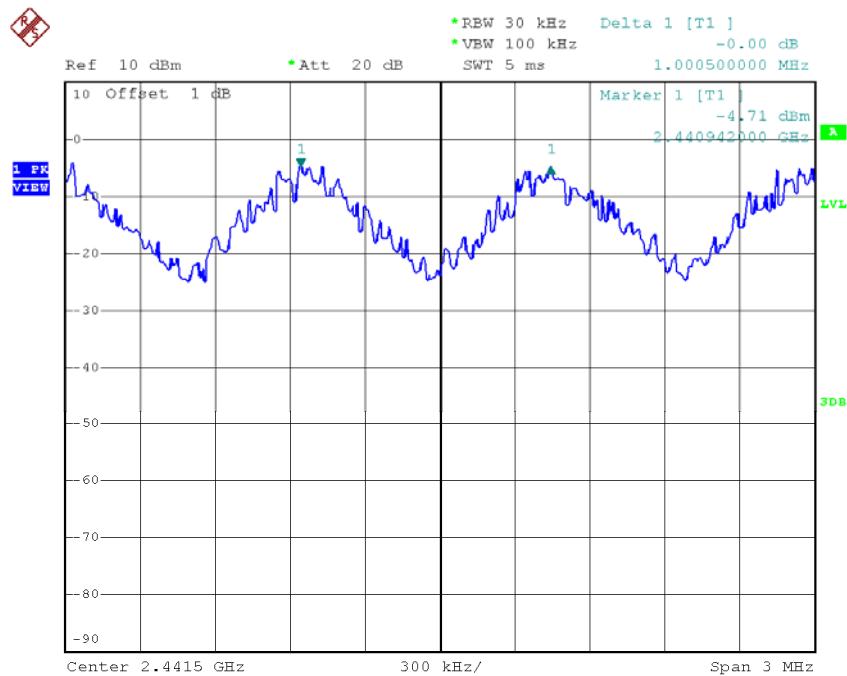
Test Mode : Hopping on \_3Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	1.096	0.913	Pass
2441	1.001	0.913	Pass
2480	1.140	0.910	Pass



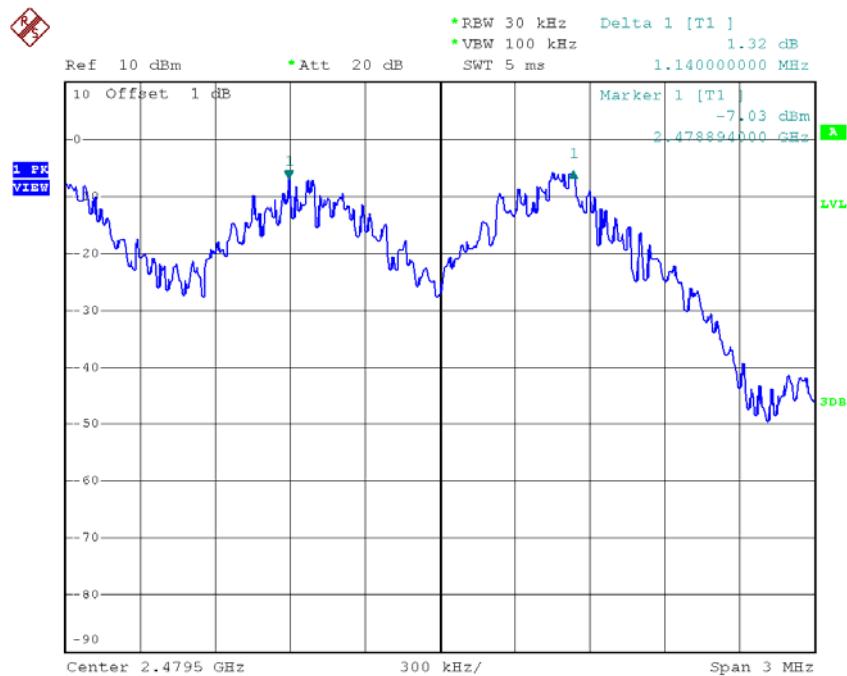
Date: 17.JAN.2016 12:53:26

## CH39



Date: 17.JAN.2016 12:54:34

## CH78

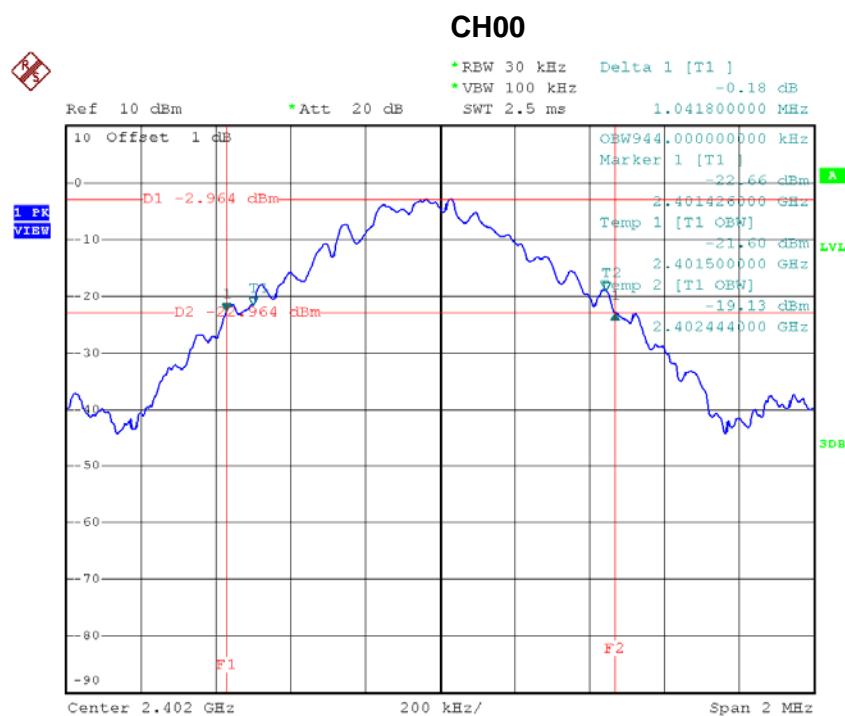


Date: 17.JAN.2016 12:55:38

## ATTACHMENT H - BANDWIDTH

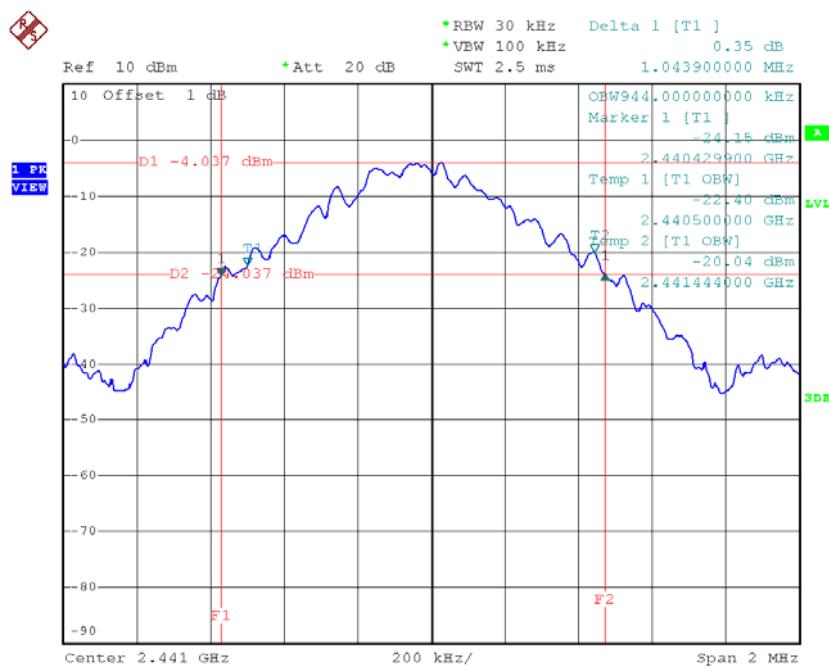
Test Mode : TX Mode \_1Mbps

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.042	0.944	Pass
2441	1.044	0.944	Pass
2480	1.038	0.948	Pass



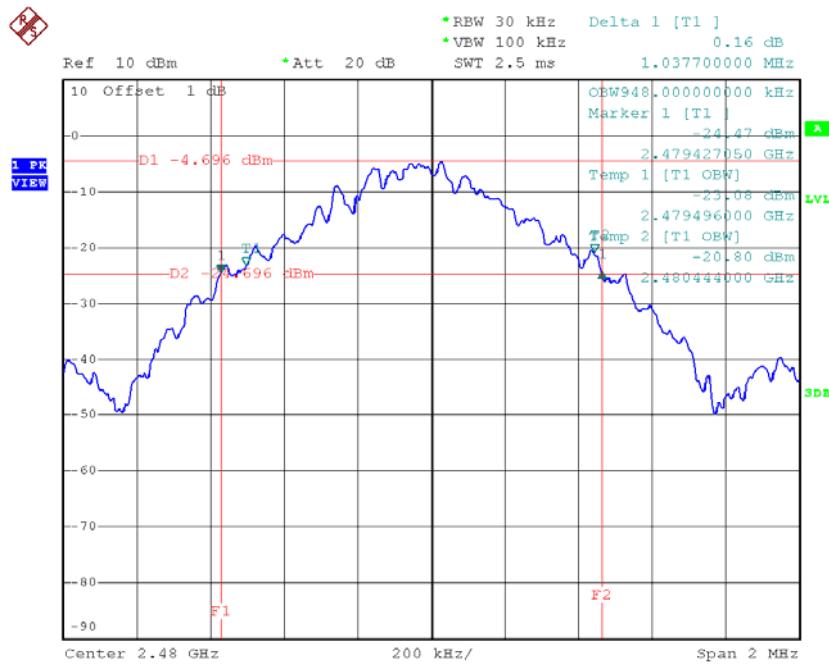
Date: 17.JAN.2016 11:50:54

## CH39



Date: 17.JAN.2016 11:53:33

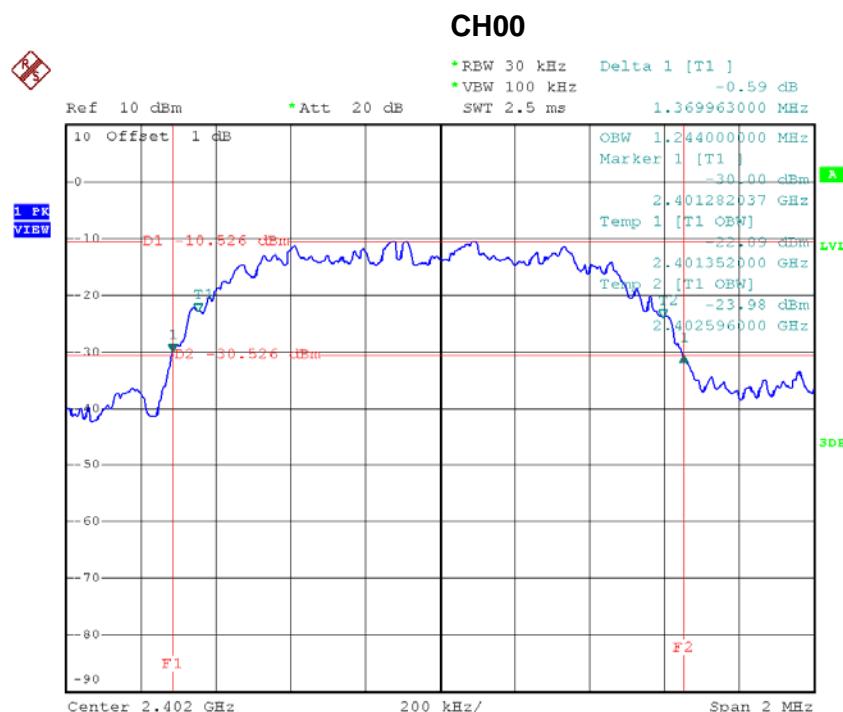
## CH78



Date: 17.JAN.2016 12:03:24

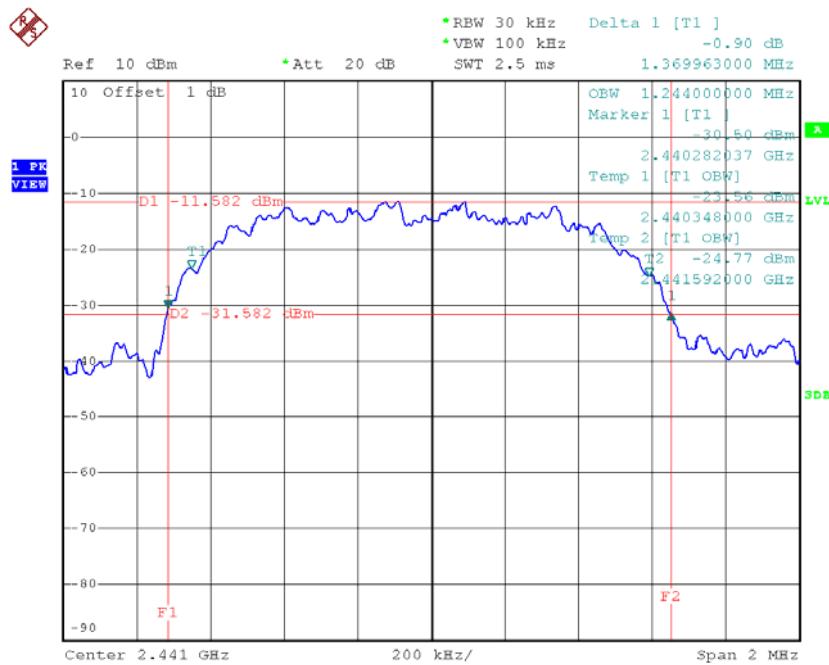
Test Mode : TX Mode \_3Mbps

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.370	1.244	Pass
2441	1.370	1.244	Pass
2480	1.365	1.244	Pass



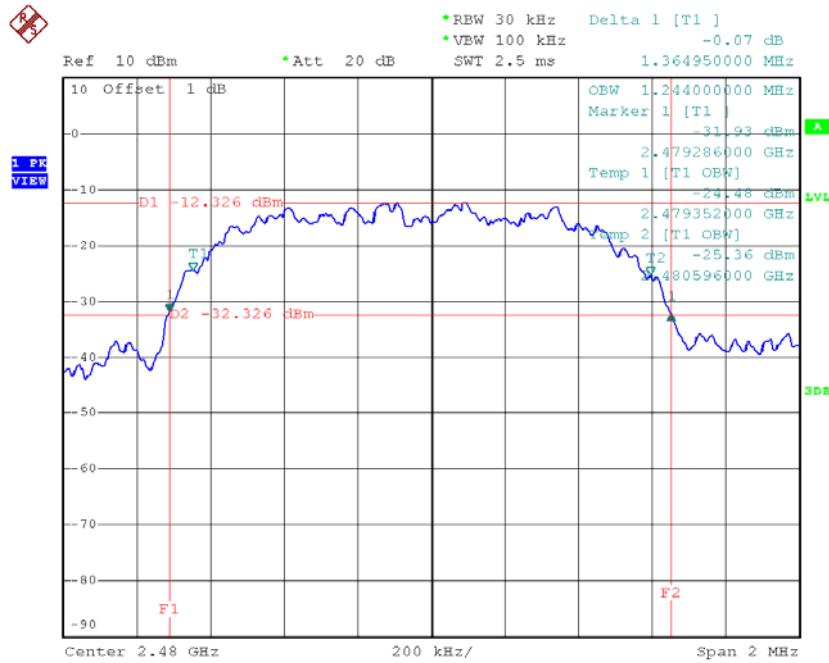
Date: 17.JAN.2016 12:47:32

## CH39



Date: 17.JAN.2016 12:49:55

## CH78

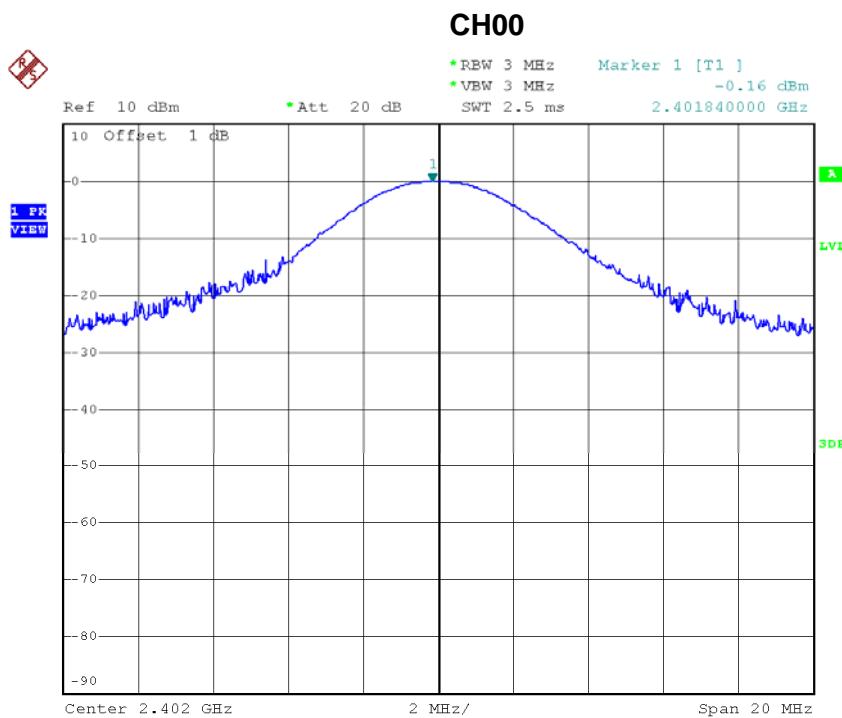


Date: 17.JAN.2016 12:50:36

## ATTACHMENT I - PEAK OUTPUT POWER

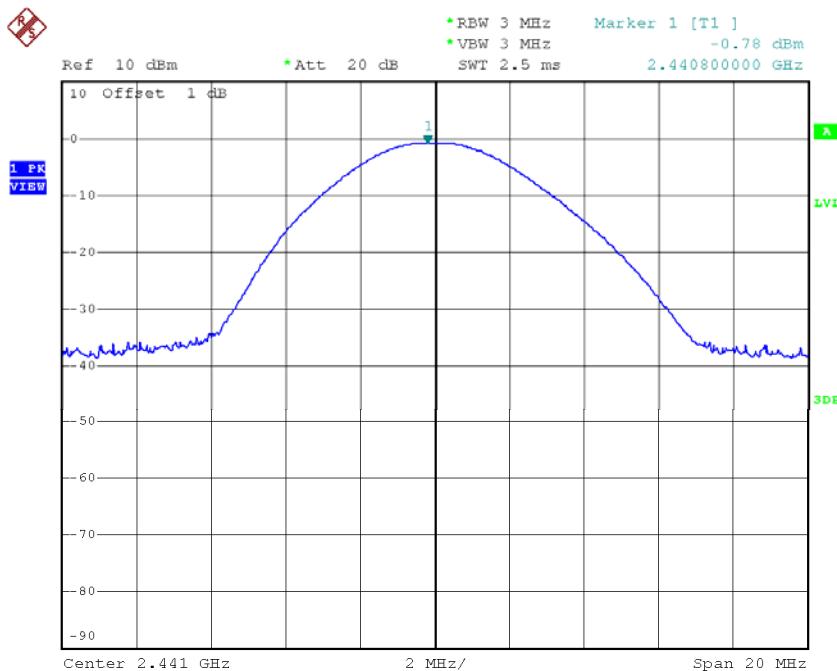
Test Mode :	TX Mode _1Mbps
-------------	----------------

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	-0.16	0.0010	30.00	1.00	Pass
2441	-0.78	0.0008	30.00	1.00	Pass
2480	-1.57	0.0007	30.00	1.00	Pass



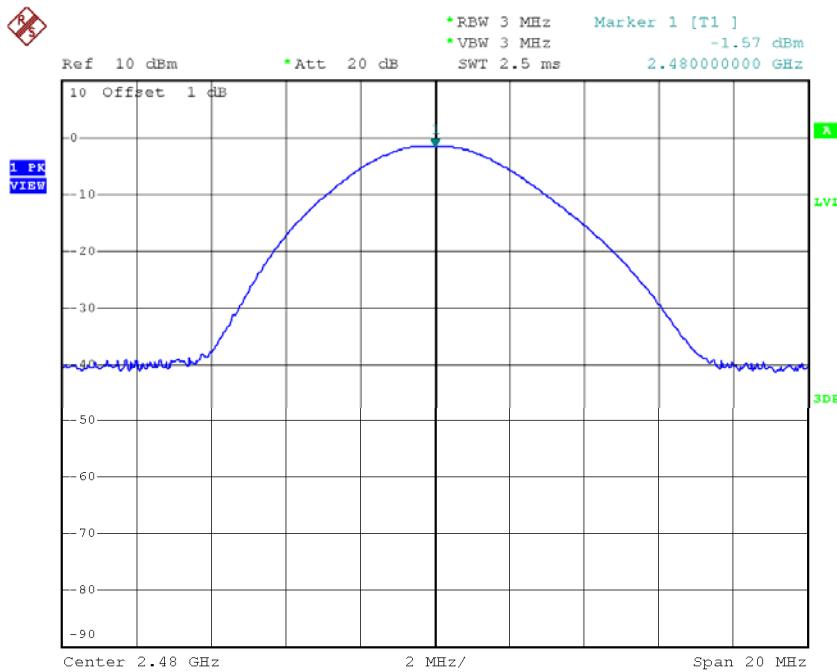
Date: 17.JAN.2016 11:57:52

## CH39



Date: 17.JAN.2016 12:00:36

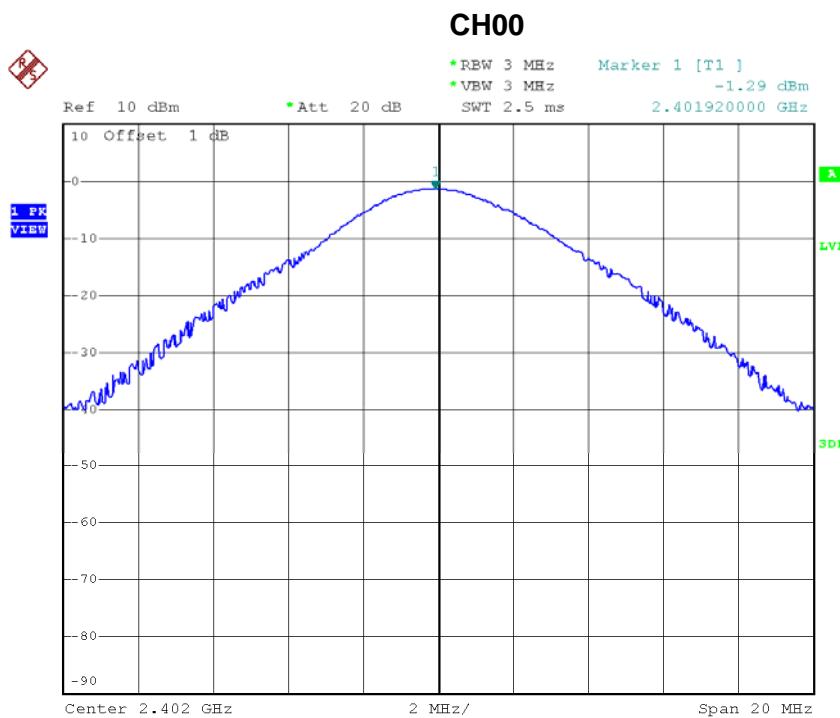
## CH78



Date: 17.JAN.2016 12:02:14

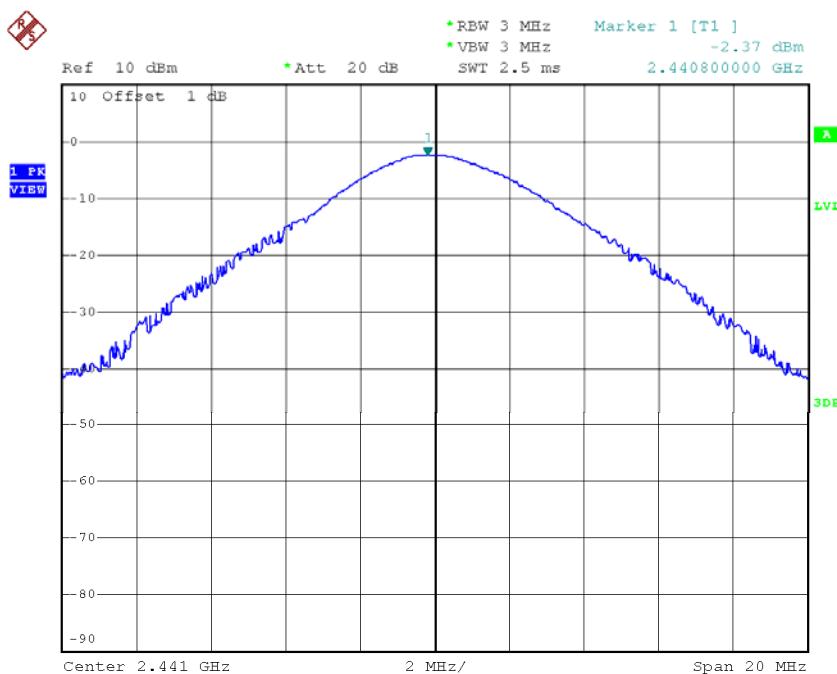
Test Mode :	TX Mode _3Mbps
-------------	----------------

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	-1.29	0.0007	30.00	1.00	Pass
2441	-2.37	0.0006	30.00	1.00	Pass
2480	-3.02	0.0005	30.00	1.00	Pass



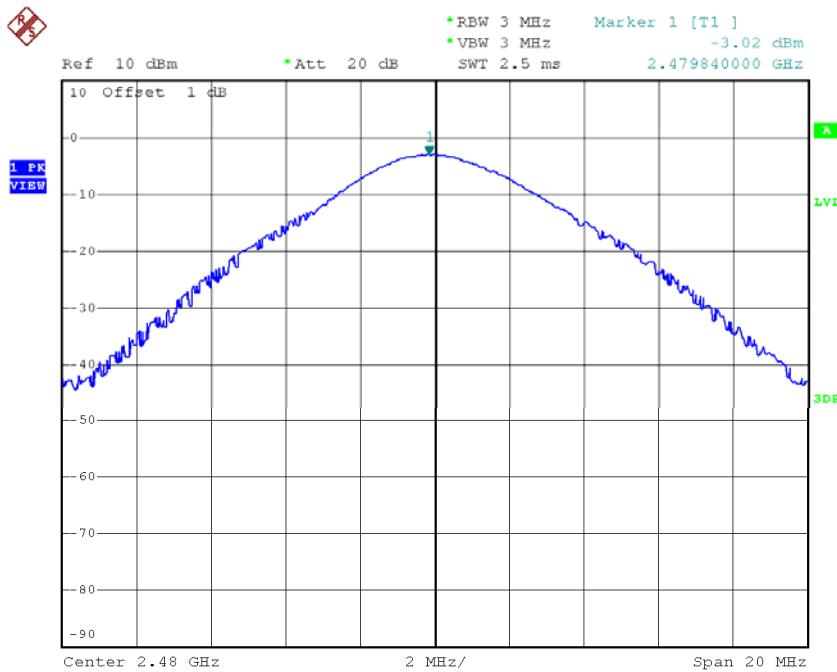
Date: 17.JAN.2016 12:45:53

## CH39



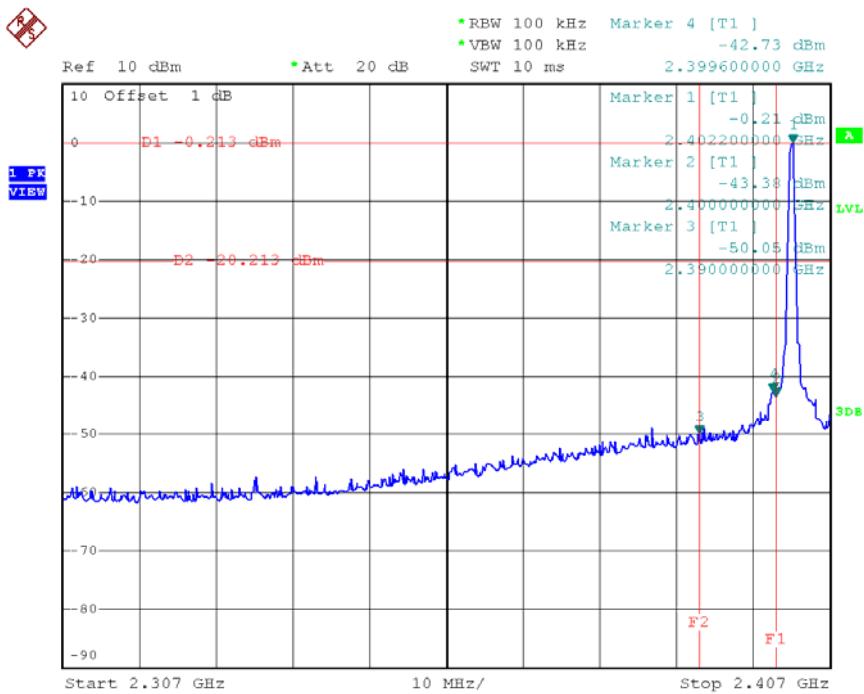
Date: 17.JAN.2016 12:46:12

## CH78

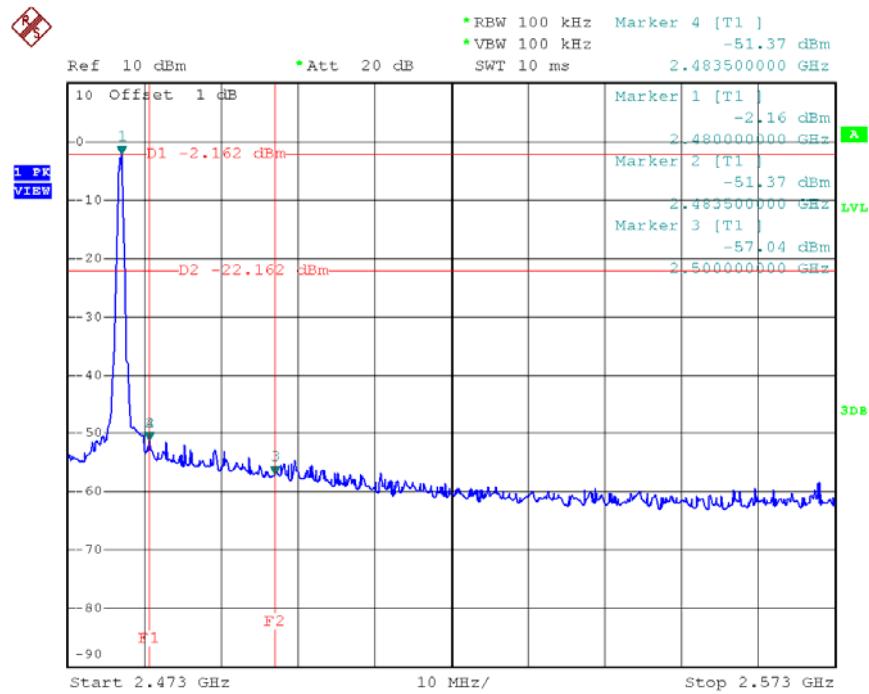


Date: 17.JAN.2016 12:46:28

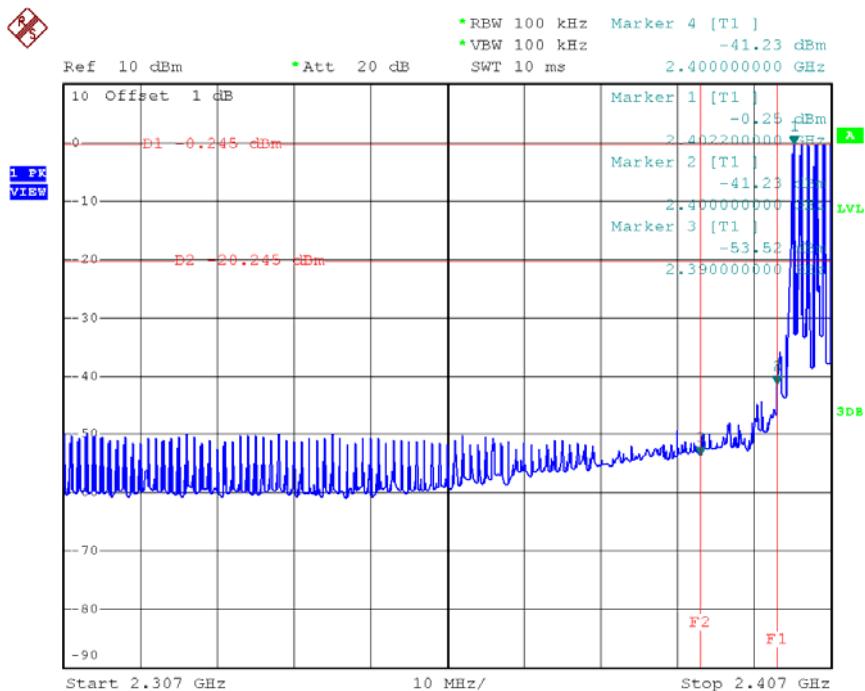
## **ATTACHMENT J - ANTENNA CONDUCTED SPURIOUS EMISSION**

**CH00 (Lower)\_1Mbps**

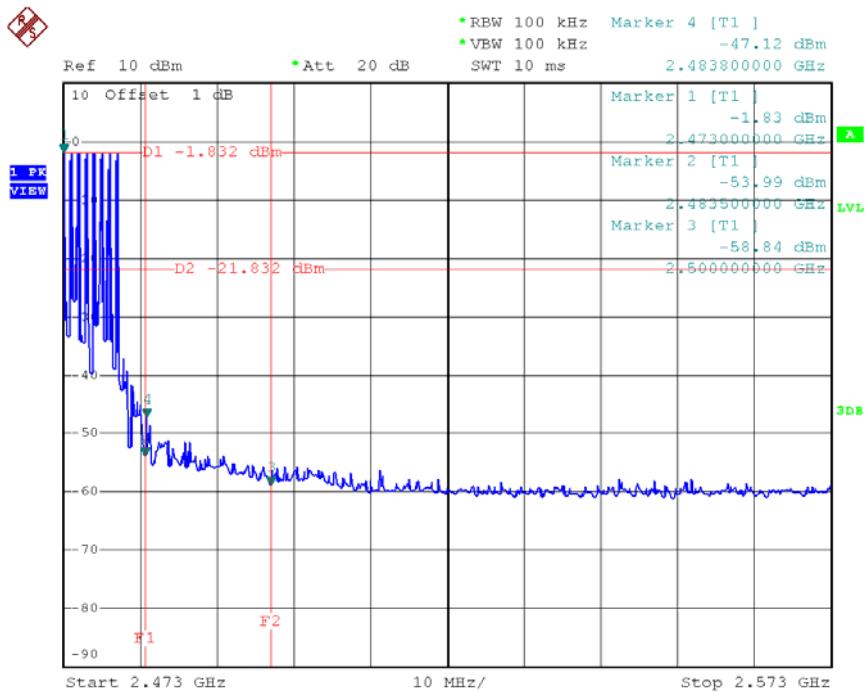
Date: 17.JAN.2016 11:50:19

**CH78 (Upper)\_1Mbps**

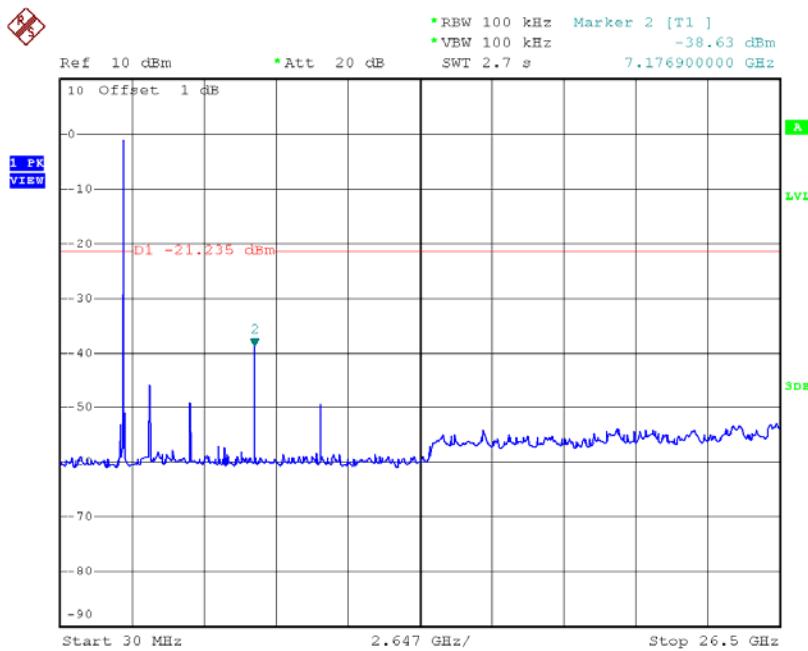
Date: 17.JAN.2016 12:02:59

**CH00 Hopping on mode (Lower)\_1Mbps**

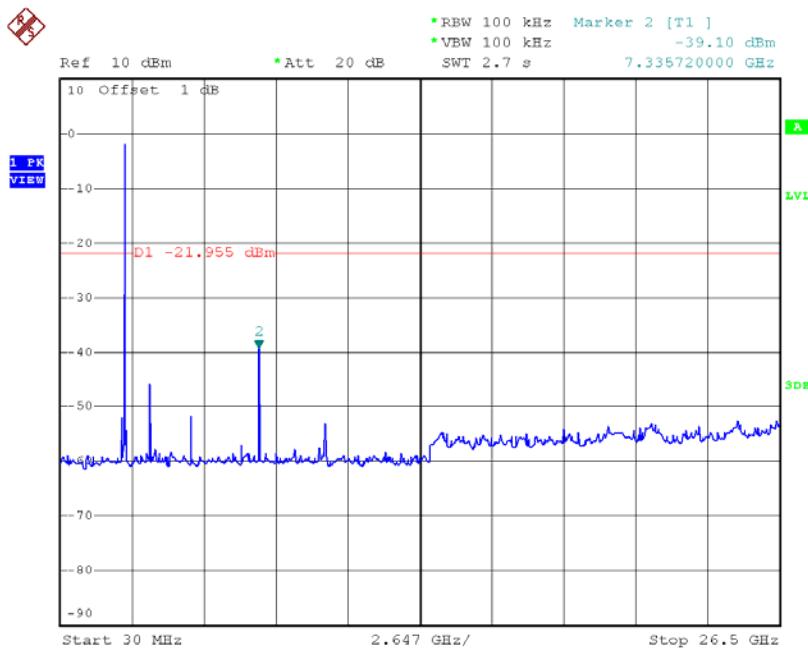
Date: 17.JAN.2016 12:41:37

**CH78 Hopping on mode (Upper)\_1Mbps**

Date: 17.JAN.2016 12:42:32

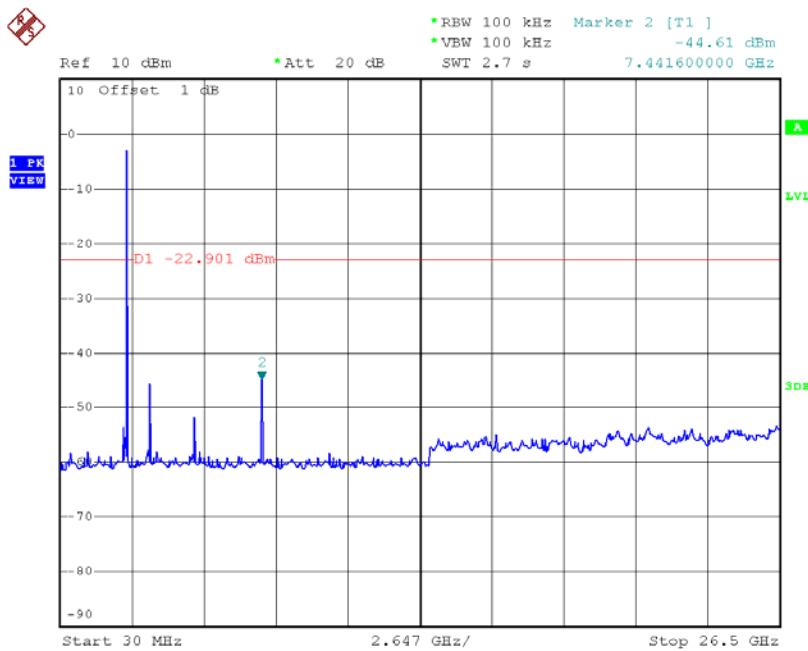
**CH00 (10 Harmonic of the frequency) \_1Mbps**

Date: 17.JAN.2016 11:51:18

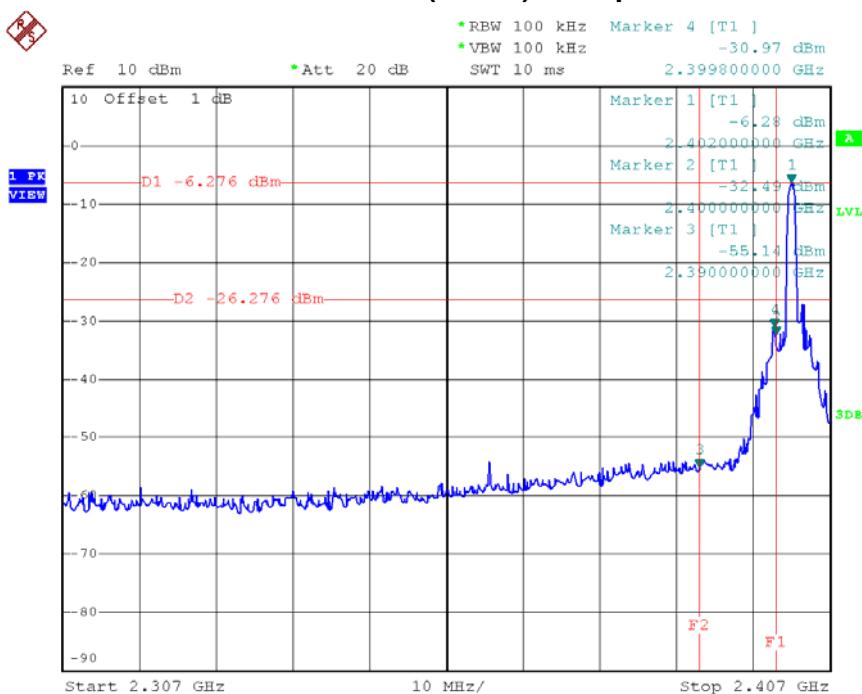
**CH39 (10 Harmonic of the frequency) \_1Mbps**

Date: 17.JAN.2016 11:52:56

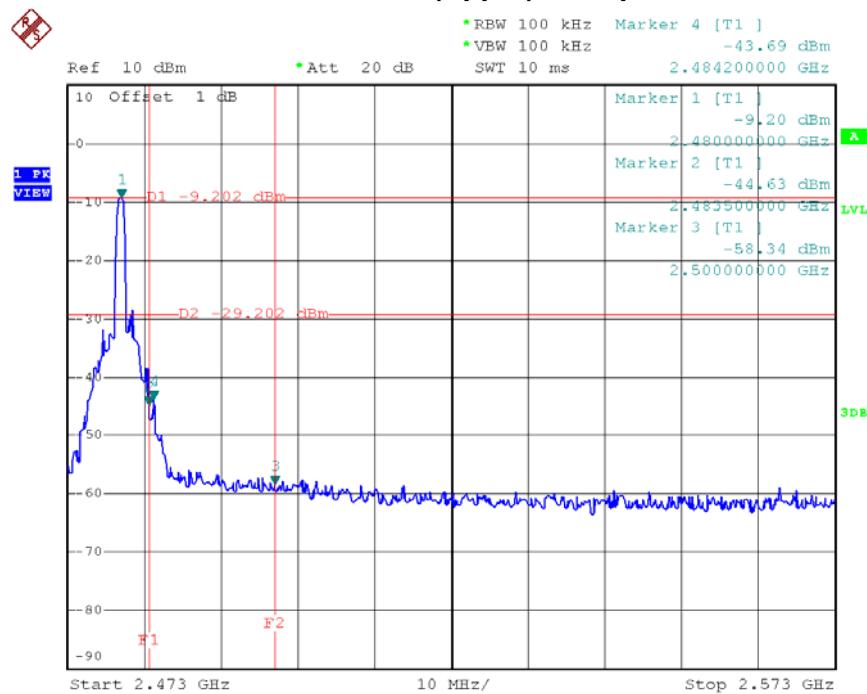
## CH78 (10 Harmonic of the frequency) \_1Mbps



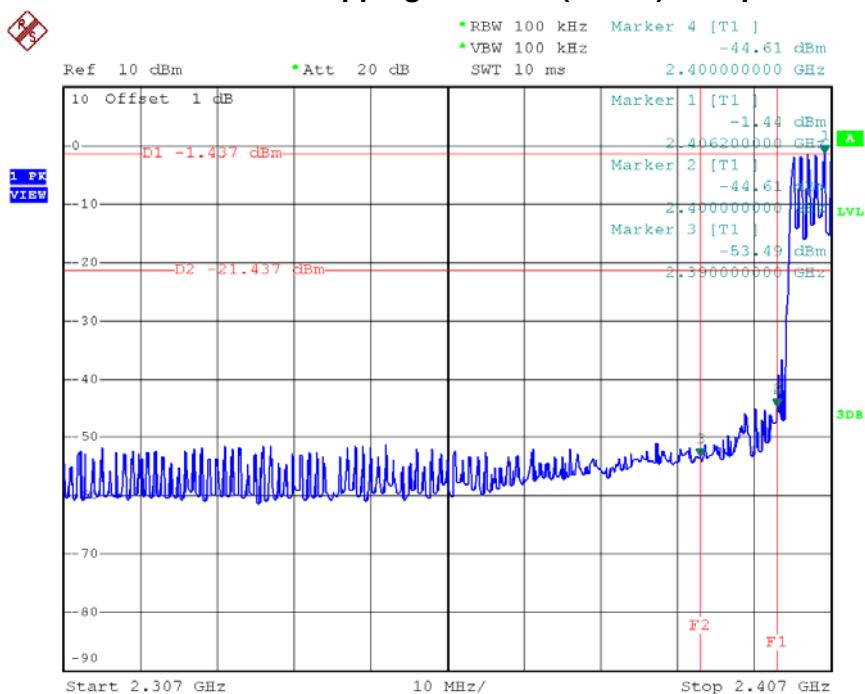
Date: 17.JAN.2016 12:11:06

**CH00 (Lower) \_3Mbps**

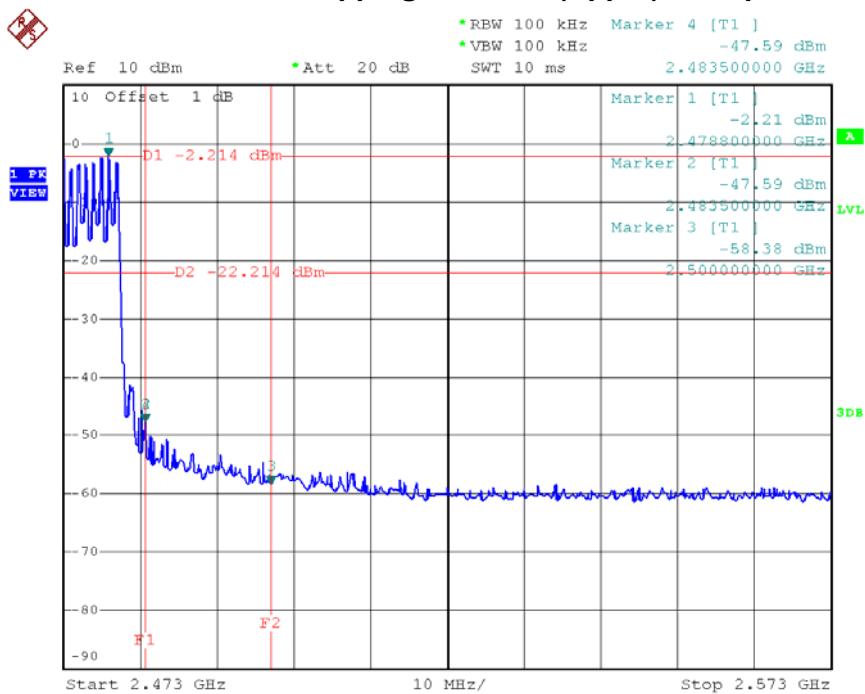
Date: 17.JAN.2016 12:47:12

**CH78 (Upper) \_3Mbps**

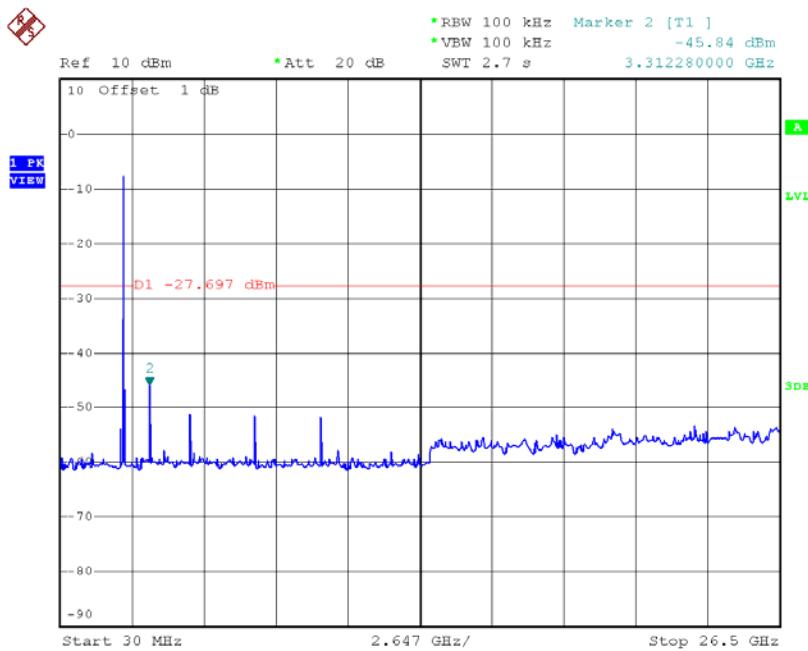
Date: 17.JAN.2016 12:50:17

**CH00 Hopping on mode (Lower) \_3Mbps**

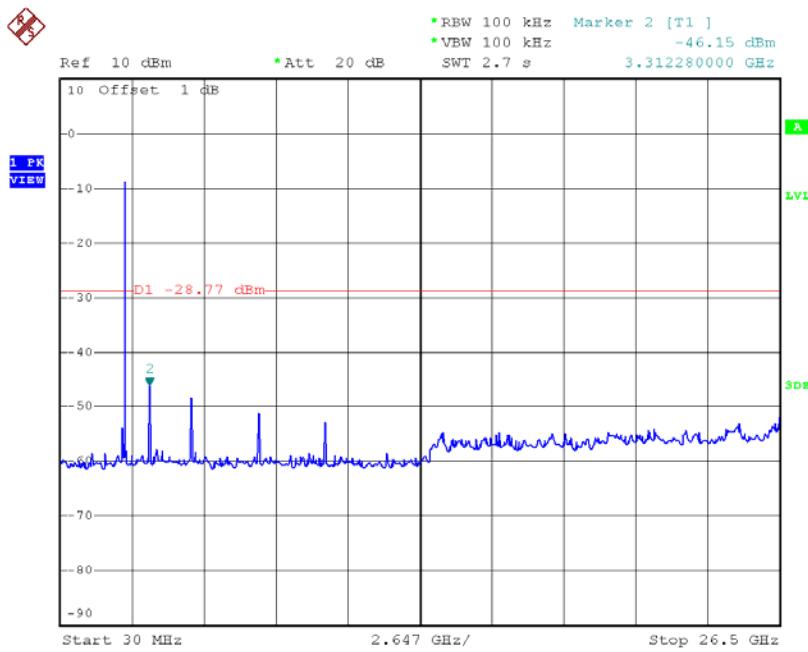
Date: 17.JAN.2016 13:02:09

**CH78 Hopping on mode (Upper) \_3Mbps**

Date: 17.JAN.2016 13:03:49

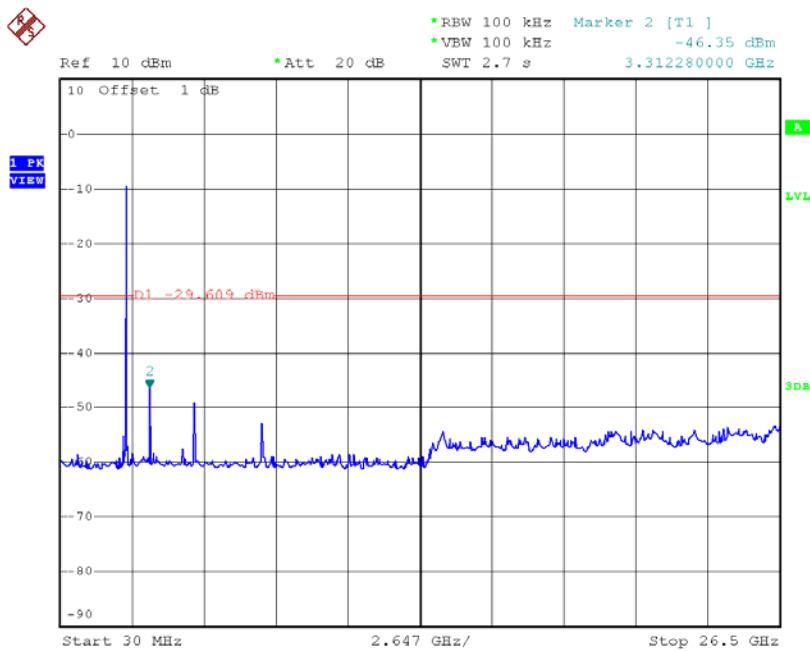
**CH00 (10 Harmonic of the frequency) \_3Mbps**

Date: 17.JAN.2016 12:47:46

**CH39 (10 Harmonic of the frequency) \_3Mbps**

Date: 17.JAN.2016 12:49:36

## CH78 (10 Harmonic of the frequency) \_3Mbps



Date: 17.JAN.2016 12:50:50