

# FCC&IC Radio Test Report

**FCC ID: UZZSFQ12**  
**IC: 7633A-SFQ12**

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

**Project No.** : 1511C215  
**Equipment** : Freqbuds  
**Model Name** : SFQ-12  
**Applicant** : Beautiful Enterprise Co., Ltd.  
**Address** : 27th Floor, Beautiful Group Tower, 77 Connaught Road Central, Hong Kong

**Date of Receipt** : Nov. 17, 2015  
**Date of Test** : Nov. 17, 2015 ~ Dec. 02, 2015  
**Issued Date** : Dec. 03, 2014  
**Tested by** : BTL Inc.

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## **Declaration**

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

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## **Limitation**

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

Table of Contents	Page
<b>1 . CERTIFICATION</b>	<b>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-1-1511C215	Original Issue.	Dec. 03, 2014

## 1. CERTIFICATION

Equipment : Freaqbuds

Brand Name : **SOUNDFREAQ®**

Model Name : SFQ-12

Applicant : Beautiful Enterprise Co., Ltd.

Manufacturer : Beautiful Enterprise Co., Ltd.

Address : 27th Floor, Beautiful Group Tower, 77 Connaught Road Central, Hong Kong

Factory : Shenzhen Synchron Electronics Co., Ltd.

Address : No. 9 Mei Li Road, Xia Mei Lin, Fu Tian Area, Shenzhen, Guangdong, China

Date of Test : Nov. 17, 2015 ~ Dec. 02, 2015

Standard(s) : FCC Part15, Subpart C : 2014 (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-1-1511C215) 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: 2014; 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

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	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	Freaqbuds	
Brand Name	<b>SOUNDFREAQ®</b>	
Model Name	SFQ-12	
Model Difference	N/A	
Output Power (Max.)	Operation Frequency	2402~2480 MHz
	BT Version	4.1 EDR
	Modulation Technology	GFSK(1Mbps) $\pi/4$ -DQPSK(2Mbps) 8-DPSK(3Mbps)
	Bit Rate of Transmitter	
	Output Power Max.	1.85 dBm(1Mbps) 1.77 dBm(3Mbps)
Power Source	#1 DC voltage supplied from USB port. #2 Battery supplied.	
Power Rating	#1 EUT I/P: DC 5V #2 DC 3.7V	

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)	Note
1	Walsin Technology Corporation	RFANT8010 080A3T	Chip	N/A	2	TX/RX

### 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:

<b>For Conducted Emission</b>	
Final Test Mode	Description
Mode 1	TX Mode

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

**Note:**

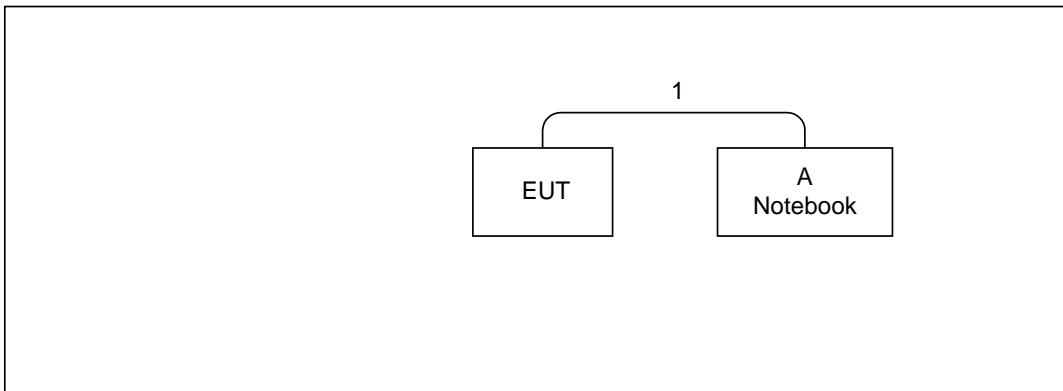
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.
- (3) USB port and battery are evaluated, operated the USB port is the worst and recorded as below test data.

### 3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test Software Version	CSR		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	55.00	55.00	68.00
Parameters(3Mbps)	68.00	68.00	68.00

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



### 3.5 DESCRIPTION OF SUPPORT UNITS

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

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

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.2m	USB Cable

## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

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

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 -0.5	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

(1) The limit of " \* " decreases with the logarithm of the frequency

(2) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)

Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

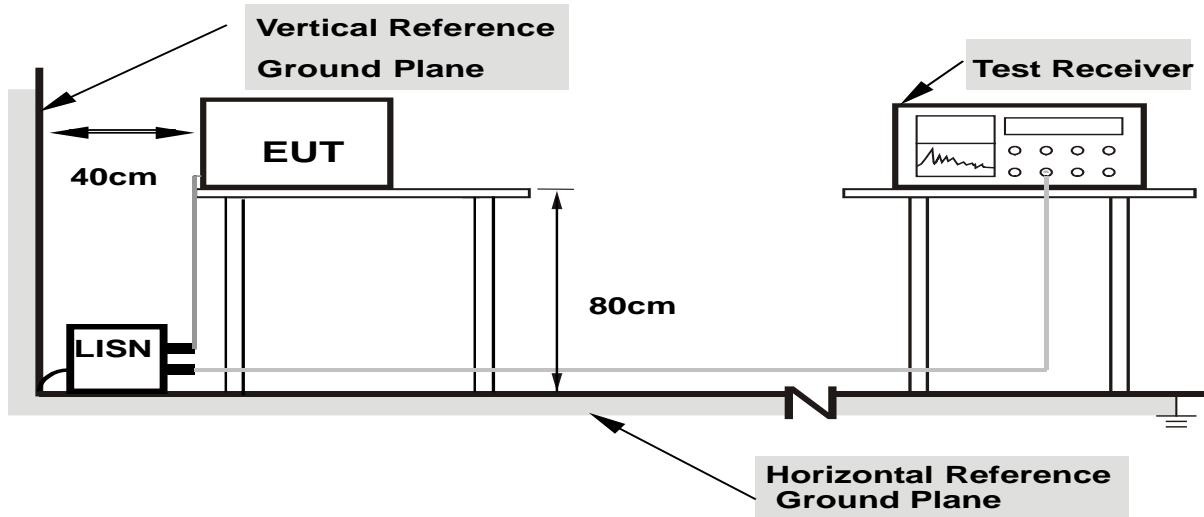
#### 4.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.4 TEST SETUP



**Note:**

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

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical 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: 24°C

Relative Humidity: 60%

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>V/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

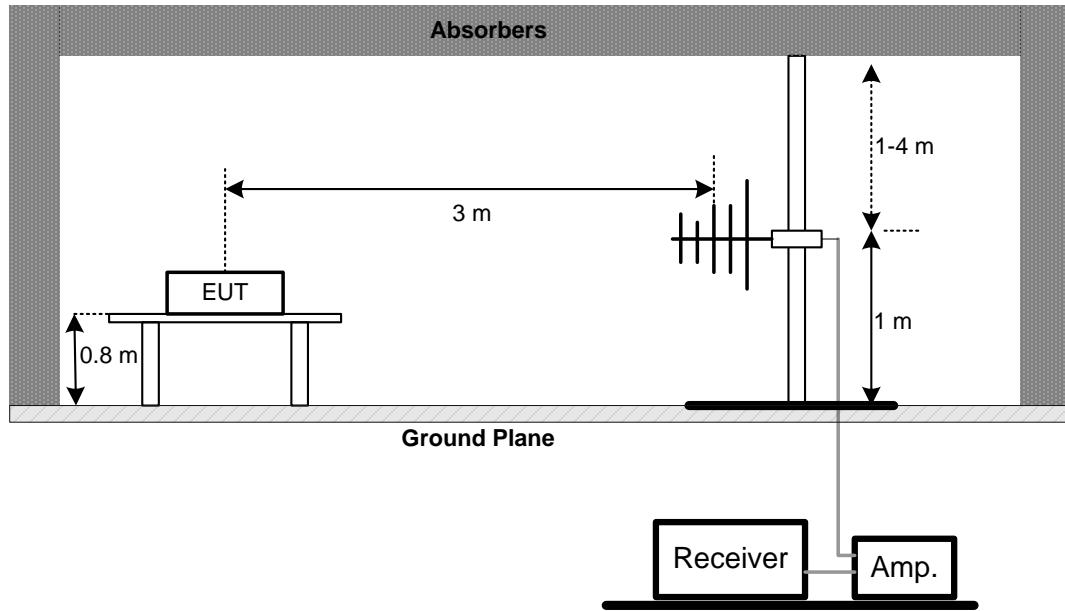
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance 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 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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

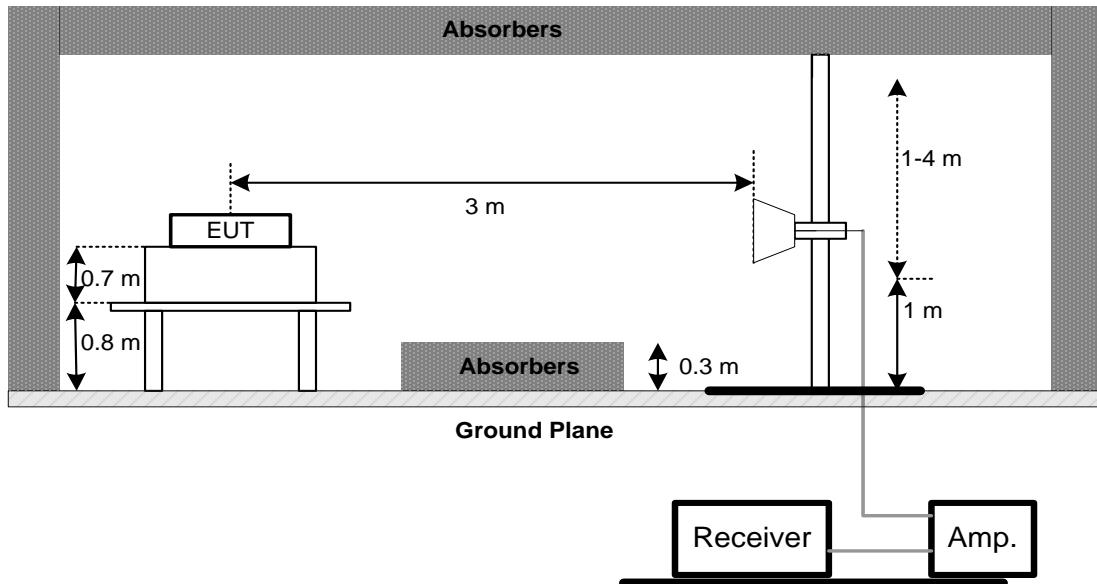
No deviation

#### 4.2.4 TEST SETUP

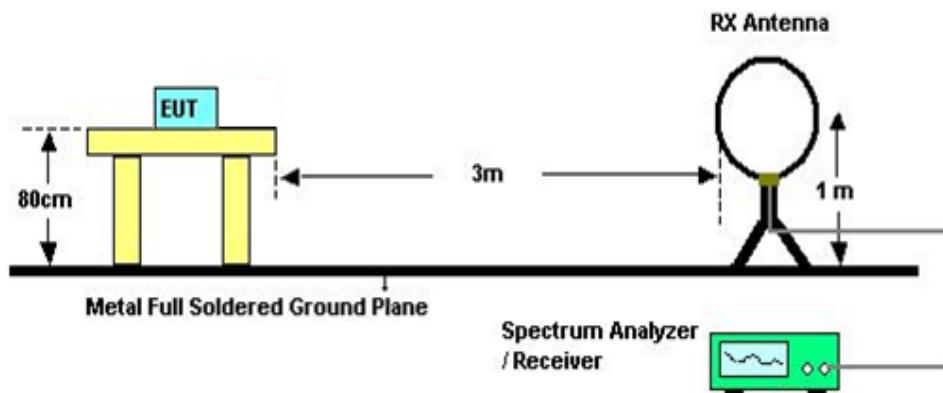
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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: 24°C

Relative Humidity: 52%

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) 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) 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

- 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.

#### 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: 24° C

Relative Humidity: 50%

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: 24° C

Relative Humidity: 50%

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

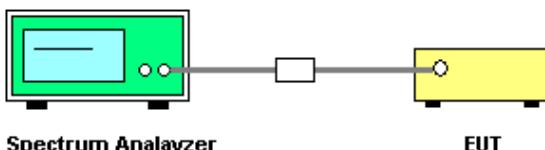
#### 7.1.1 TEST PROCEDURE

- 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: 24° C  
Relative Humidity: 50%  
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

- 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= 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: 24° C

Relative Humidity: 50%

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

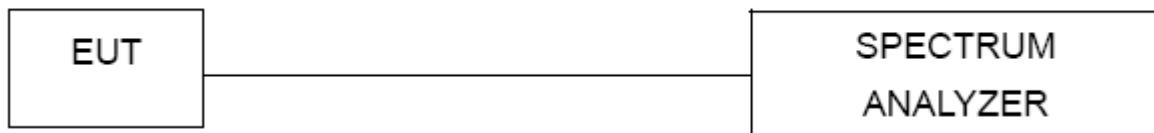
#### 9.1.1 TEST PROCEDURE

- 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= 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: 24° C

Relative Humidity: 50%

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.

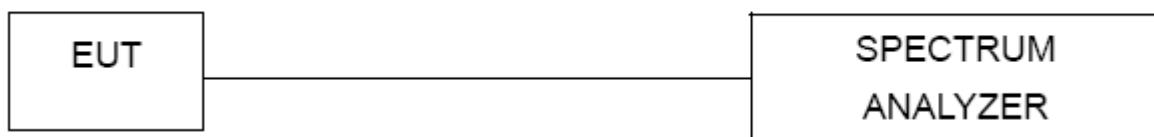
#### 10.1.1 TEST PROCEDURE

- 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: 24° C

Relative Humidity: 50%

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-30 MHz)	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	Test Cable	emci	EMC104-SM-S M-10000(1GHz-26.5GHz)	C-68	Jun. 28, 2016
10	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 28, 2016
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 28, 2016
12	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2016

<b>Number of Hopping Channel</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

<b>Average Time of Occupancy</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

<b>Hopping Channel Separation Measurement</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

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

<b>Peak Output Power</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

<b>Antenna Conducted Spurious Emission</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

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

All calibration period of equipment list is one year.

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

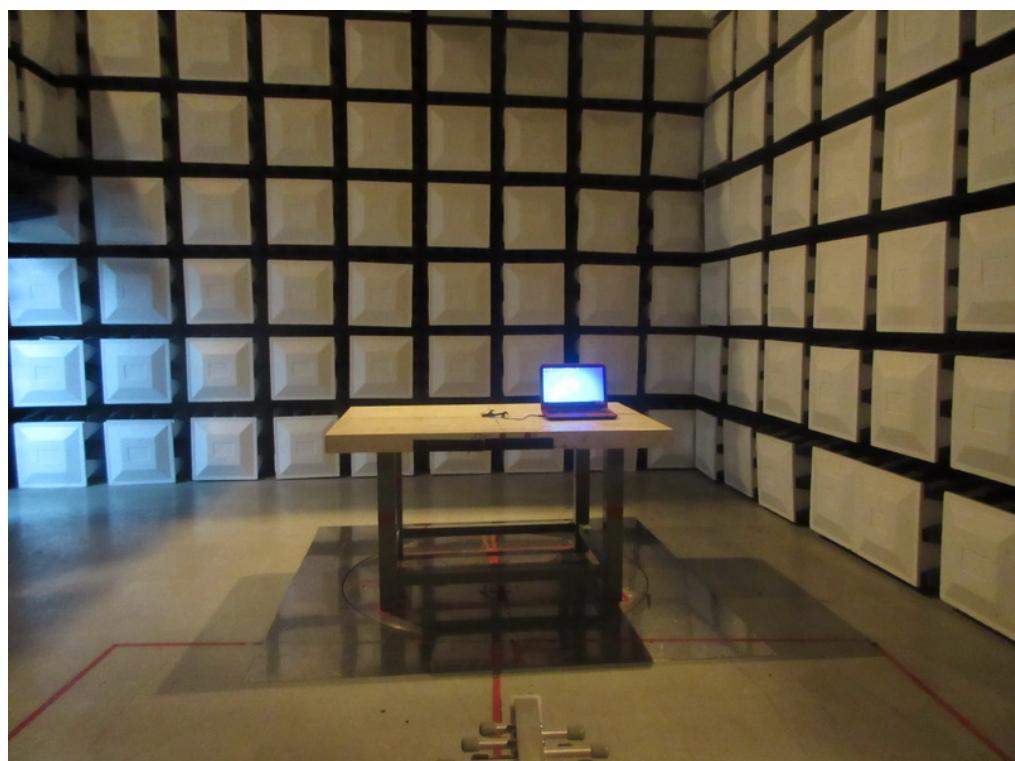
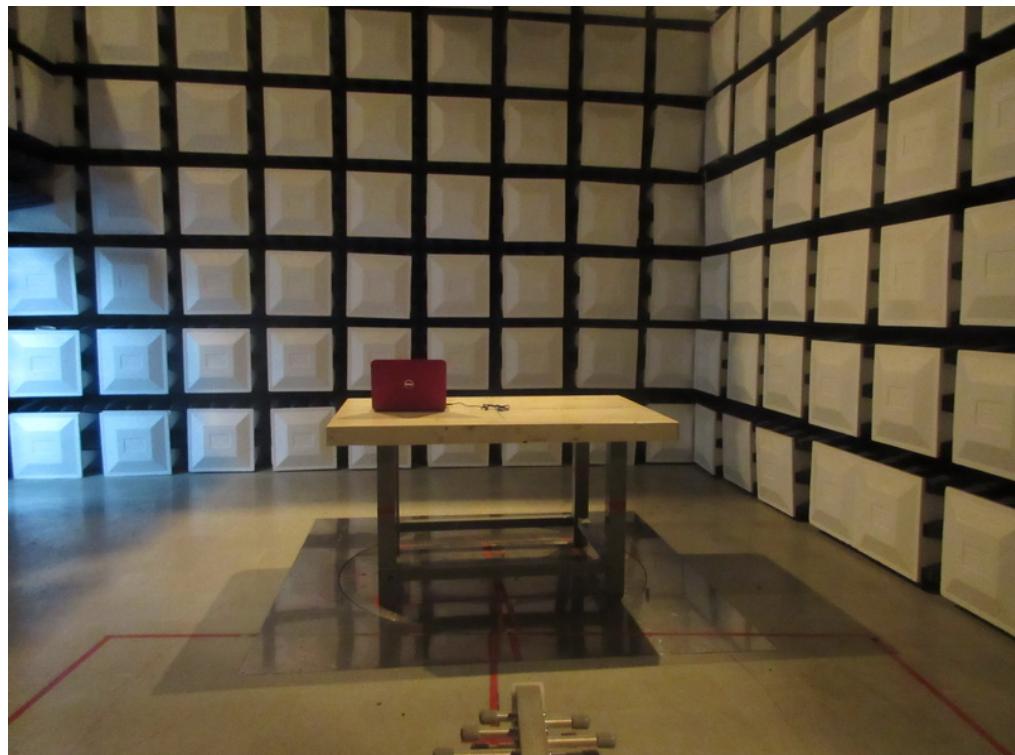
## Radiated Measurement Photos

9KHz to 30MHz



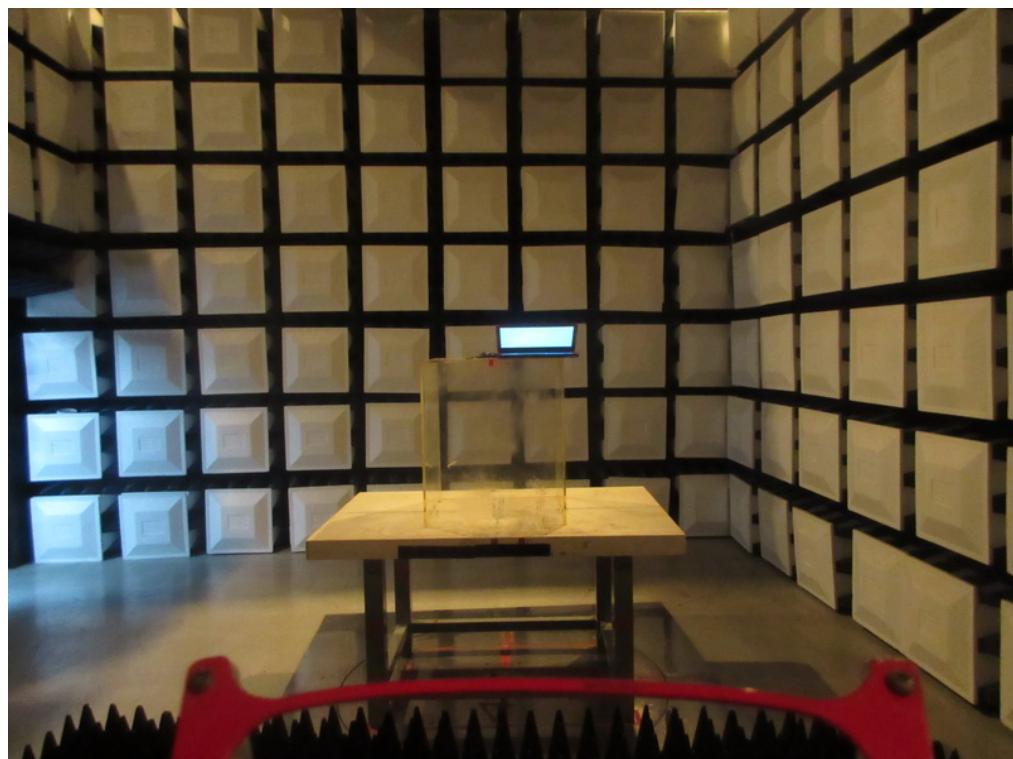
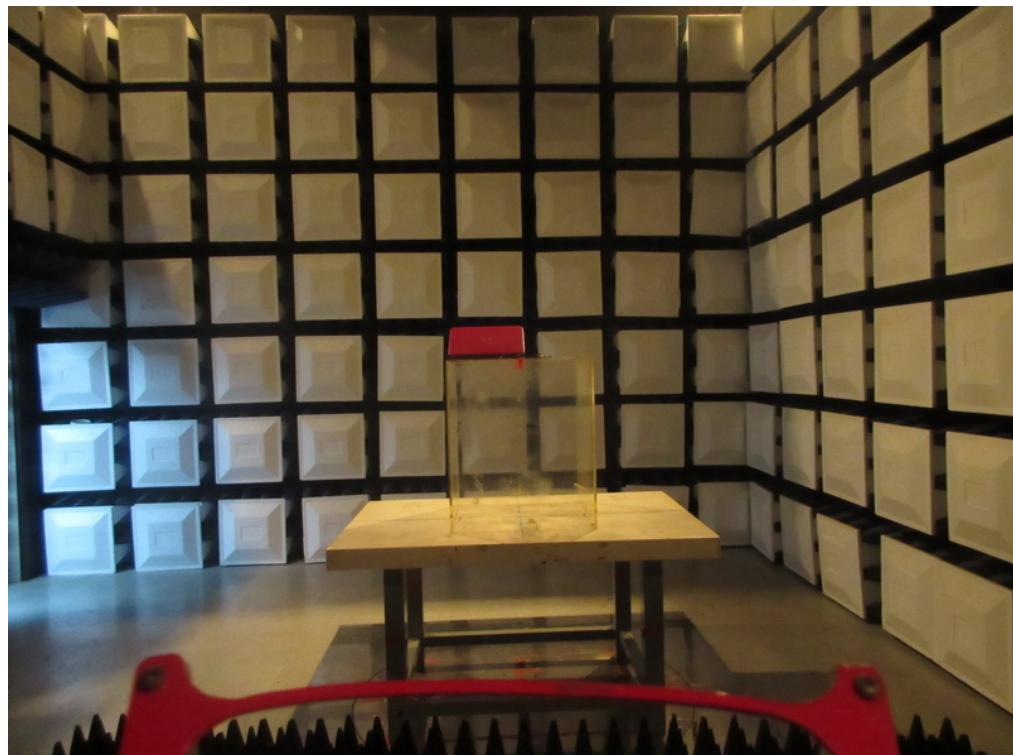
## Radiated Measurement Photos

30MHz to 1000MHz



## Radiated Measurement Photos

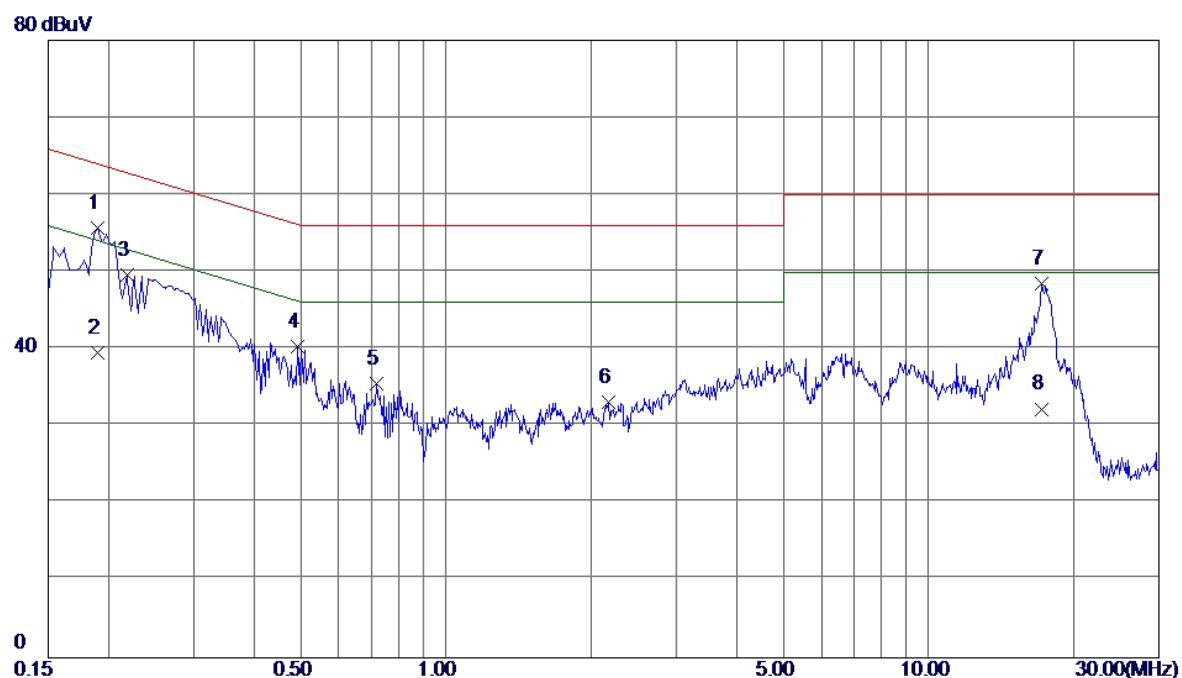
### Above 1000MHz



## ATTACHMENT A - CONDUCTED EMISSION

Test Mode:	TX Mode
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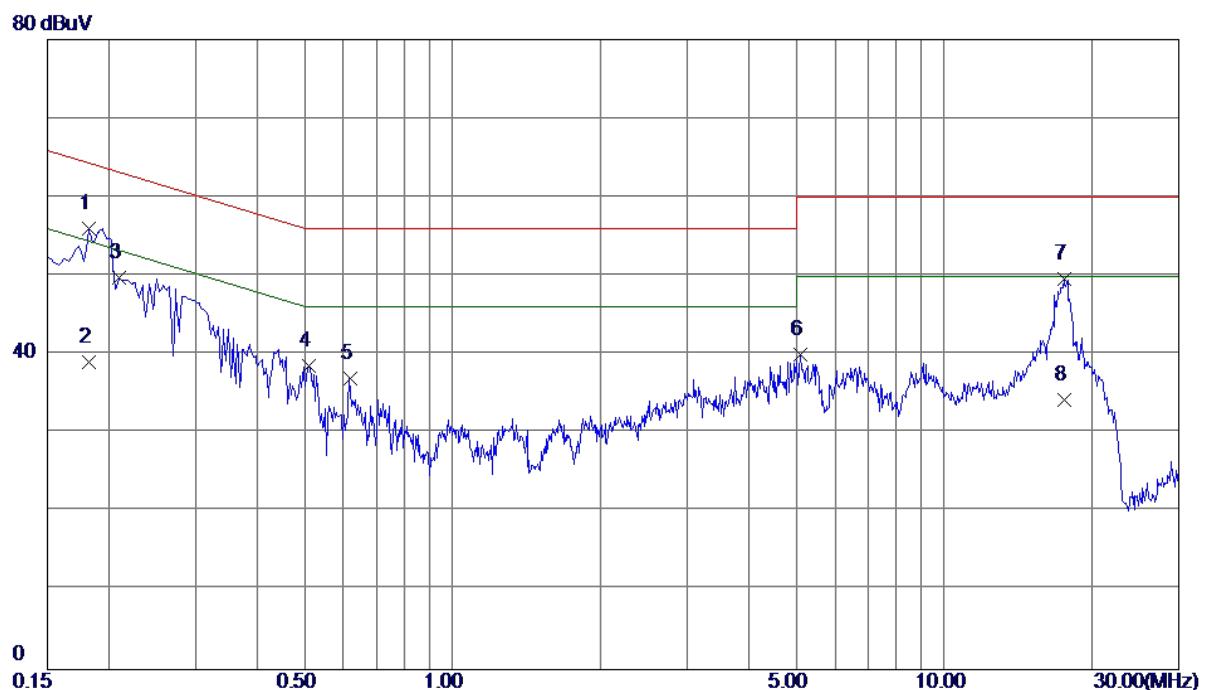
### Line



No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dB	Margin Detector	Comment
1	0.1900	46.08	9.57	55.65	64.04	-8.39	Peak
2	0.1900	29.90	9.57	39.47	54.04	-14.57	AVG
3	0.2180	39.95	9.58	49.53	62.89	-13.36	Peak
4	0.4940	30.63	9.68	40.31	56.10	-15.79	Peak
5	0.7180	25.83	9.74	35.57	56.00	-20.43	Peak
6	2.1700	23.11	9.95	33.06	56.00	-22.94	Peak
7	17.1940	38.60	9.83	48.43	60.00	-11.57	Peak
8	17.1940	22.41	9.83	32.24	50.00	-17.76	AVG

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

### Neutral



No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1819	46.46	9.49	55.95	64.40	-8.45	Peak	
2	0.1819	29.50	9.49	38.99	54.40	-15.41	AVG	
3	0.2100	40.23	9.50	49.73	63.21	-13.48	Peak	
4	0.5100	28.93	9.56	38.49	56.00	-17.51	Peak	
5	0.6180	27.39	9.55	36.94	56.00	-19.06	Peak	
6	5.0860	30.05	9.91	39.96	60.00	-20.04	Peak	
7	17.5140	39.71	9.95	49.66	60.00	-10.34	Peak	
8	17.5140	24.30	9.95	34.25	50.00	-15.75	AVG	

## 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
0.0089	0°	12.35	25.0030	37.3530	128.6164	-91.2634	AVG
0.0089	0°	15.17	25.0030	40.1730	148.6164	-108.4434	PEAK
0.0158	0°	9.26	24.5660	33.8260	123.6311	-89.8051	AVG
0.0158	0°	10.35	24.5660	34.9160	143.6311	-108.7151	PEAK
0.0237	0°	6.13	24.0657	30.1957	120.1093	-89.9136	AVG
0.0237	0°	8.41	24.0657	32.4757	140.1093	-107.6336	PEAK
0.0413	0°	1.24	22.9510	24.1910	115.2852	-91.0942	AVG
0.0413	0°	2.57	22.9510	25.5210	135.2852	-109.7642	PEAK
0.5203	0°	18.13	19.8650	37.9950	73.2791	-35.2842	QP
1.9216	0°	22.45	19.5078	41.9578	69.5400	-27.5822	QP

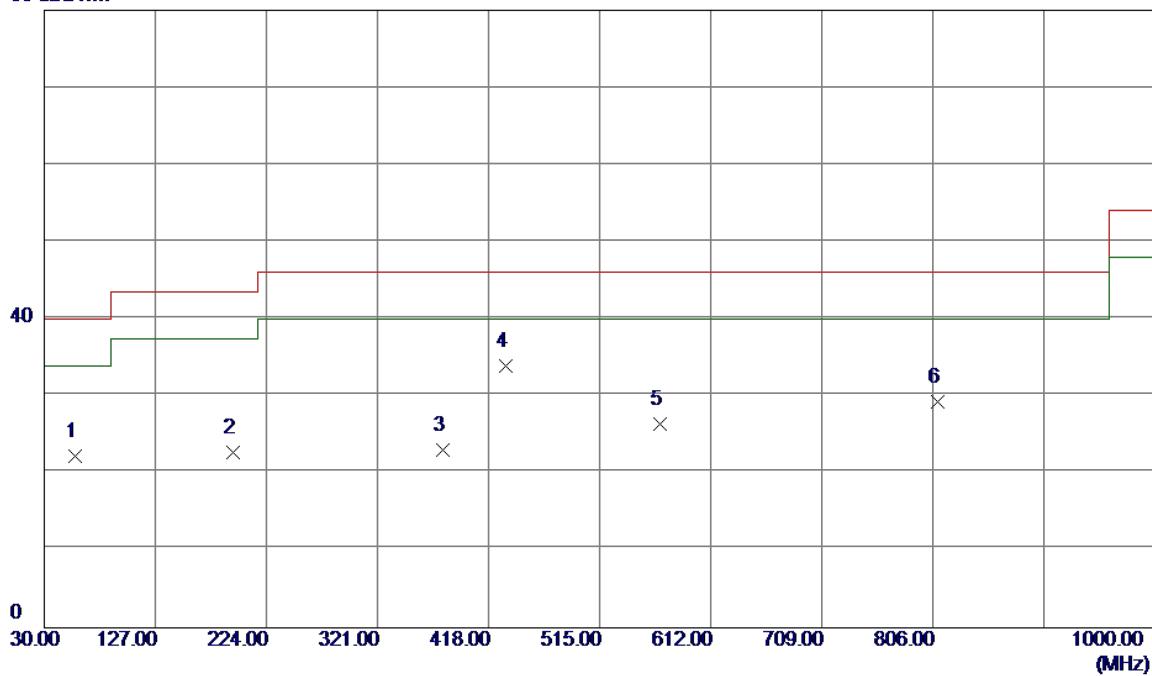
Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0126	90°	10.71	24.3000	35.0100	125.5968	-90.5868	AVG
0.0126	90°	12.15	24.3000	36.4500	145.5968	-109.1468	PEAK
0.0281	90°	6.26	23.7870	30.0470	118.6301	-88.5831	AVG
0.0281	90°	7.13	23.7870	30.9170	138.6301	-107.7131	PEAK
0.0353	90°	2.62	23.3310	25.9510	116.6487	-90.6977	AVG
0.0353	90°	3.39	23.3310	26.7210	136.6487	-109.9277	PEAK
0.0452	90°	1.03	22.7040	23.7340	114.5015	-90.7675	AVG
0.0452	90°	2.31	22.7040	25.0140	134.5015	-109.4875	PEAK
0.6152	90°	20.49	20.1686	40.6586	71.8239	-31.1653	QP
2.3057	90°	24.37	19.3166	43.6866	69.5400	-25.8534	QP

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

Test Mode: TX 2402MHz \_CH00\_1Mbps

### Vertical

80 dBuV/m

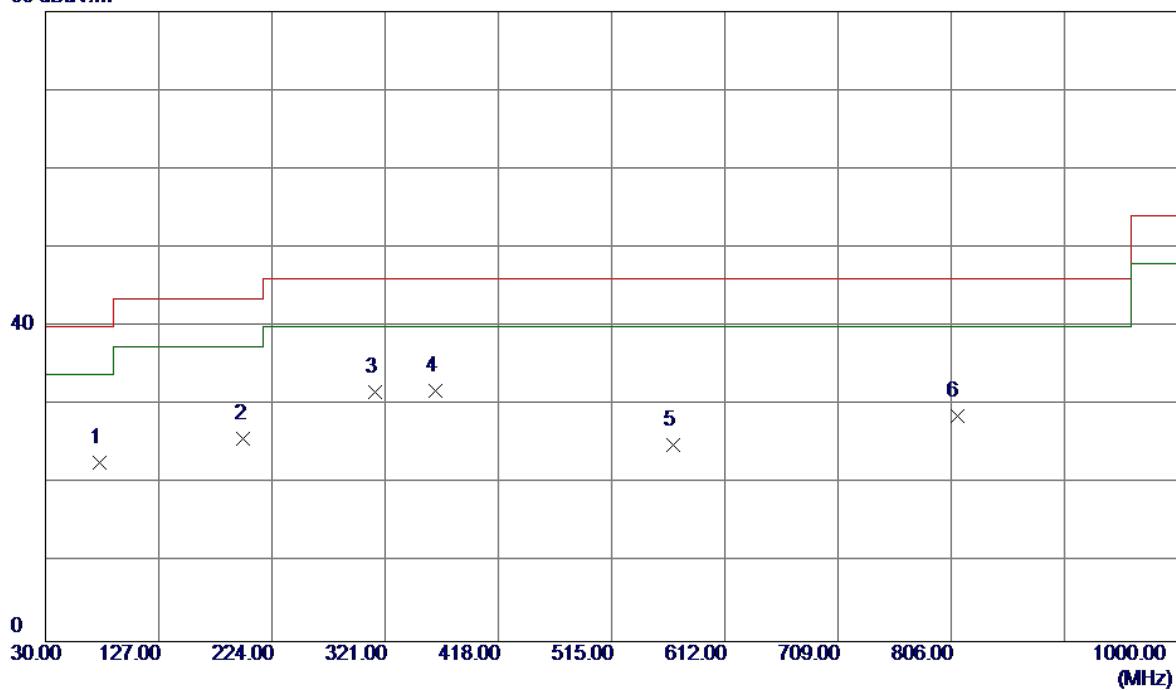


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	57.1600	35.28	-13.02	22.26	40.00	-17.74	Peak	
2	194.9000	36.04	-13.27	22.77	43.50	-20.73	Peak	
3	378.2300	31.46	-8.42	23.04	46.00	-22.96	Peak	
4	433.5200	40.29	-6.35	33.94	46.00	-12.06	Peak	
5	567.3800	31.06	-4.63	26.43	46.00	-19.57	Peak	
6	809.8800	29.07	0.15	29.22	46.00	-16.78	Peak	

Test Mode: TX 2402MHz \_CH00\_1Mbps

## Horizontal

80 dBuV/m

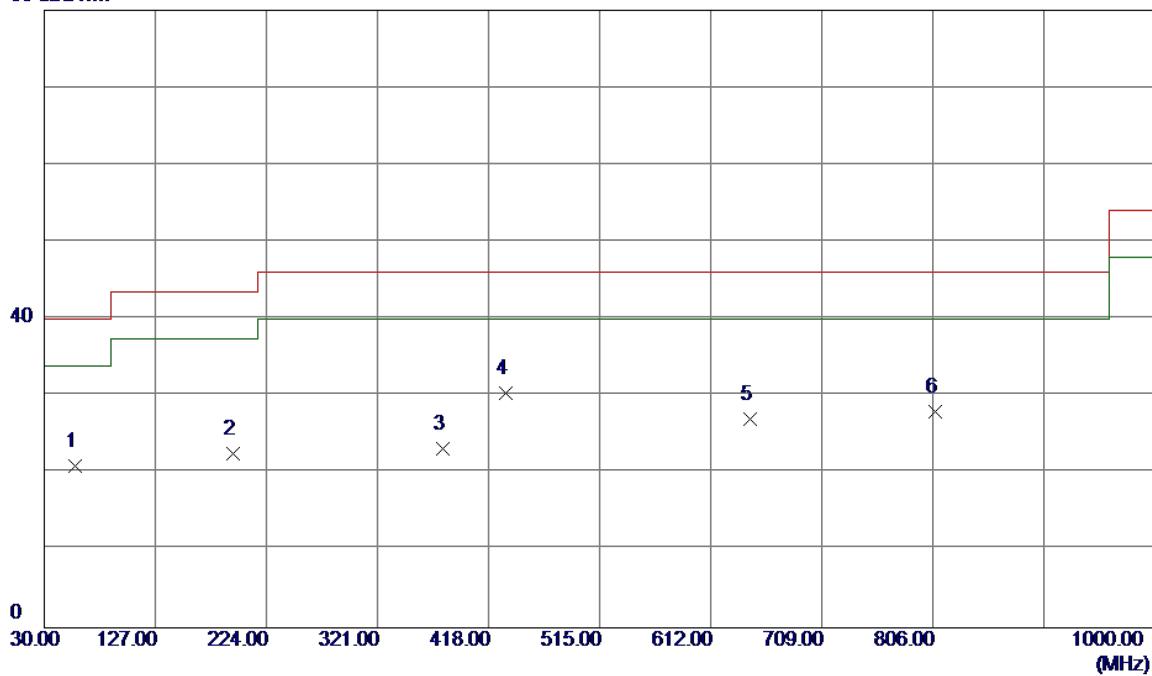


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	76.5600	38.04	-15.39	22.65	40.00	-17.35	Peak	
2	199.7500	39.33	-13.56	25.77	43.50	-17.73	Peak	
3	312.2700	41.37	-9.66	31.71	46.00	-14.29	Peak	
4	363.6800	41.02	-9.19	31.83	46.00	-14.17	Peak	
5	567.3800	29.58	-4.63	24.95	46.00	-21.05	Peak	
6	810.8500	28.44	0.15	28.59	46.00	-17.41	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

### Vertical

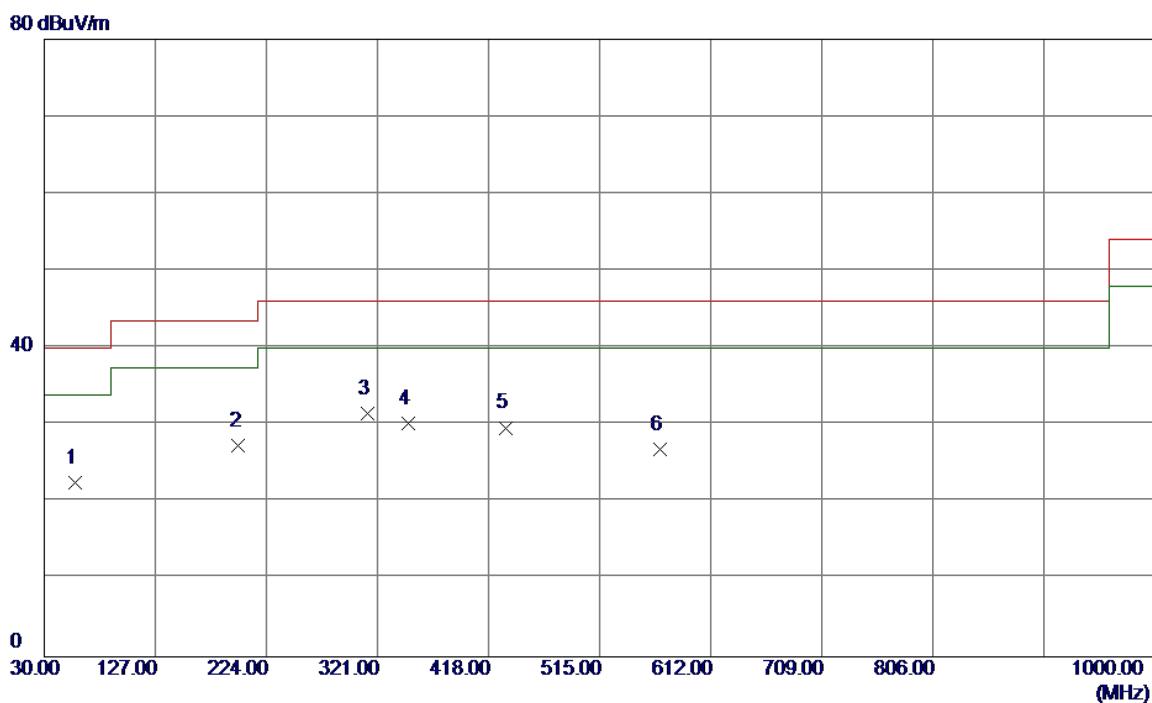
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	57.1600	34.01	-13.02	20.99	40.00	-19.01	Peak	
2	194.9000	35.79	-13.27	22.52	43.50	-20.98	Peak	
3	378.2300	31.62	-8.42	23.20	46.00	-22.80	Peak	
4	433.5200	36.80	-6.35	30.45	46.00	-15.55	Peak	
5	645.9500	28.91	-1.88	27.03	46.00	-18.97	Peak	
6	807.9400	27.90	0.15	28.05	46.00	-17.95	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

### Horizontal

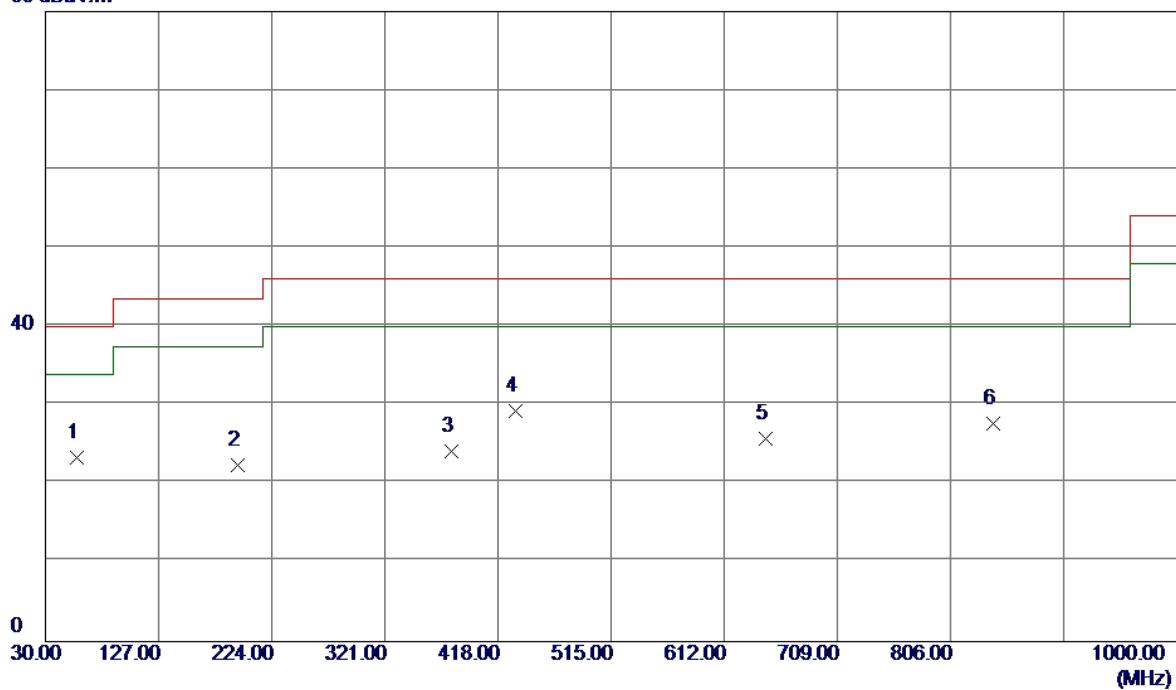


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	57.1600	35.61	-13.02	22.59	40.00	-17.41	Peak	
2	199.7500	40.99	-13.56	27.43	43.50	-16.07	Peak	
3	312.2700	41.20	-9.66	31.54	46.00	-14.46	Peak	
4	348.1600	40.20	-9.91	30.29	46.00	-15.71	Peak	
5	433.5200	36.03	-6.35	29.68	46.00	-16.32	Peak	
6	567.3800	31.56	-4.63	26.93	46.00	-19.07	Peak	

Test Mode: TX 2480MHz \_CH78\_1Mbps

### Vertical

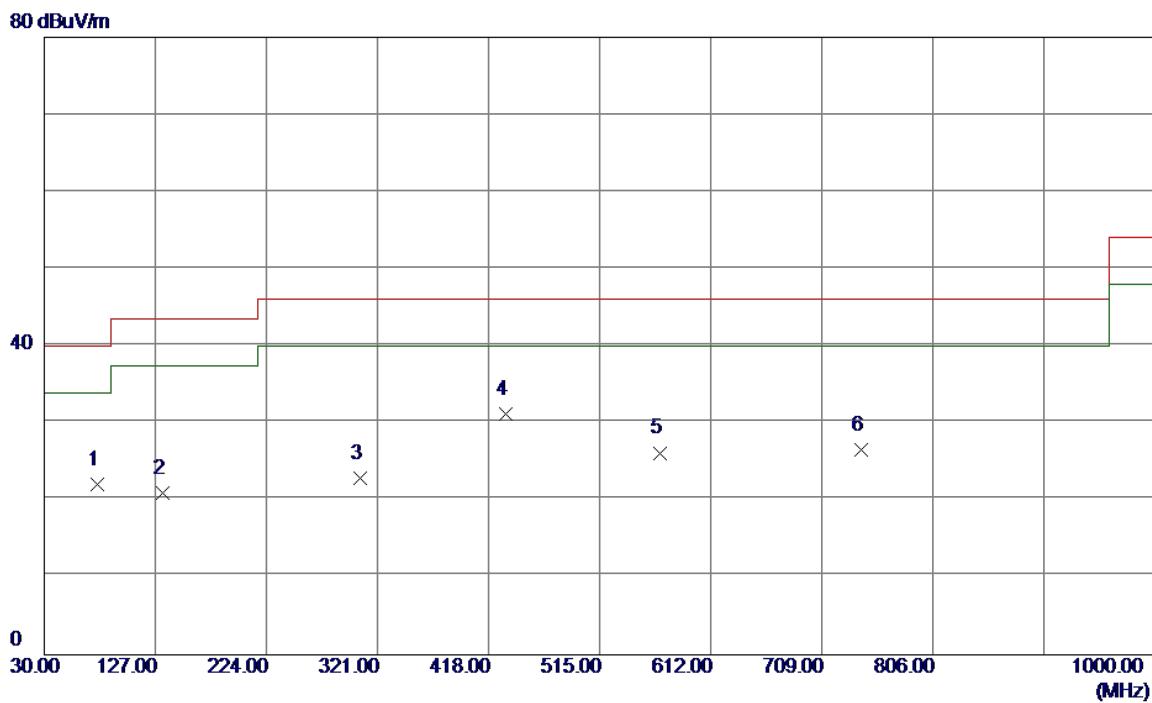
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	57.1600	36.34	-13.02	23.32	40.00	-16.68	Peak	
2	194.9000	35.72	-13.27	22.45	43.50	-21.05	Peak	
3	378.2300	32.53	-8.42	24.11	46.00	-21.89	Peak	
4	433.5200	35.67	-6.35	29.32	46.00	-16.68	Peak	
5	647.8900	27.54	-1.77	25.77	46.00	-20.23	Peak	
6	842.8600	27.52	0.13	27.65	46.00	-18.35	Peak	

Test Mode: TX 2480MHz \_CH78\_1Mbps

### Horizontal

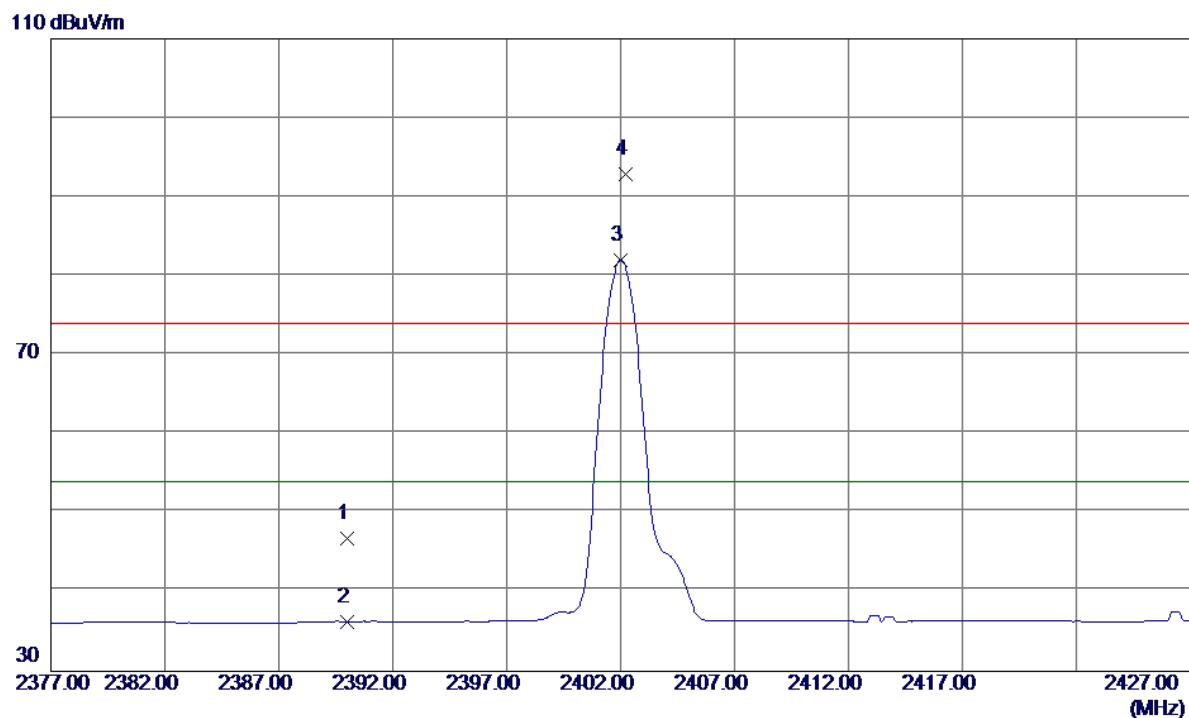


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	76.5600	37.53	-15.39	22.14	40.00	-17.86	Peak	
2	133.7899	32.51	-11.53	20.98	43.50	-22.52	Peak	
3	305.4800	32.49	-9.62	22.87	46.00	-23.13	Peak	
4	433.5200	37.55	-6.35	31.20	46.00	-14.80	Peak	
5	567.3800	30.79	-4.63	26.16	46.00	-19.84	Peak	
6	742.9500	28.01	-1.43	26.58	46.00	-19.42	Peak	

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

Test Mode : TX 2402MHz \_CH00\_1Mbps

### Vertical

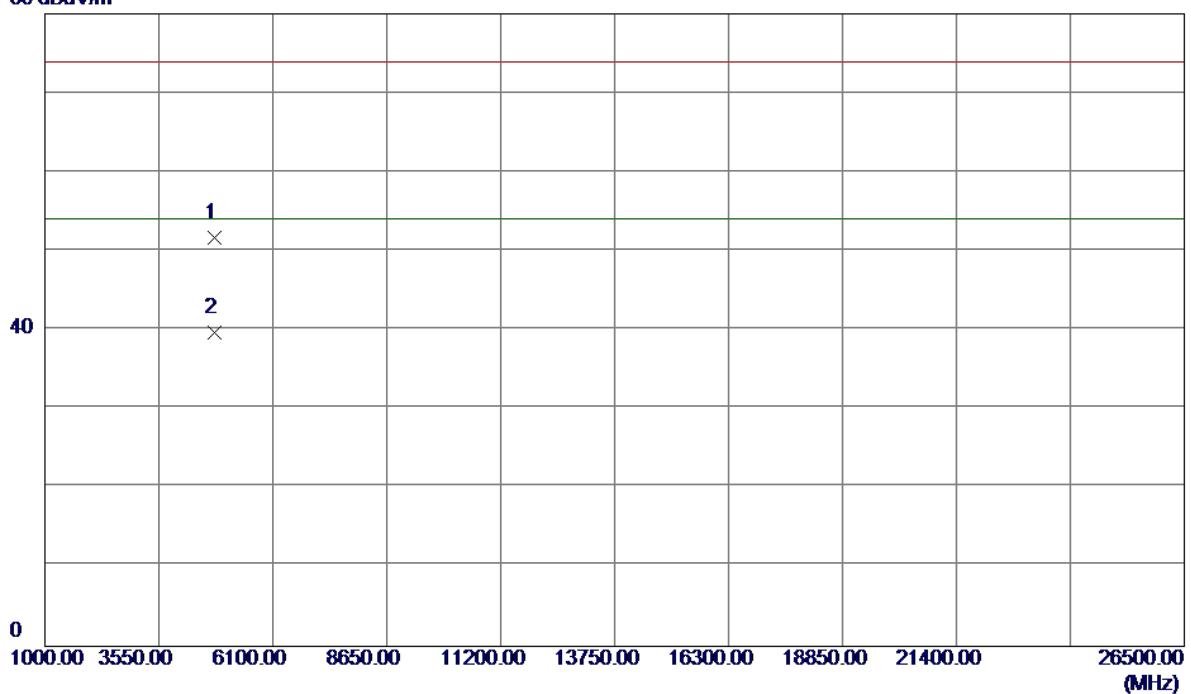


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	12.59	34.23	46.82	74.00	-27.18	Peak	
2	2390.0000	2.08	34.23	36.31	54.00	-17.69	AVG	
3	2402.0000	47.68	34.30	81.98	54.00	27.98	AVG	No Limit
4	2402.2000	58.64	34.30	92.94	74.00	18.94	Peak	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps

**Vertical**

80 dBuV/m

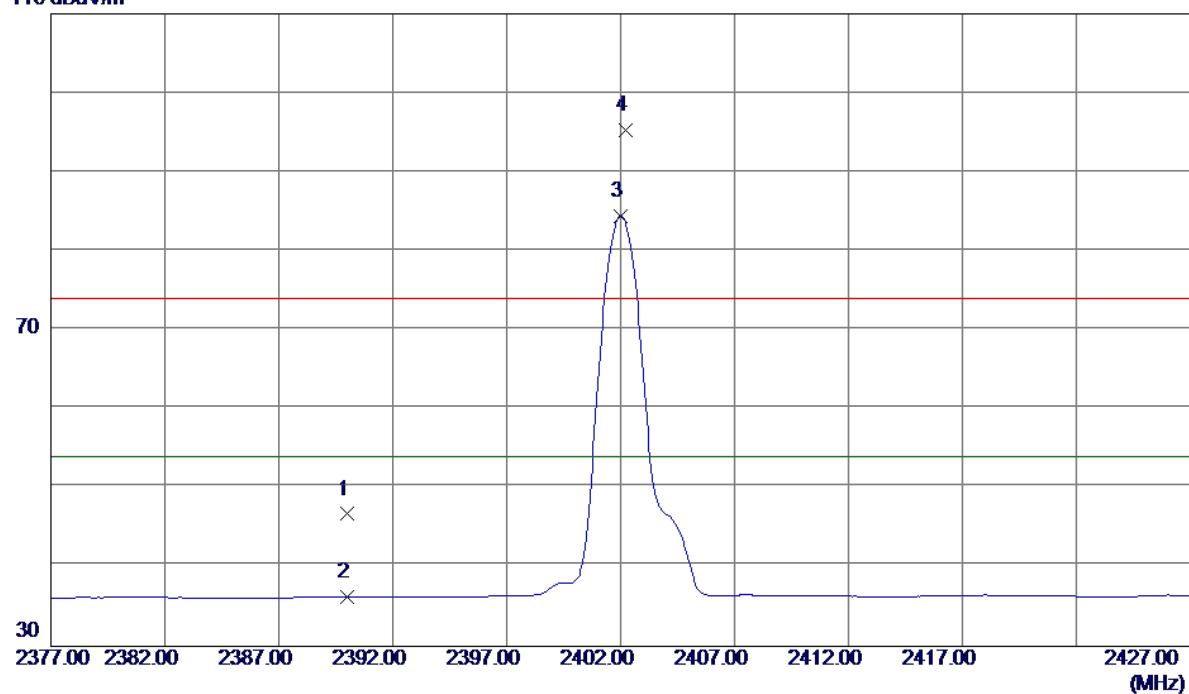


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4803.6000	45.92	5.82	51.74	74.00	-22.26	Peak	
2	4804.4000	33.88	5.82	39.70	54.00	-14.30	AVG	

Test Mode : TX 2402MHz \_CH00\_1Mbps

### Horizontal

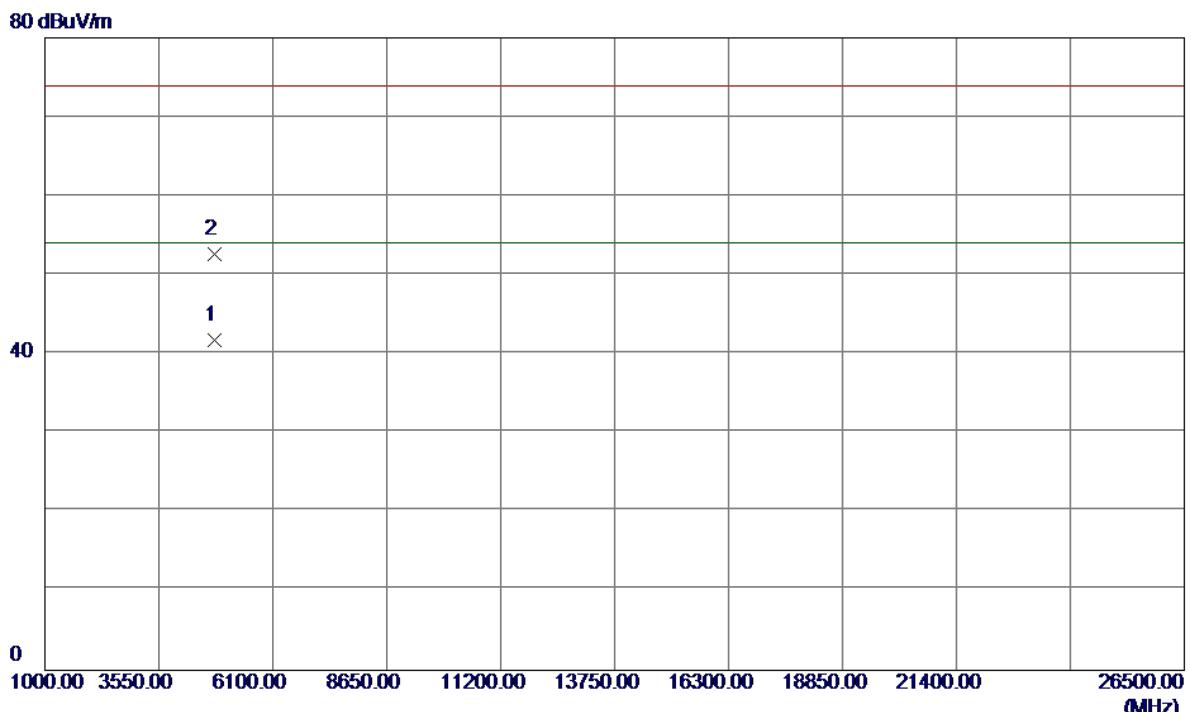
110 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	12.49	34.23	46.72	74.00	-27.28	Peak	
2	2390.0000	2.07	34.23	36.30	54.00	-17.70	AVG	
3	2402.0000	50.10	34.30	84.40	54.00	30.40	AVG	No Limit
4	2402.2000	61.03	34.30	95.33	74.00	21.33	Peak	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps

**Horizontal**

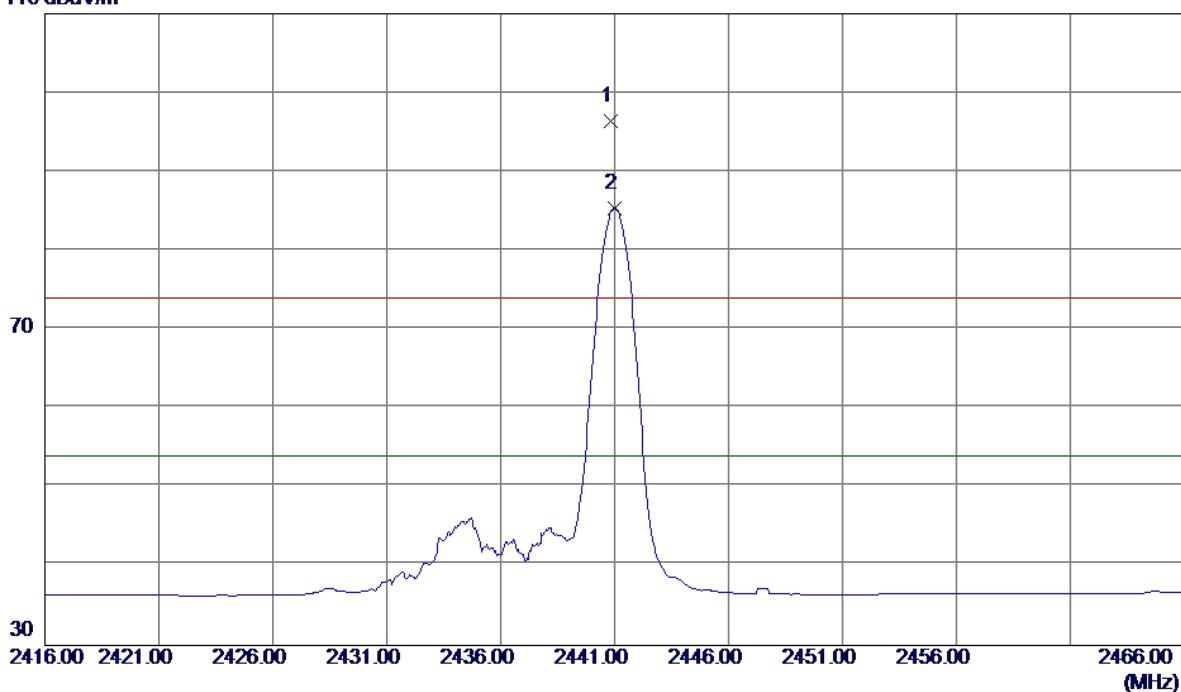


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4804.7000	35.87	5.82	41.69	54.00	-12.31	Avg	
2	4805.6000	46.83	5.82	52.65	74.00	-21.35	Peak	

Test Mode : TX 2441MHz \_CH39\_1Mbps

Vertical

110 dBuV/m

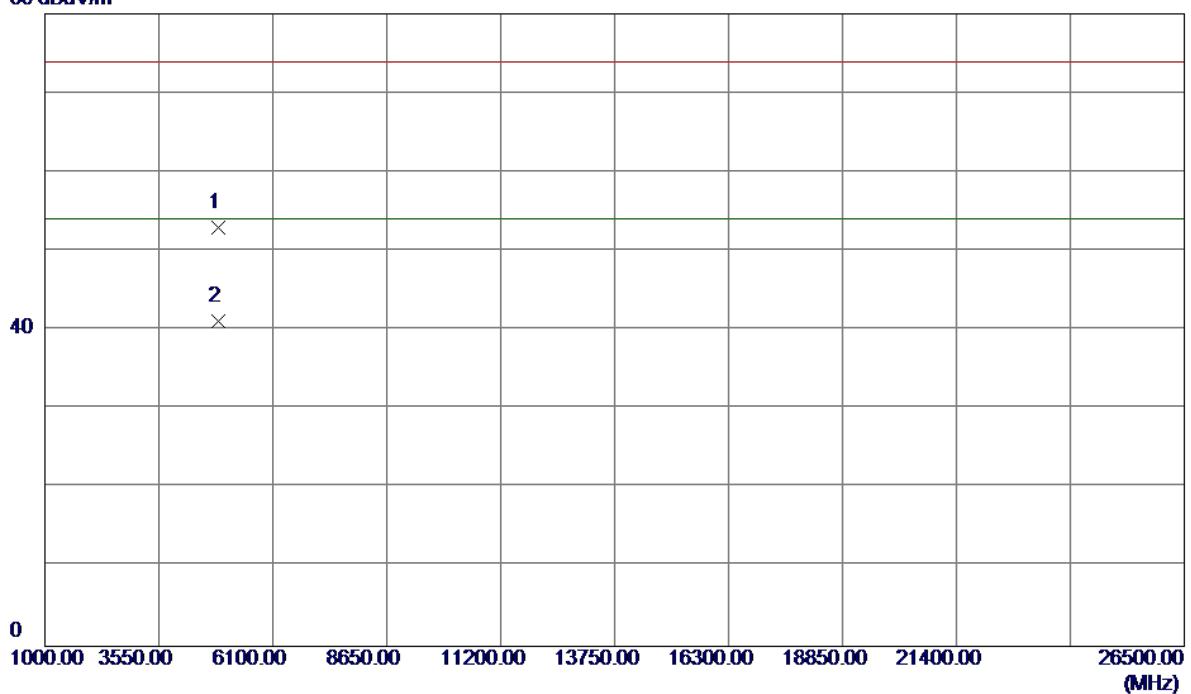


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2440.8500	61.81	34.53	96.34	74.00	22.34	Peak	No Limit
2	2441.0000	50.84	34.53	85.37	54.00	31.37	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_1Mbps

**Vertical**

80 dBuV/m

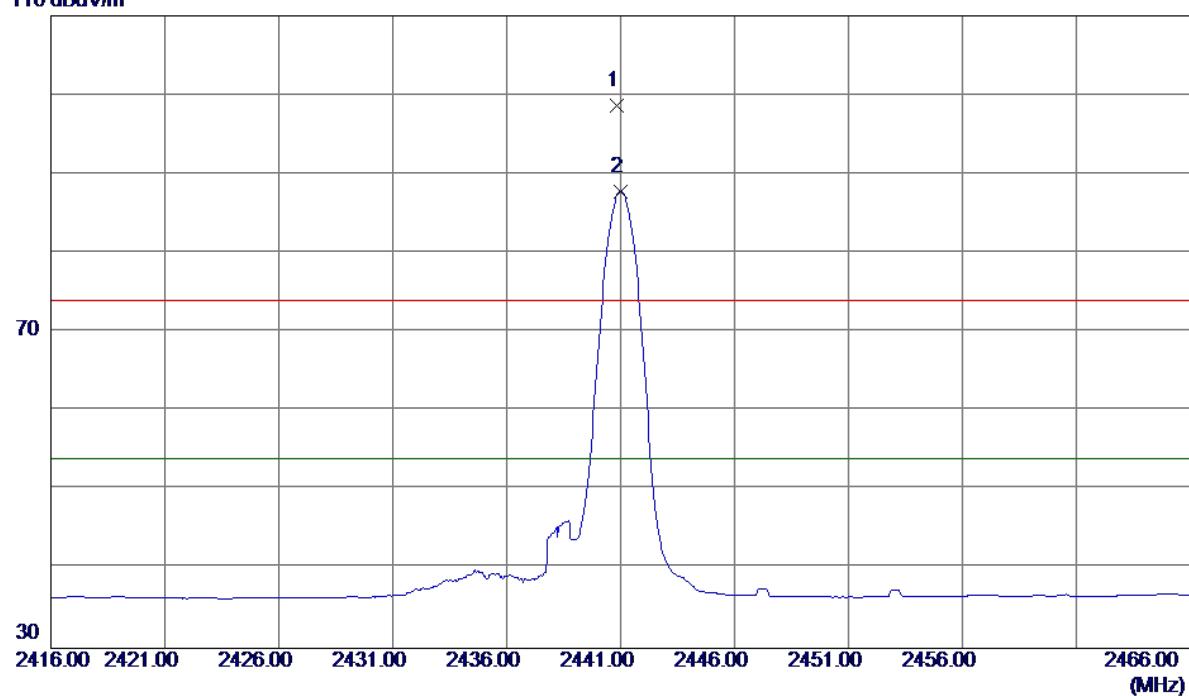


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4881.8000	46.92	6.02	52.94	74.00	-21.06	Peak	
2	4882.6000	35.04	6.03	41.07	54.00	-12.93	AVG	

Test Mode : TX 2441MHz \_CH39\_1Mbps

**Horizontal**

**110 dBuV/m**

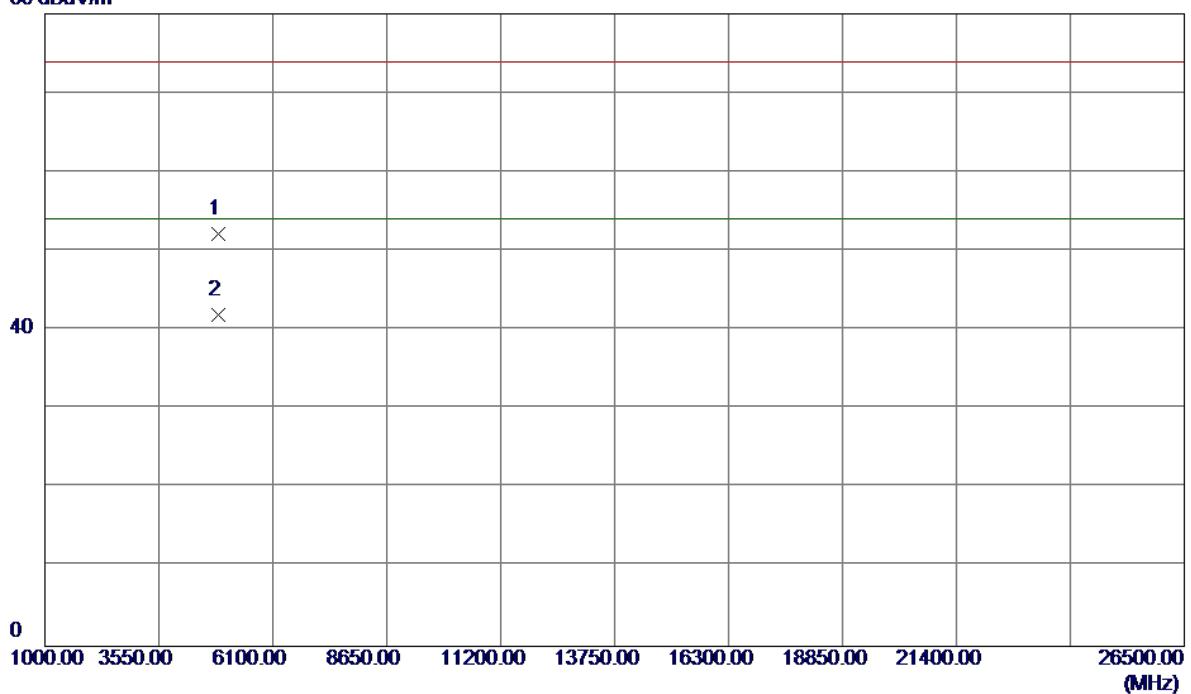


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2440.8500	64.18	34.53	98.71	74.00	24.71	Peak	No Limit
2	2441.0000	53.27	34.53	87.80	54.00	33.80	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_1Mbps

**Horizontal**

80 dBuV/m

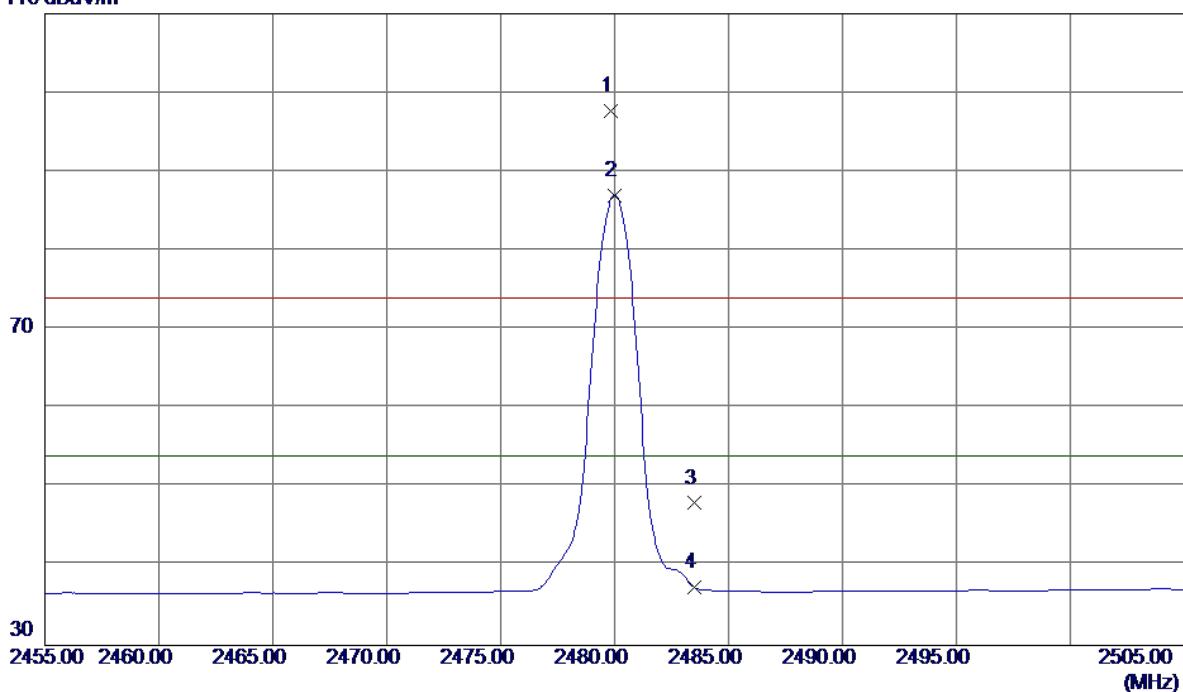


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4881.4000	46.13	6.02	52.15	74.00	-21.85	Peak	
2	4881.9200	35.97	6.02	41.99	54.00	-12.01	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

**Vertical**

**110 dBuV/m**

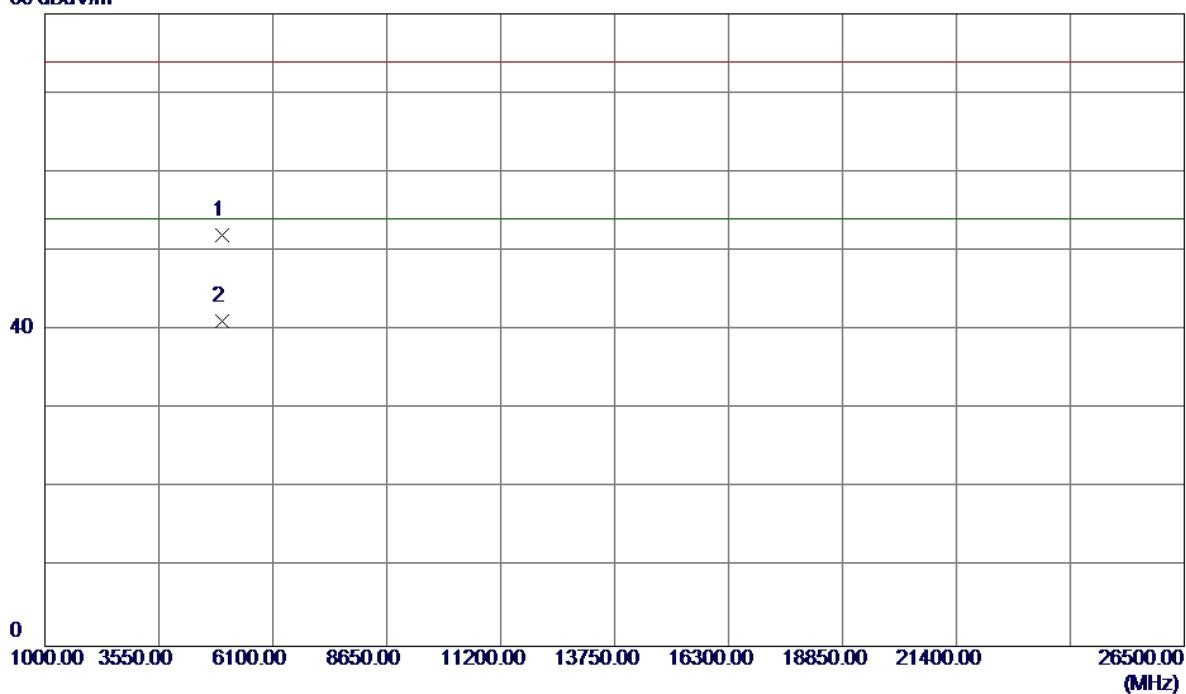


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2479.8500	62.97	34.75	97.72	74.00	23.72	Peak	No Limit
2	2480.0000	52.24	34.75	86.99	54.00	32.99	AVG	No Limit
3	2483.5000	13.23	34.77	48.00	74.00	-26.00	Peak	
4	2483.5000	2.58	34.77	37.35	54.00	-16.65	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

**Vertical**

80 dBuV/m

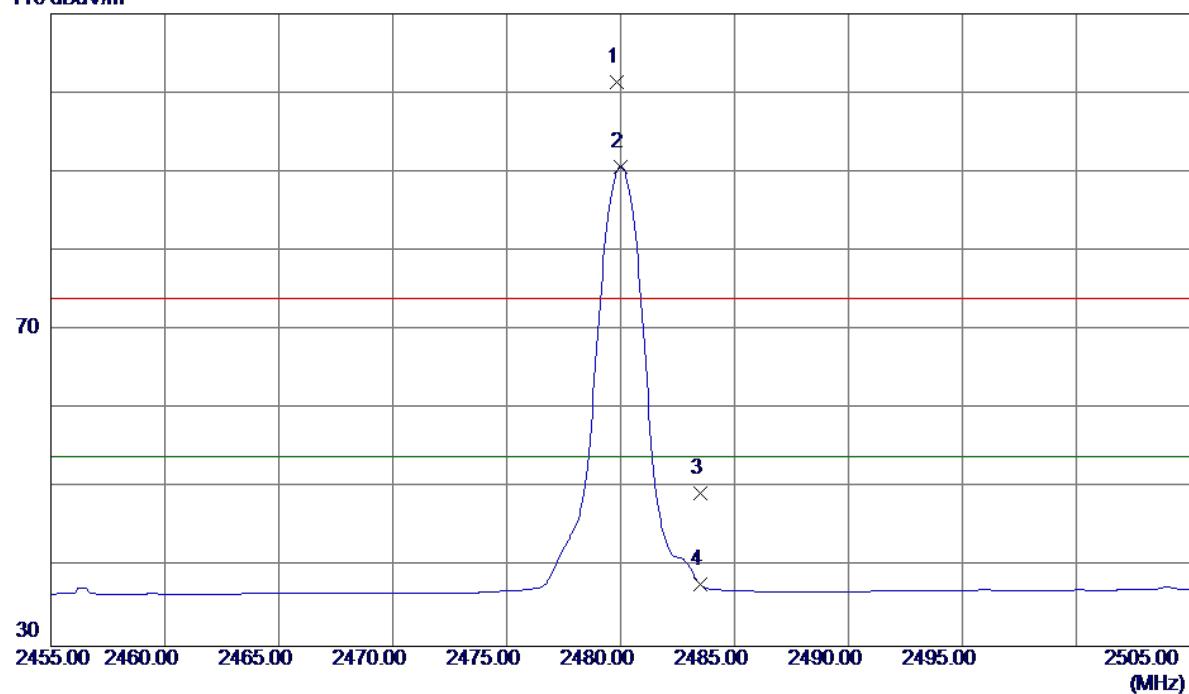


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4958.9000	45.71	6.23	51.94	74.00	-22.06	Peak	
2	4960.4100	34.94	6.23	41.17	54.00	-12.83	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

### Horizontal

110 dBuV/m

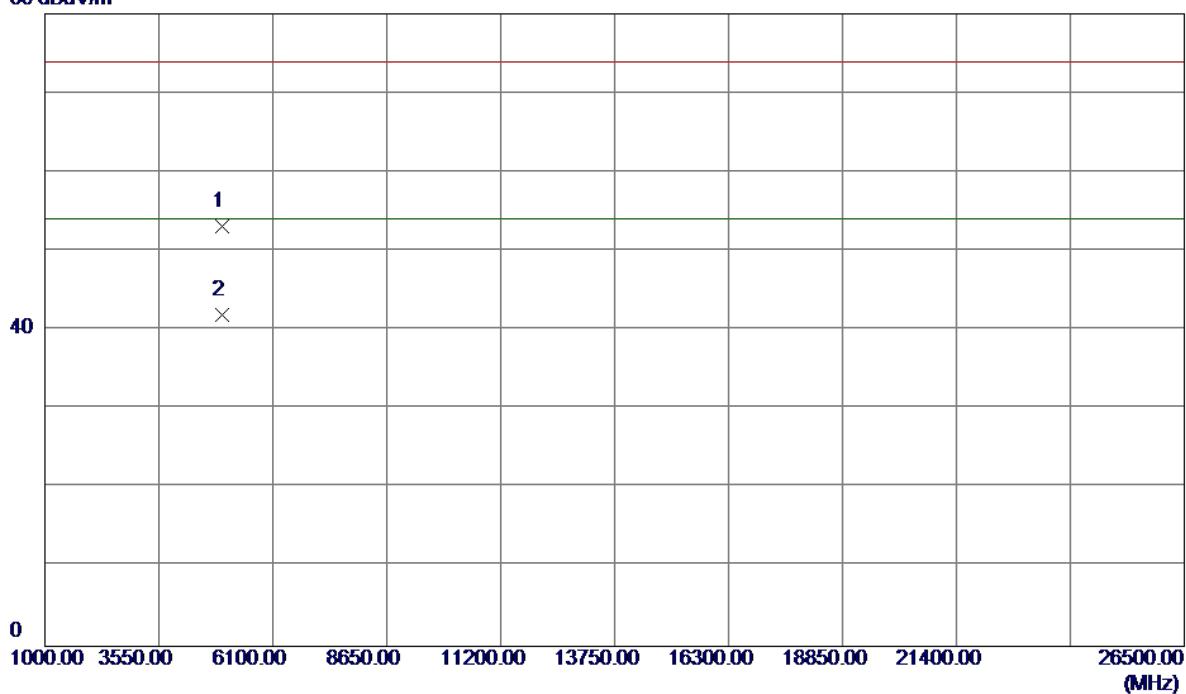


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.8500	66.65	34.75	101.40	74.00	27.40	Peak	No Limit
2	2480.0000	55.85	34.75	90.60	54.00	36.60	AVG	No Limit
3	2483.5000	14.62	34.77	49.39	74.00	-24.61	Peak	
4	2483.5000	3.06	34.77	37.83	54.00	-16.17	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

**Horizontal**

80 dBuV/m

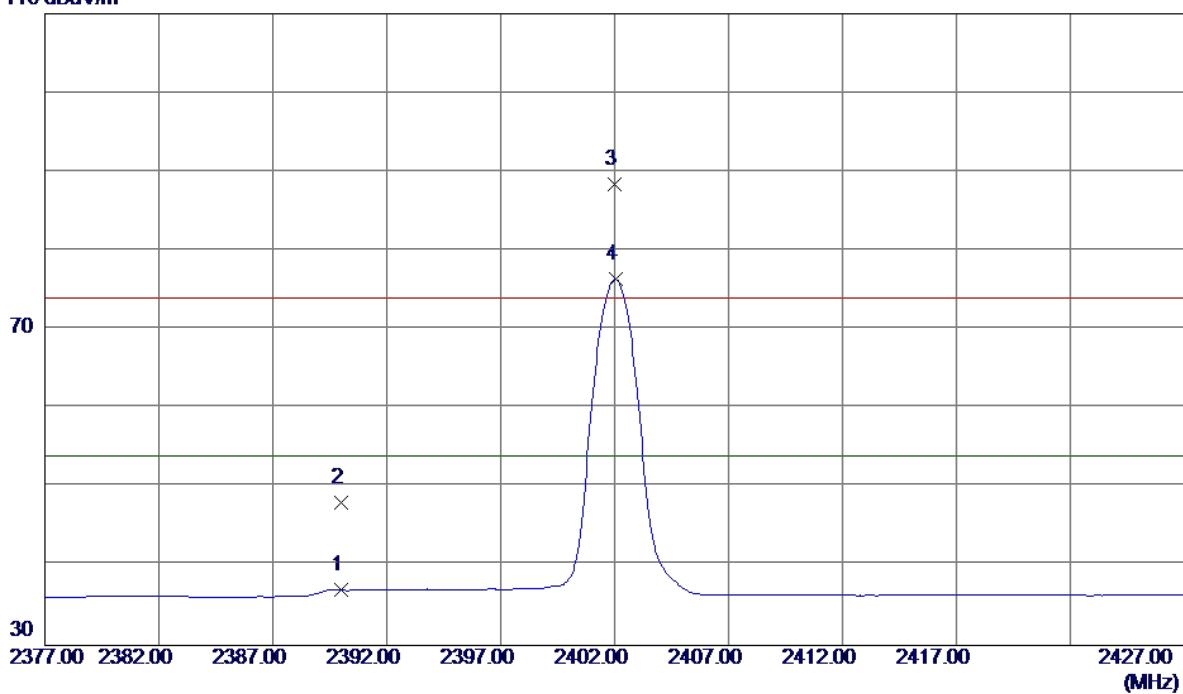


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4959.6000	46.92	6.23	53.15	74.00	-20.85	Peak	
2	4960.5200	35.76	6.23	41.99	54.00	-12.01	AVG	

Test Mode : TX 2402MHz \_CH00\_3Mbps

**Vertical**

**110 dBuV/m**

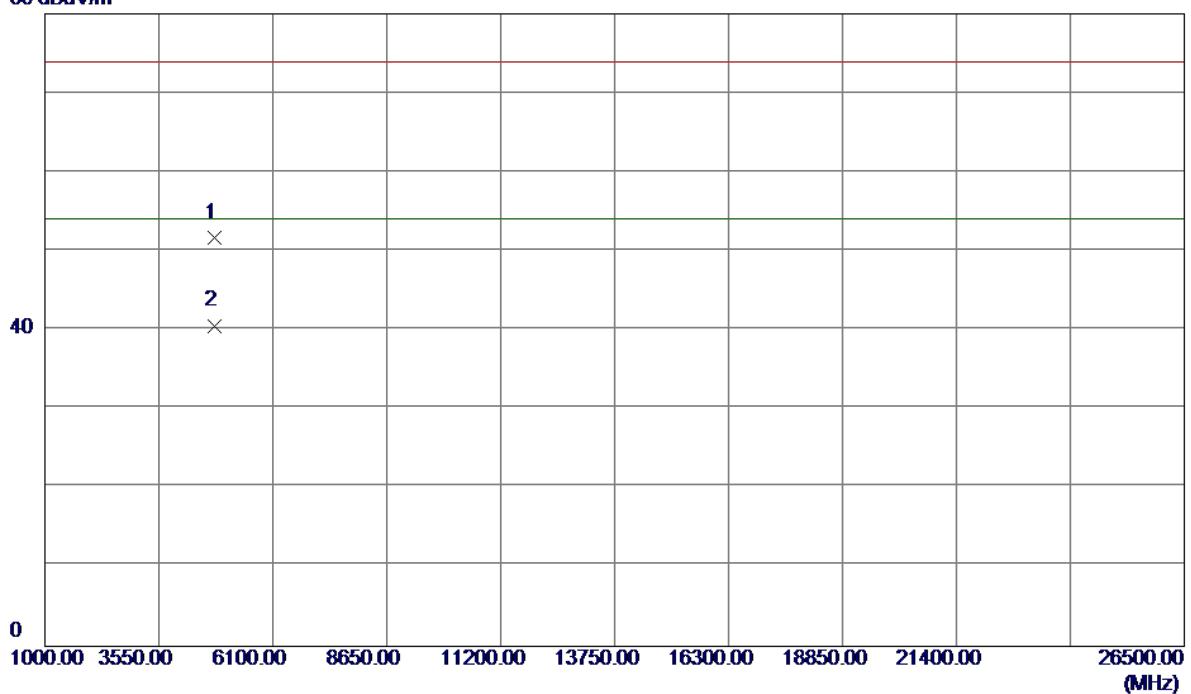


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	2.77	34.23	37.00	74.00	-37.00	Peak	
2	2390.0000	13.80	34.23	48.03	74.00	-25.97	Peak	
3	2402.0000	54.16	34.30	88.46	74.00	14.46	Peak	No Limit
4	2402.0500	42.04	34.30	76.34	54.00	22.34	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_3Mbps

**Vertical**

80 dBuV/m

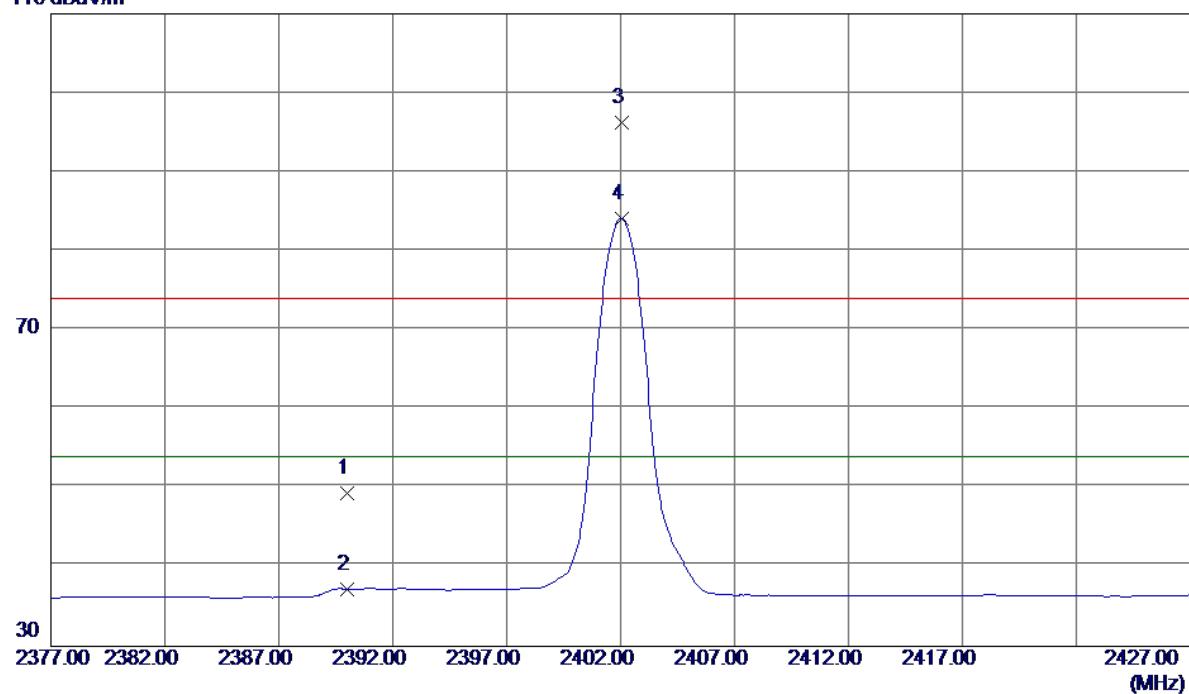


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4803.8100	45.90	5.82	51.72	74.00	-22.28	Peak	
2	4804.3000	34.74	5.82	40.56	54.00	-13.44	AVG	

Test Mode : TX 2402MHz \_CH00\_3Mbps

### Horizontal

110 dBuV/m

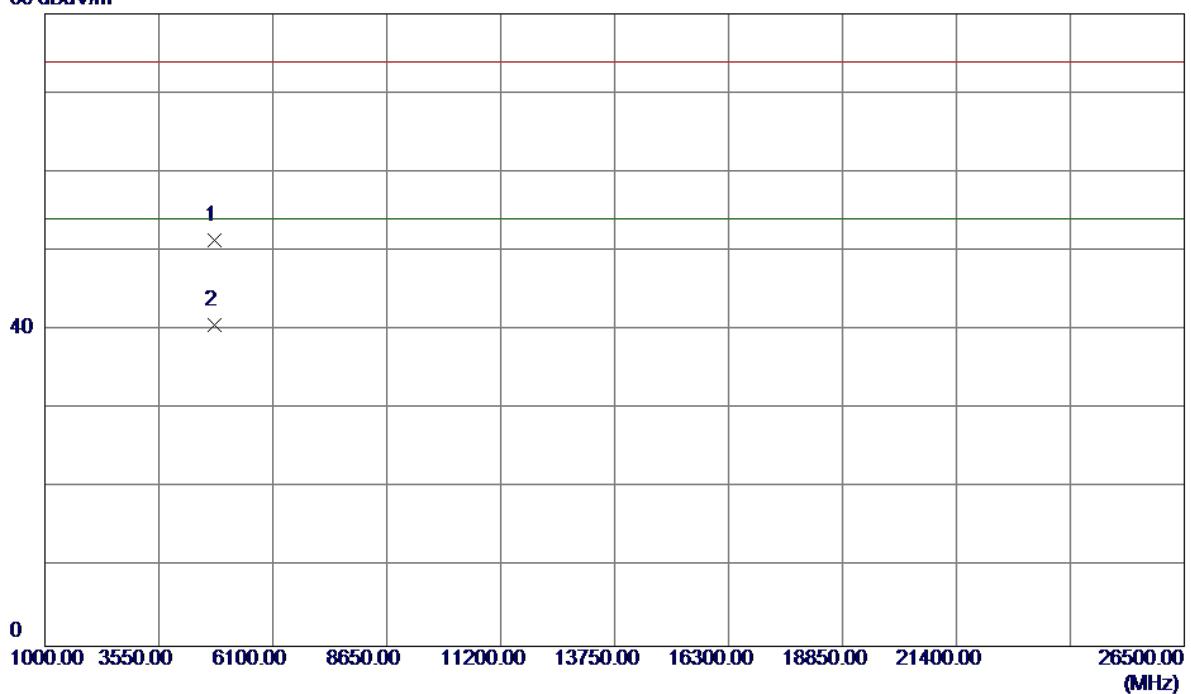


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	15.12	34.23	49.35	74.00	-24.65	Peak	
2	2390.0000	3.00	34.23	37.23	54.00	-16.77	AVG	
3	2402.0500	61.89	34.30	96.19	74.00	22.19	Peak	No Limit
4	2402.0500	49.85	34.30	84.15	54.00	30.15	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_3Mbps

### Horizontal

80 dBuV/m

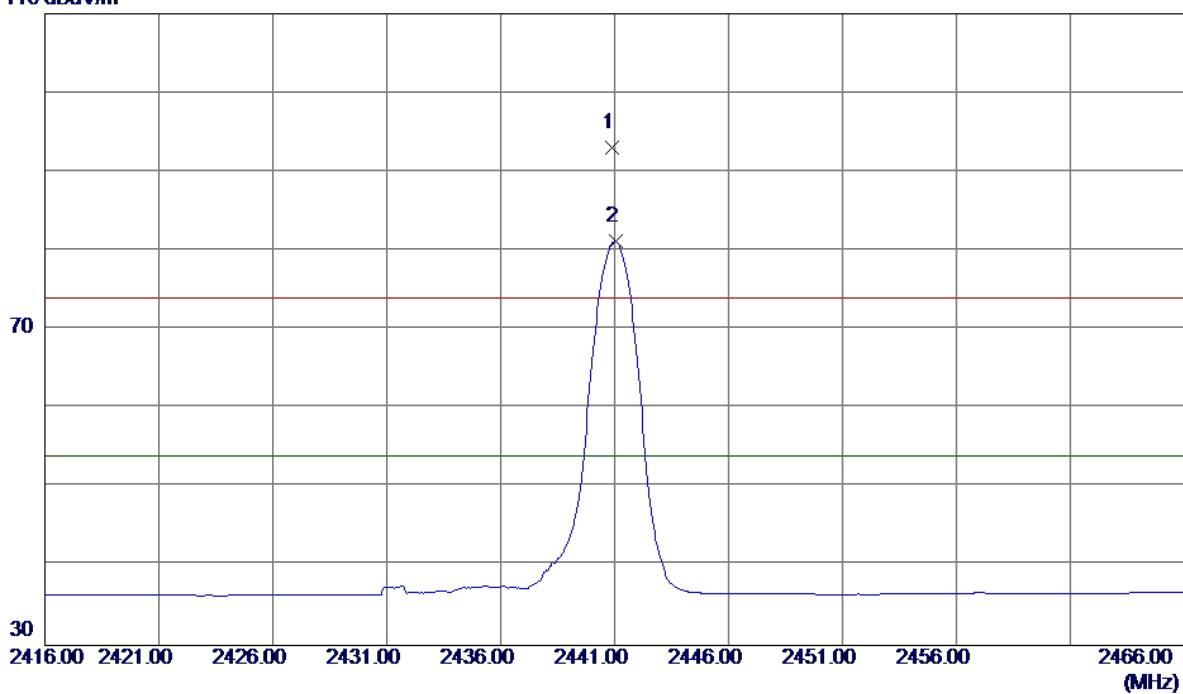


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB		
							Detector	Comment
1	4803.9100	45.54	5.82	51.36	74.00	-22.64	Peak	
2	4804.1000	34.86	5.82	40.68	54.00	-13.32	AVG	

Test Mode : TX 2441MHz \_CH39\_3Mbps

Vertical

110 dBuV/m

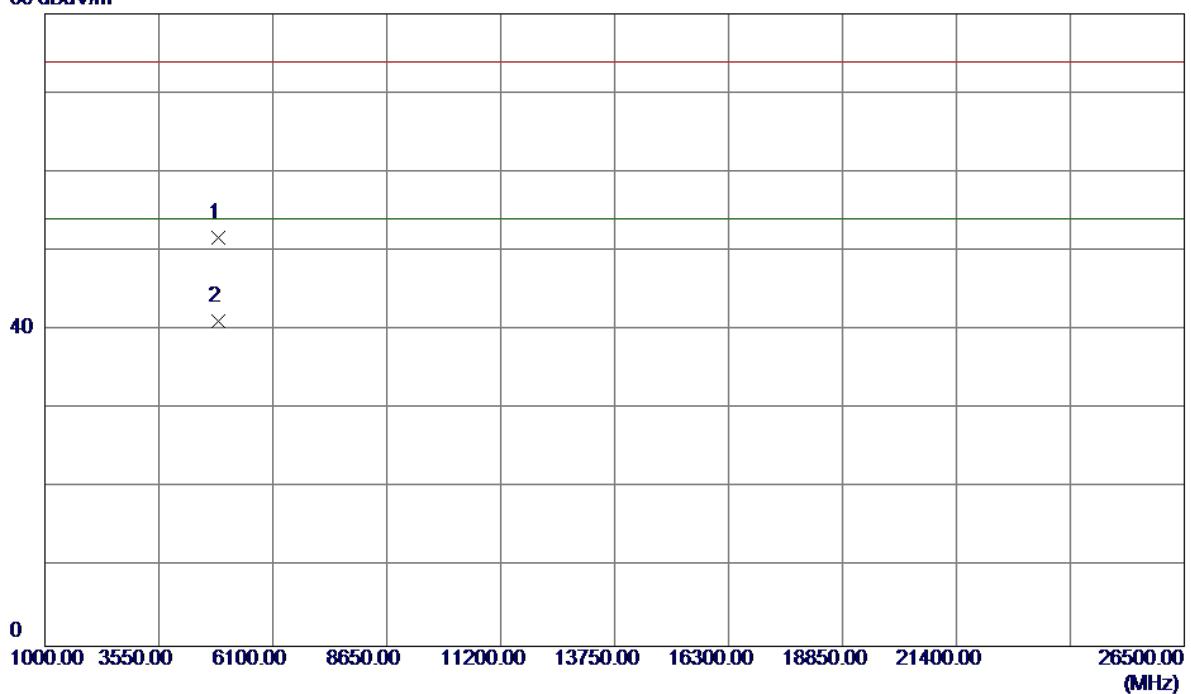


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2440.9000	58.57	34.53	93.10	74.00	19.10	Peak	No Limit
2	2441.0500	46.60	34.53	81.13	54.00	27.13	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_3Mbps

Vertical

80 dBuV/m

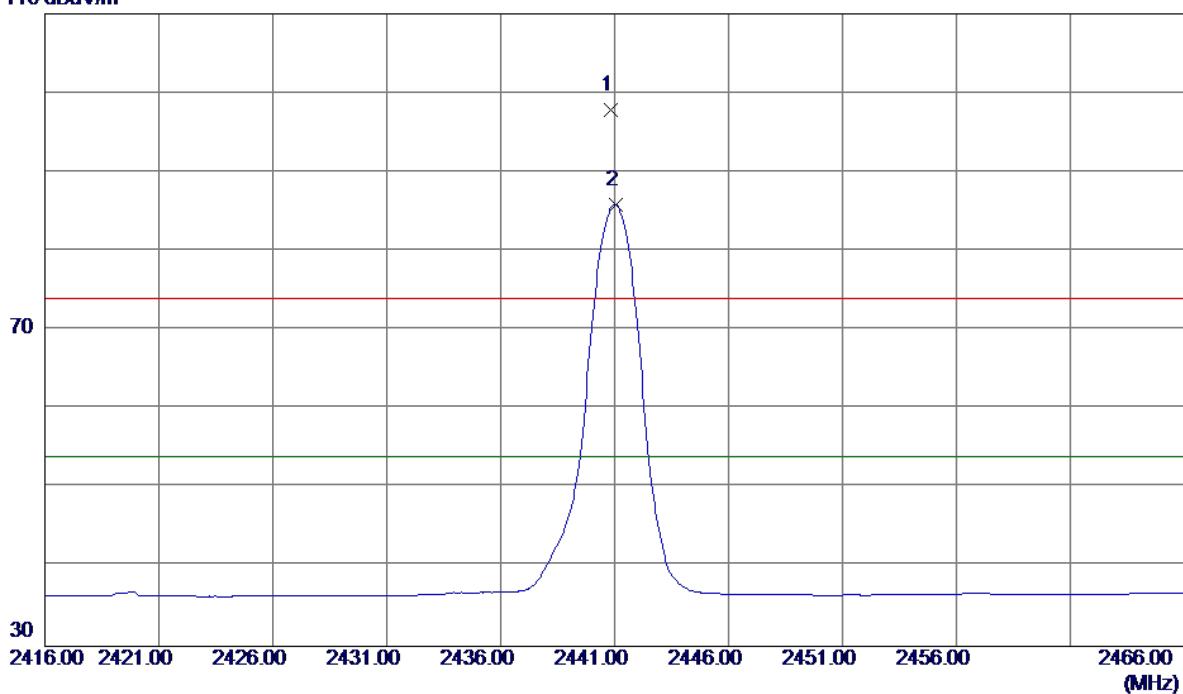


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4881.7599	45.65	6.02	51.67	74.00	-22.33	Peak	
2	4882.1600	35.14	6.03	41.17	54.00	-12.83	AVG	

Test Mode : TX 2441MHz \_CH39\_3Mbps

**Horizontal**

110 dBuV/m

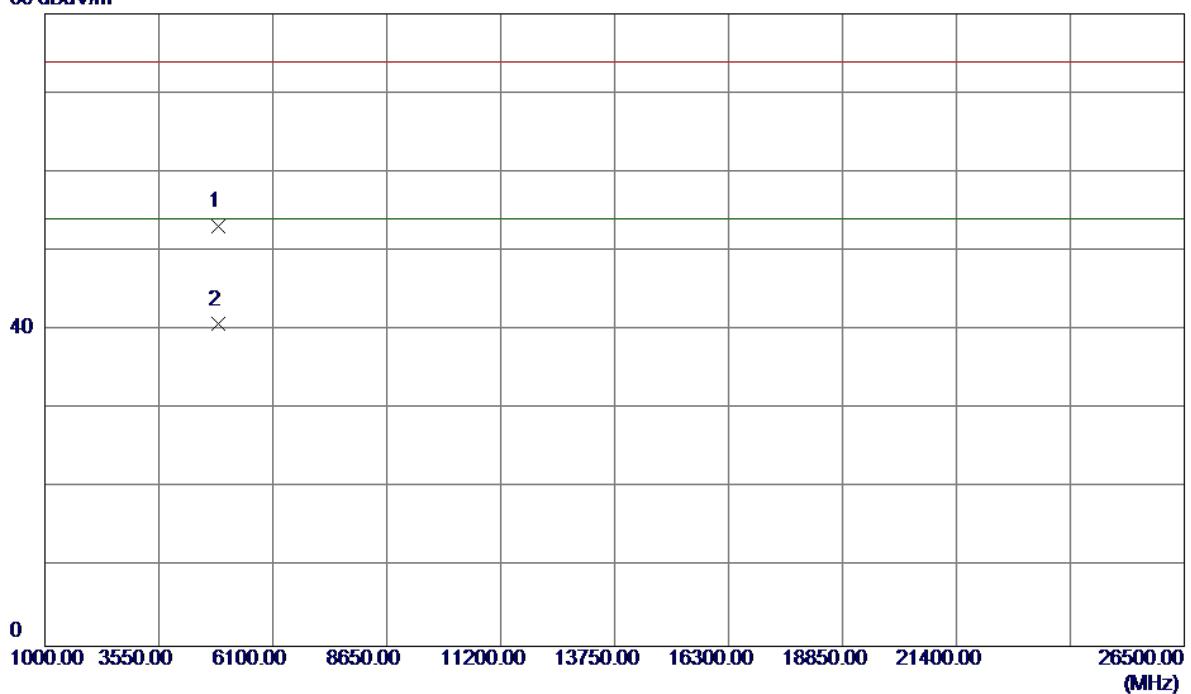


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	2440.8500	63.38	34.53	97.91	74.00	23.91	Peak	No Limit
2	2441.0500	51.37	34.53	85.90	54.00	31.90	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_3Mbps

### Horizontal

80 dBuV/m

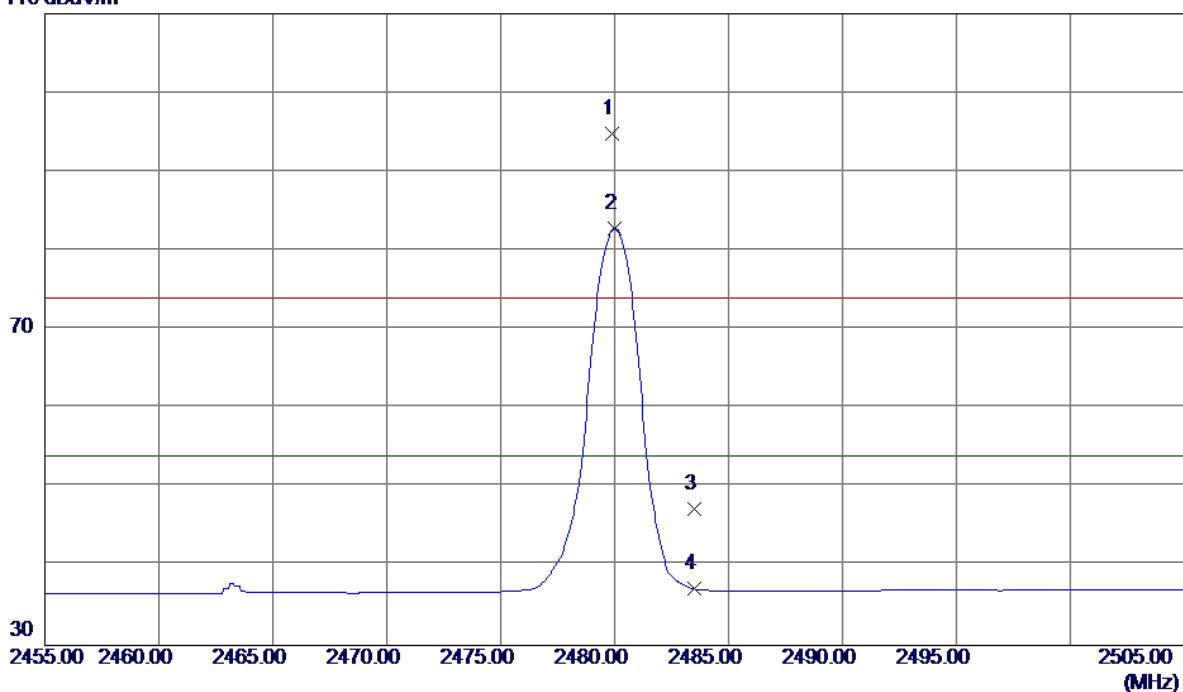


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4881.9900	47.07	6.02	53.09	74.00	-20.91	Peak	
2	4882.2000	34.69	6.03	40.72	54.00	-13.28	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

**Vertical**

**110 dBuV/m**

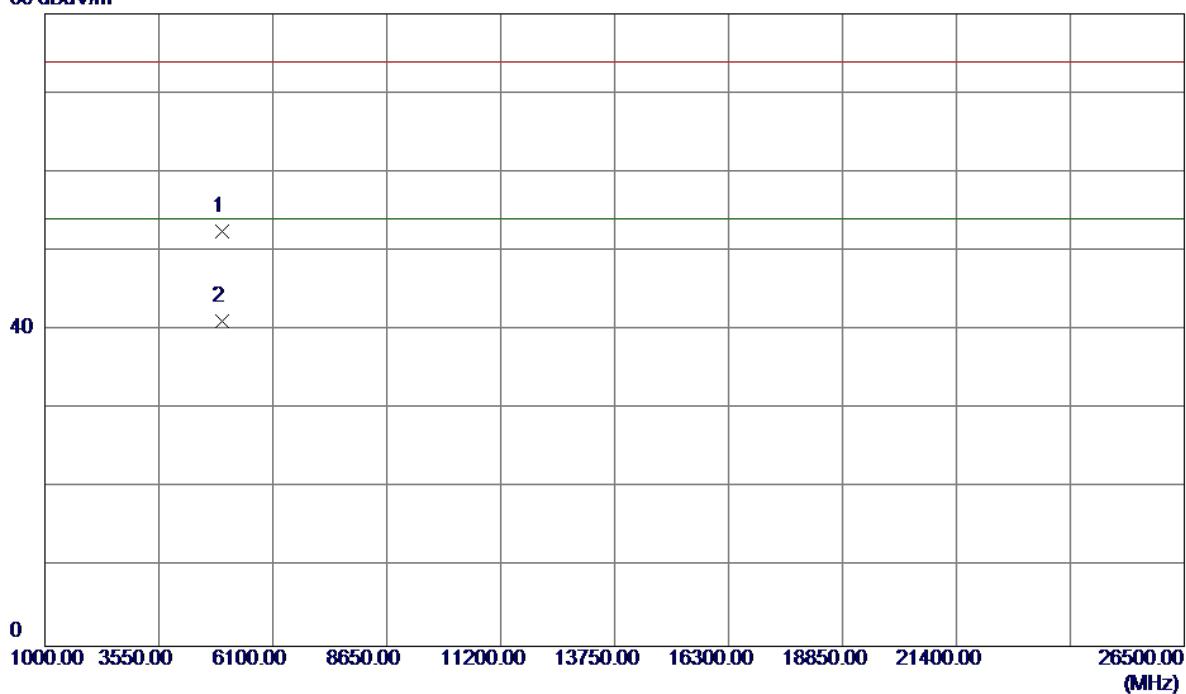


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.9000	60.05	34.75	94.80	74.00	20.80	Peak	No Limit
2	2480.0000	48.05	34.75	82.80	54.00	28.80	AVG	No Limit
3	2483.5000	12.57	34.77	47.34	74.00	-26.66	Peak	
4	2483.5000	2.36	34.77	37.13	54.00	-16.87	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

**Vertical**

80 dBuV/m

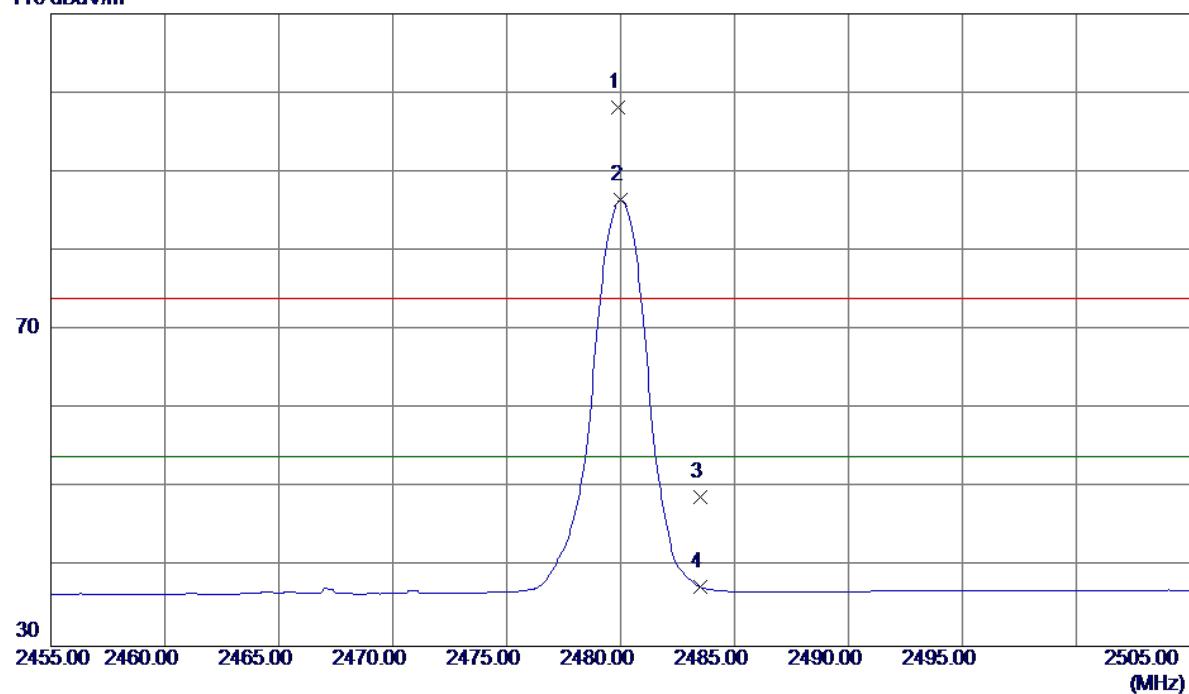


No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4960.8000	46.17	6.24	52.41	74.00	-21.59	Peak	
2	4961.0000	34.92	6.24	41.16	54.00	-12.84	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

### Horizontal

110 dBuV/m

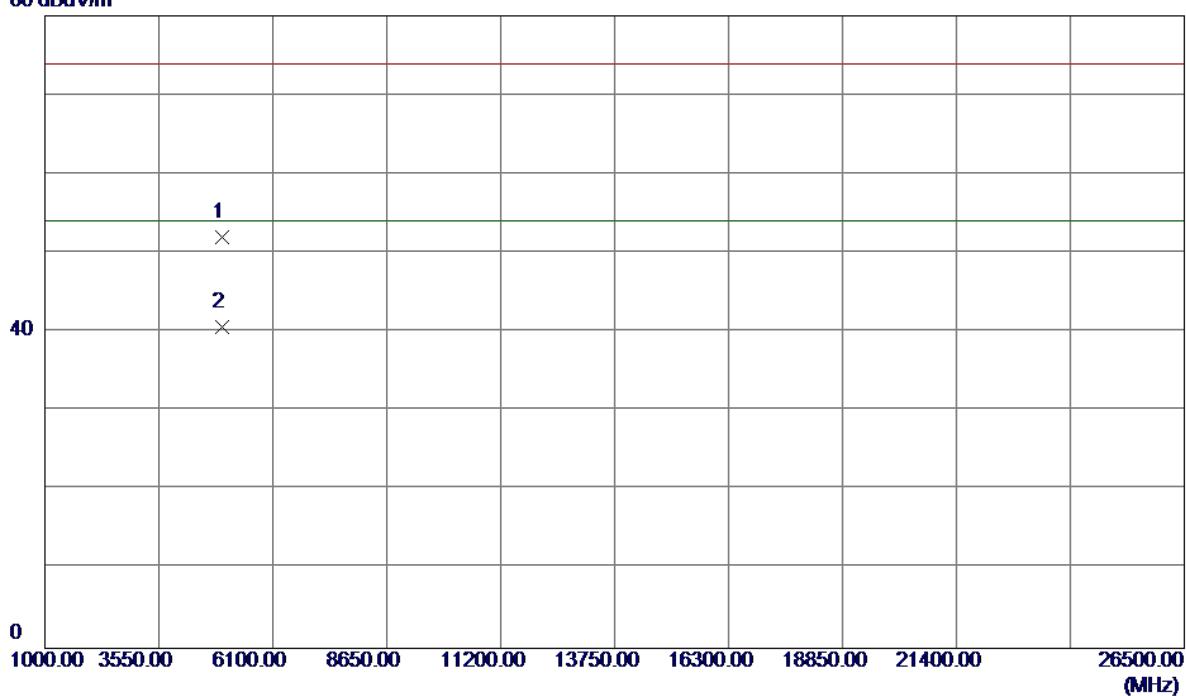


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.9000	63.46	34.75	98.21	74.00	24.21	Peak	No Limit
2	2480.0000	51.66	34.75	86.41	54.00	32.41	AVG	No Limit
3	2483.5000	14.17	34.77	48.94	74.00	-25.06	Peak	
4	2483.5000	2.71	34.77	37.48	54.00	-16.52	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

**Horizontal**

80 dBuV/m



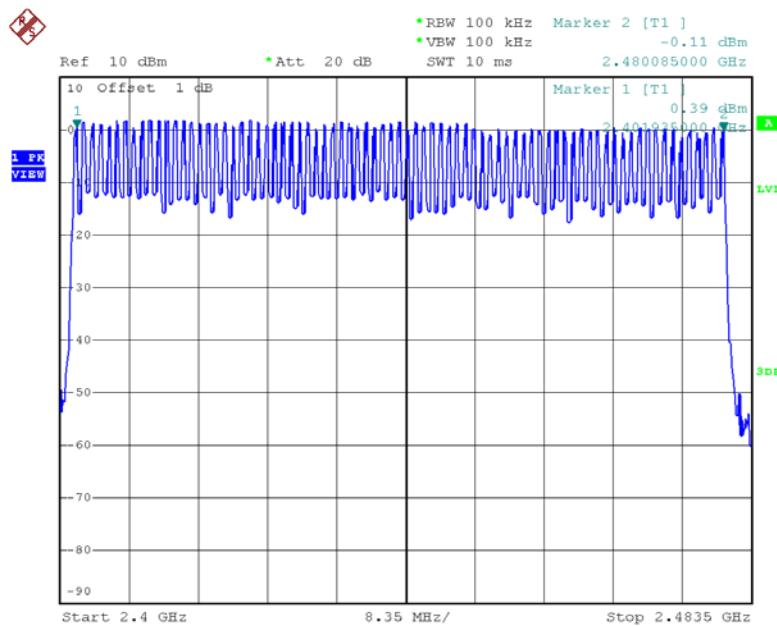
No.	Freq. MHz	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
		dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4959.1000	45.73	6.23	51.96	74.00	-22.04	Peak	
2	4960.8000	34.34	6.24	40.58	54.00	-13.42	AVG	

## ATTACHMENT E - NUMBER OF HOPPING CHANNEL

**Test Mode                    Hopping Mode\_1Mbps**

Number of Hopping Channel

79

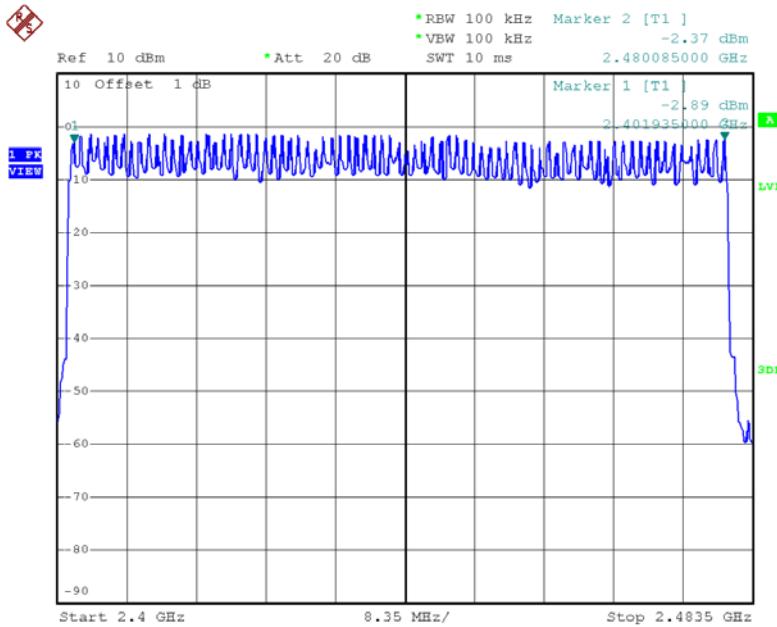


Date: 30.NOV.2015 14:43:42

**Test Mode                    Hopping Mode\_3Mbps**

Number of Hopping Channel

79

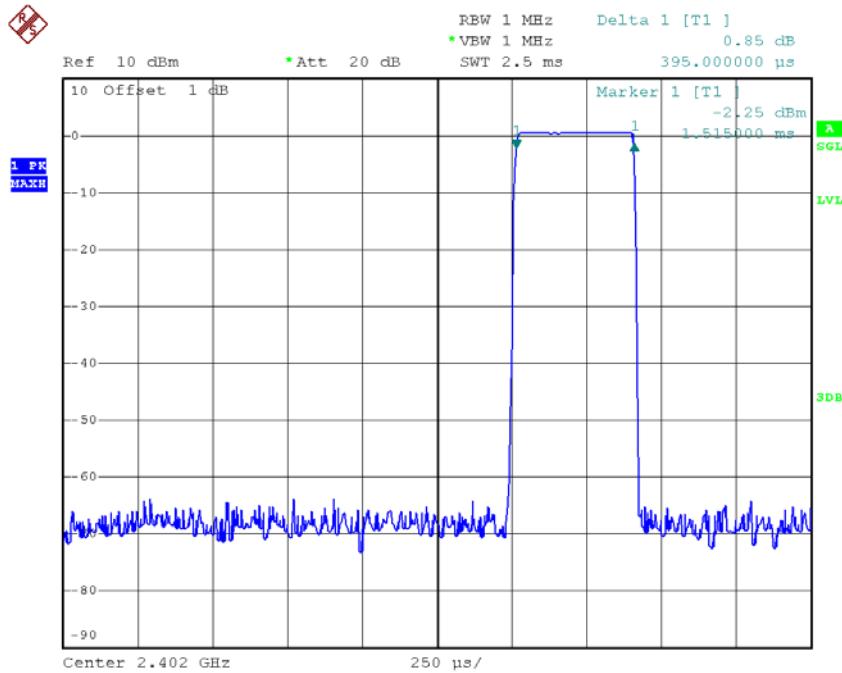


Date: 30.NOV.2015 14:57:29

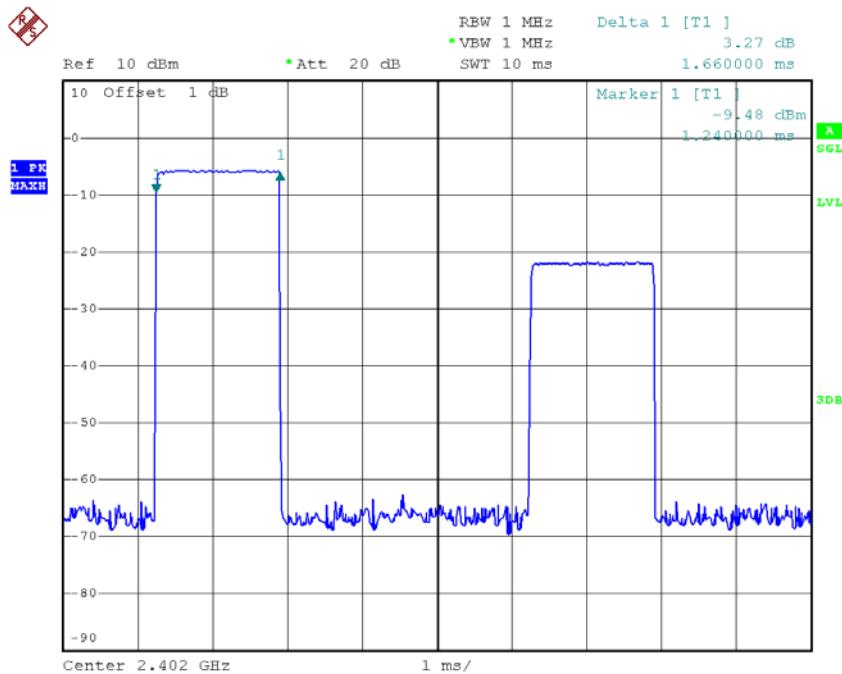
## ATTACHMENT F - AVERAGE TIME OF OCCUPANCY

Test Mode :	TX Mode_1Mbps
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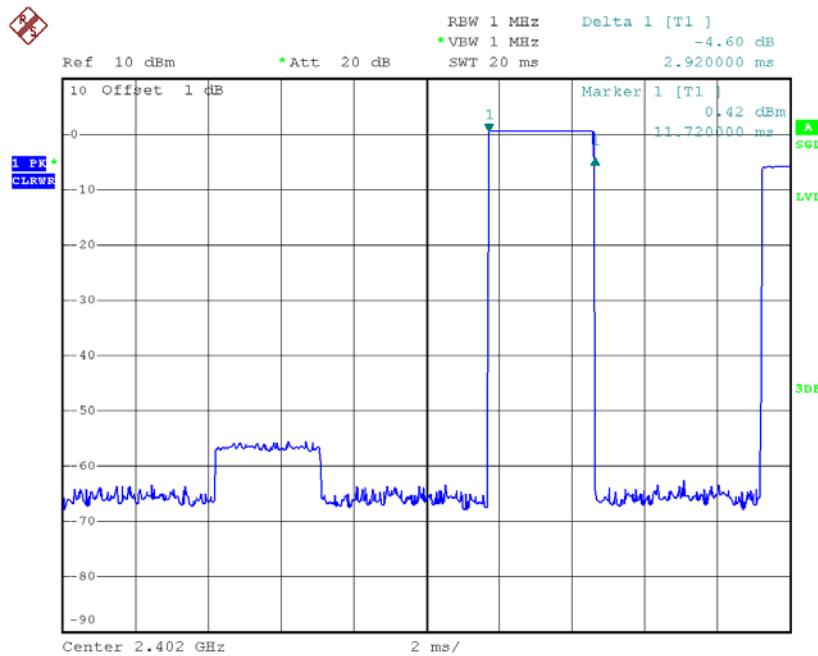
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.9200	0.3115	0.4000	Pass
DH3	2402	1.6600	0.1771	0.4000	Pass
DH1	2402	0.3950	0.0421	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6400	0.1749	0.4000	Pass
DH1	2441	0.3950	0.0421	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass
DH3	2480	1.6600	0.1771	0.4000	Pass
DH1	2480	0.3950	0.0421	0.4000	Pass

**CH00-DH1**

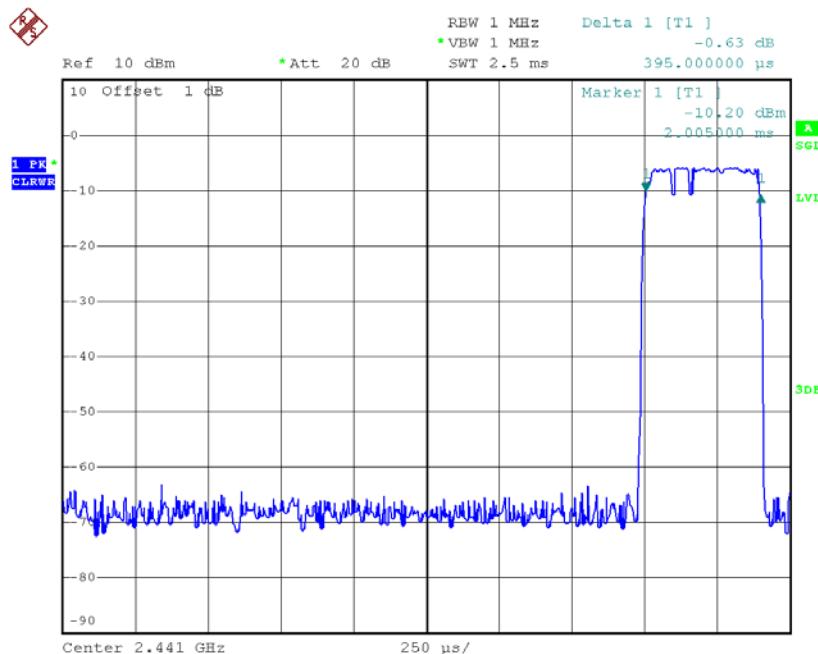
Date: 30.NOV.2015 14:38:15

**CH00-DH3**

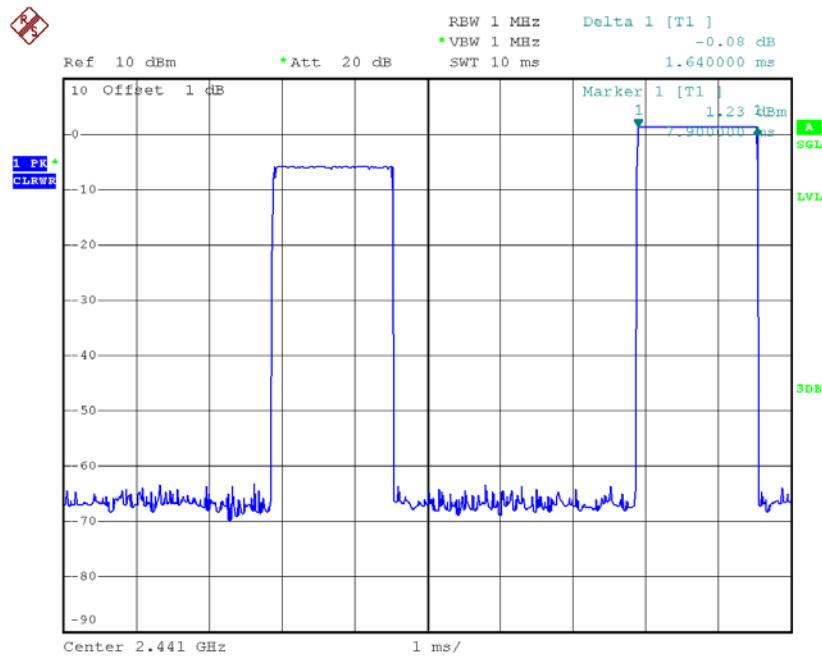
Date: 30.NOV.2015 14:45:59

**CH00-DH5**

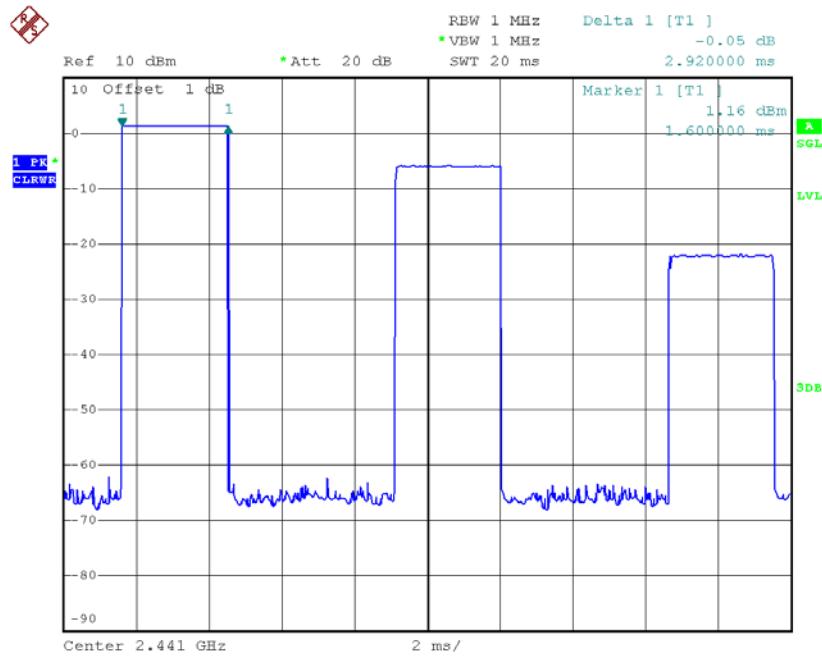
Date: 30.NOV.2015 14:46:44

**CH39-DH1**

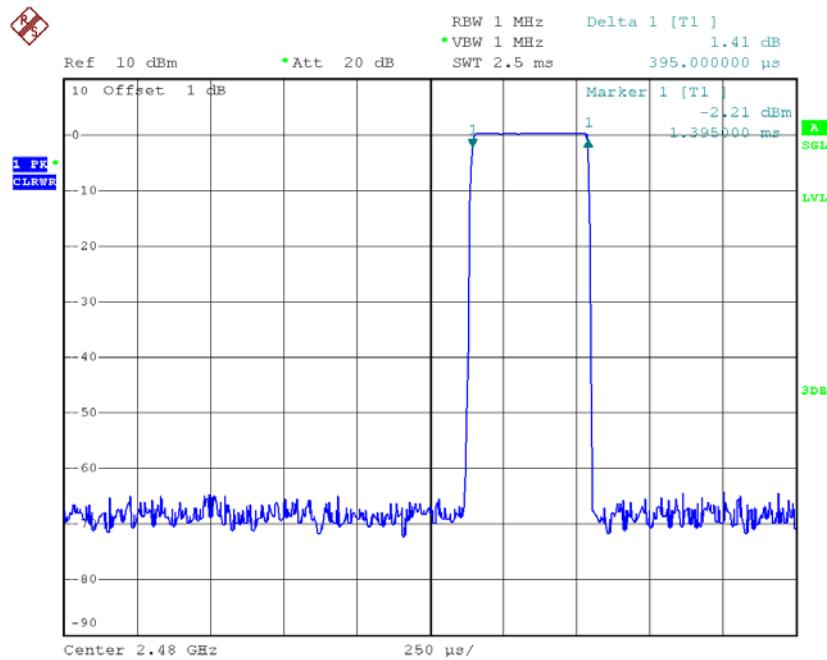
Date: 30.NOV.2015 14:38:20

**CH39-DH3**

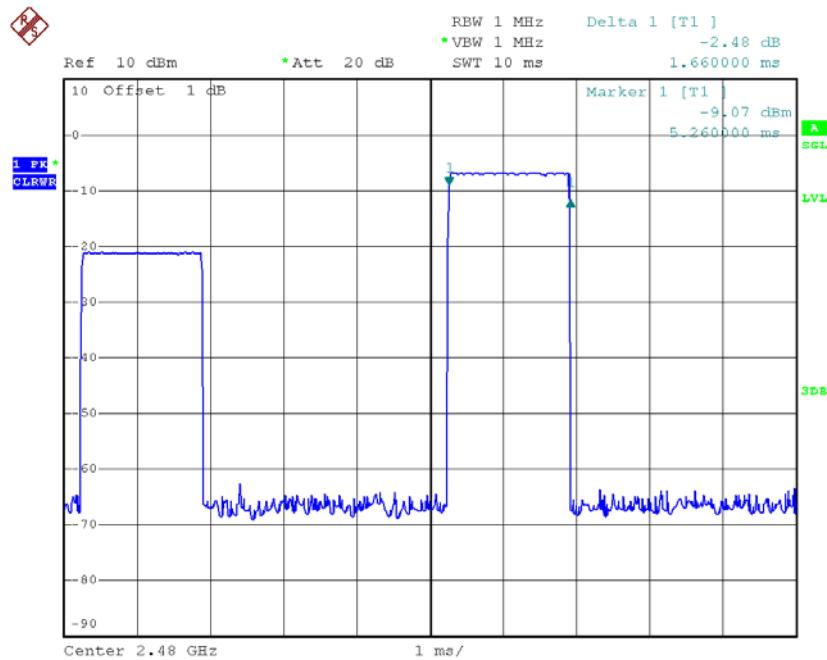
Date: 30.NOV.2015 14:46:08

**CH39-DH5**

Date: 30.NOV.2015 14:46:48

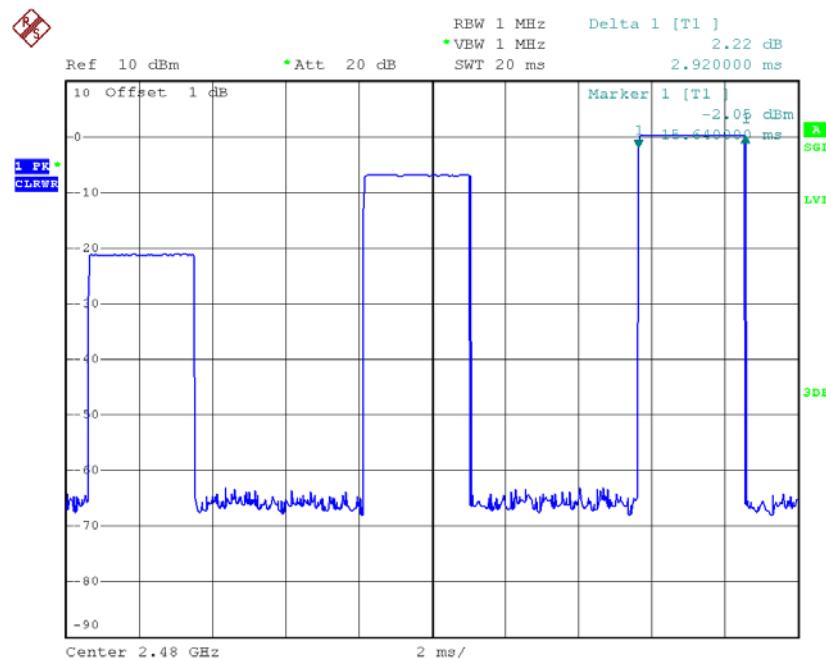
**CH78-DH1**

Date: 30.NOV.2015 14:38:33

**CH78-DH3**

Date: 30.NOV.2015 14:46:12

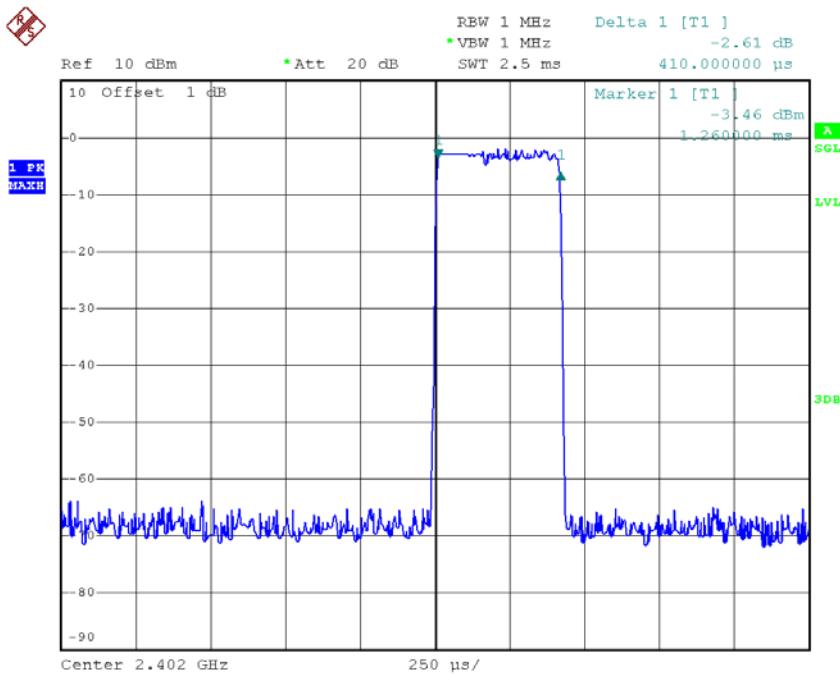
## CH78-DH5



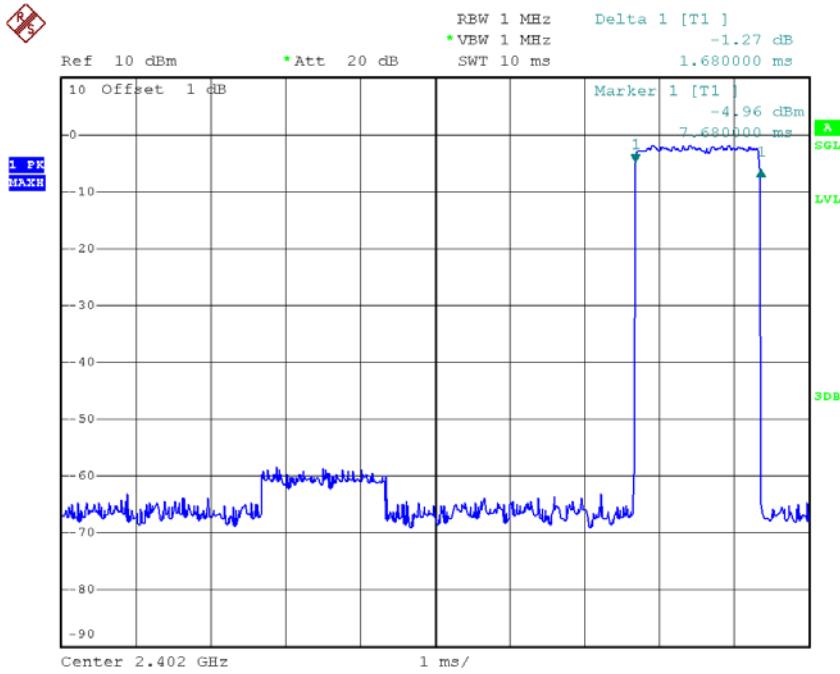
Date: 30.NOV.2015 14:46:54

Test Mode :	TX Mode_3Mbps
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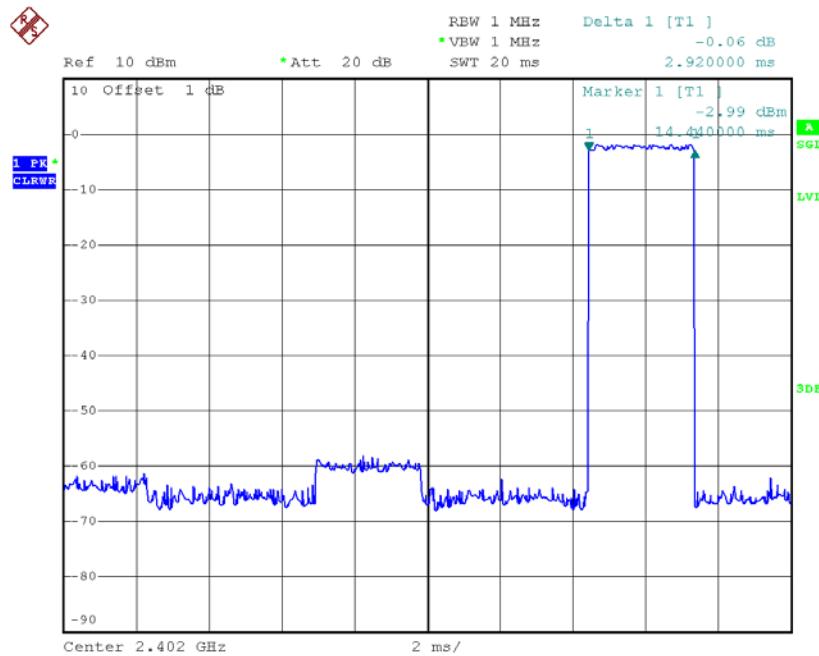
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.9200	0.3115	0.4000	Pass
DH3	2402	1.6800	0.1792	0.4000	Pass
DH1	2402	0.4100	0.0437	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6400	0.1749	0.4000	Pass
DH1	2441	0.4100	0.0437	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass
DH3	2480	1.6800	0.1792	0.4000	Pass
DH1	2480	0.4050	0.0432	0.4000	Pass

**CH00-DH1**

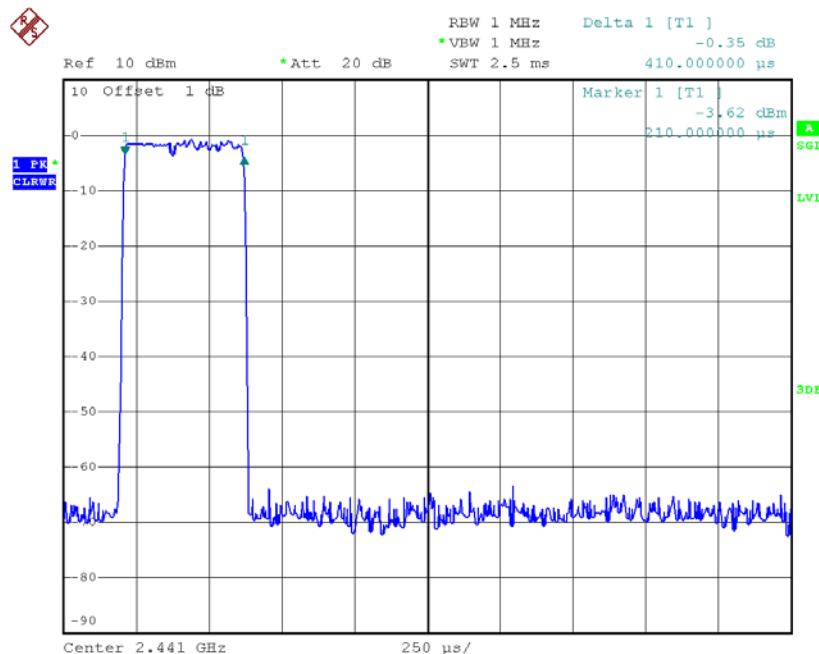
Date: 30.NOV.2015 14:52:09

**CH00-DH3**

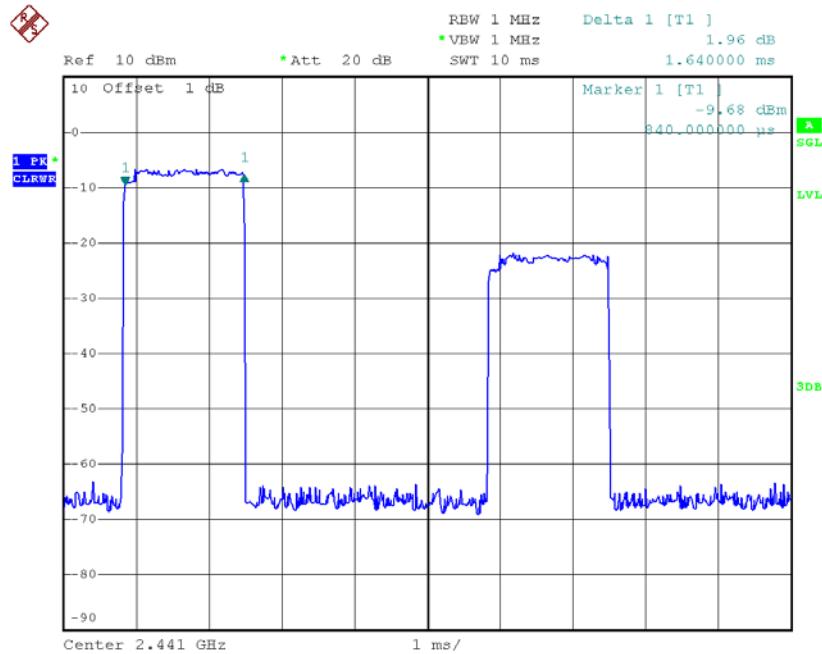
Date: 30.NOV.2015 15:06:06

**CH00-DH5**

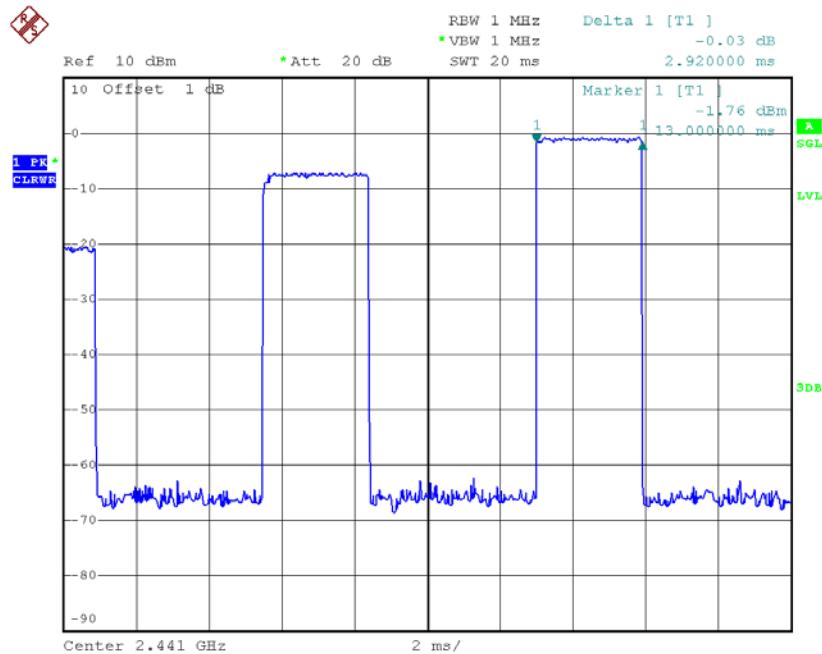
Date: 30.NOV.2015 15:06:54

**CH39-DH1**

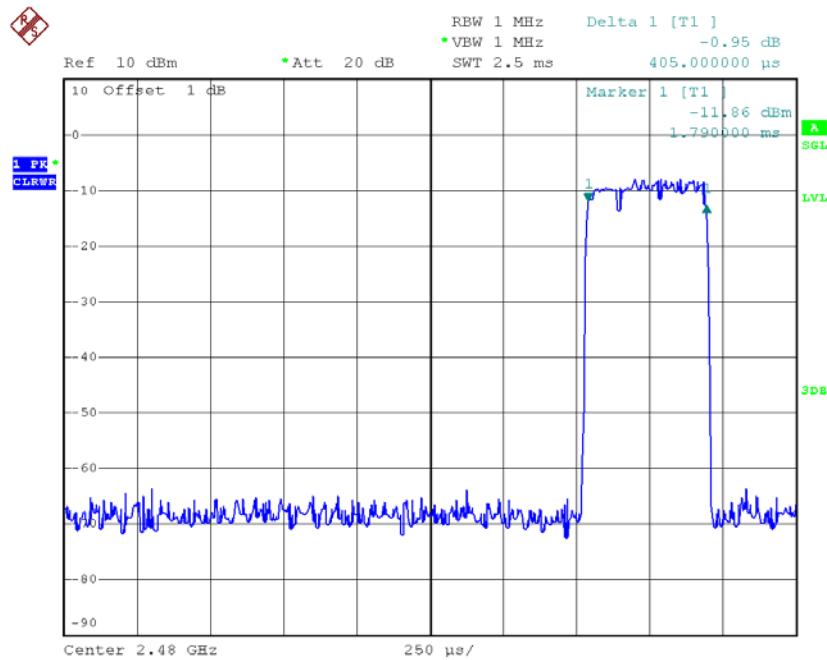
Date: 30.NOV.2015 14:52:14

**CH39-DH3**

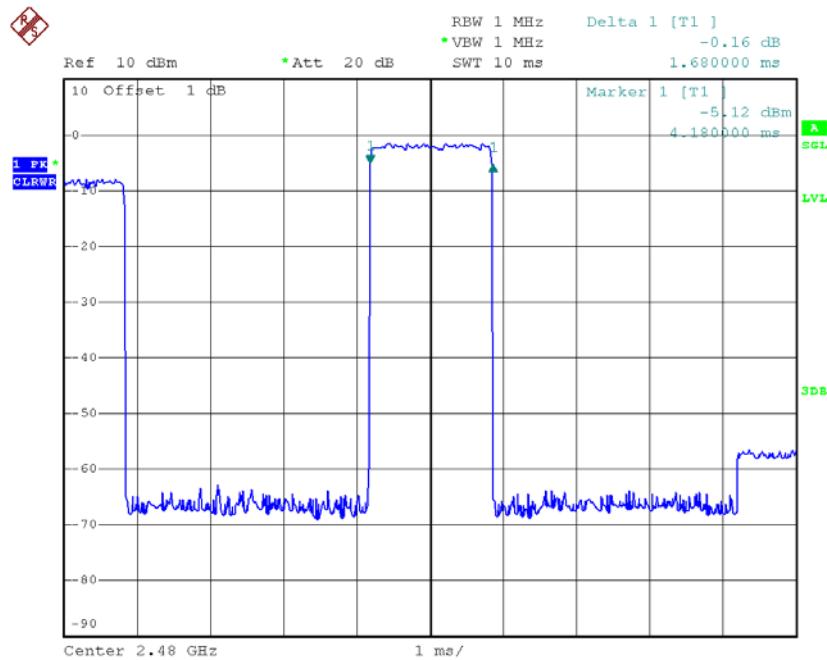
Date: 30.NOV.2015 15:06:11

**CH39-DH5**

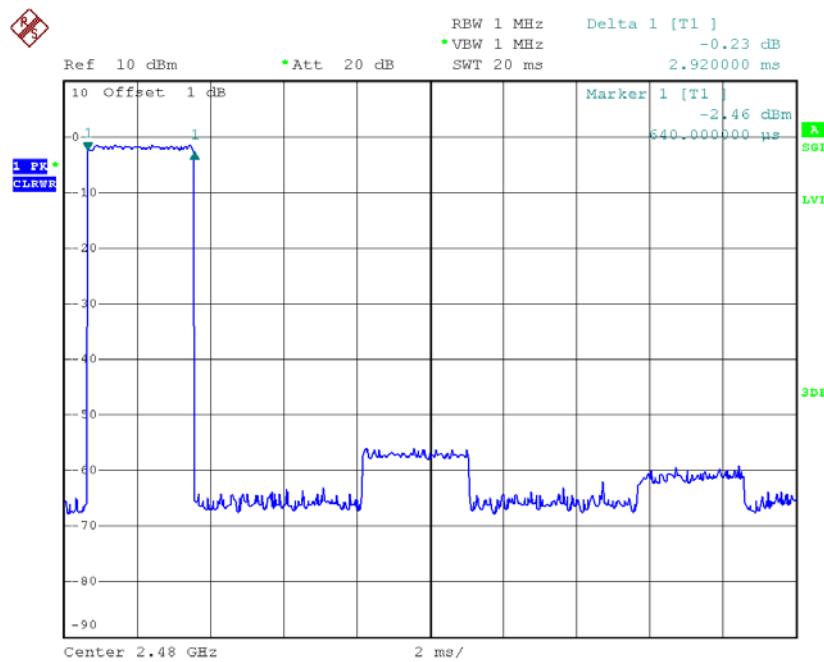
Date: 30.NOV.2015 15:07:01

**CH78-DH1**

Date: 30.NOV.2015 14:52:21

**CH78-DH3**

Date: 30.NOV.2015 15:06:15

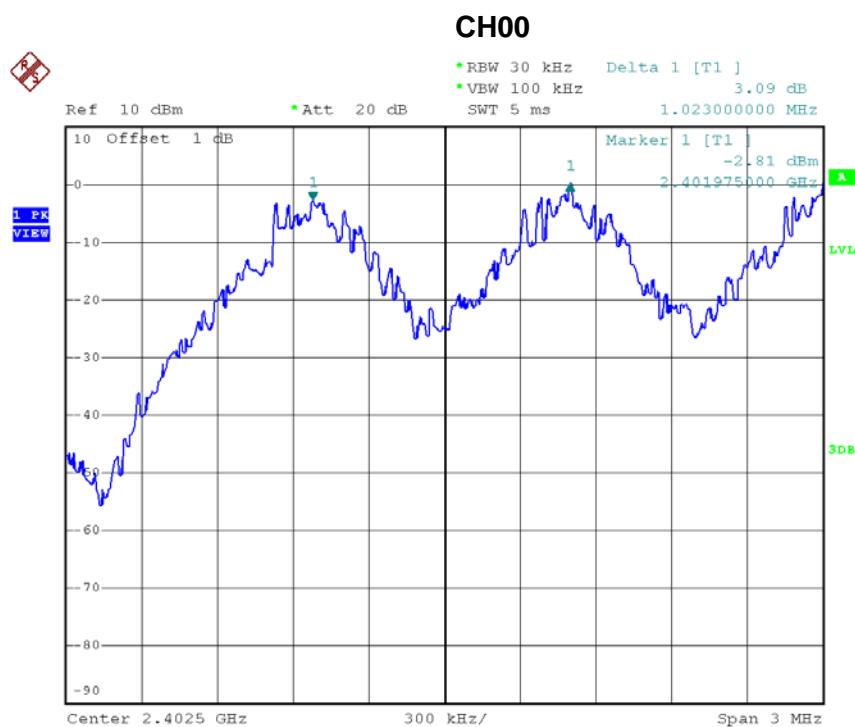
**CH78-DH5**

Date: 30.NOV.2015 15:07:05

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

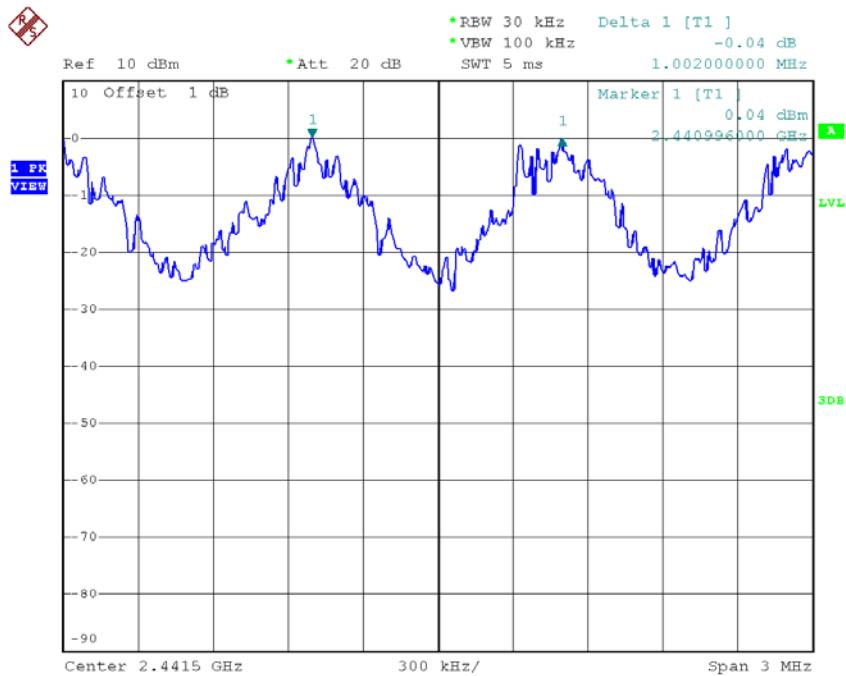
Test Mode : Hopping on \_1Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	1.023	0.577	Pass
2441	1.002	0.544	Pass
2480	0.983	0.525	Pass



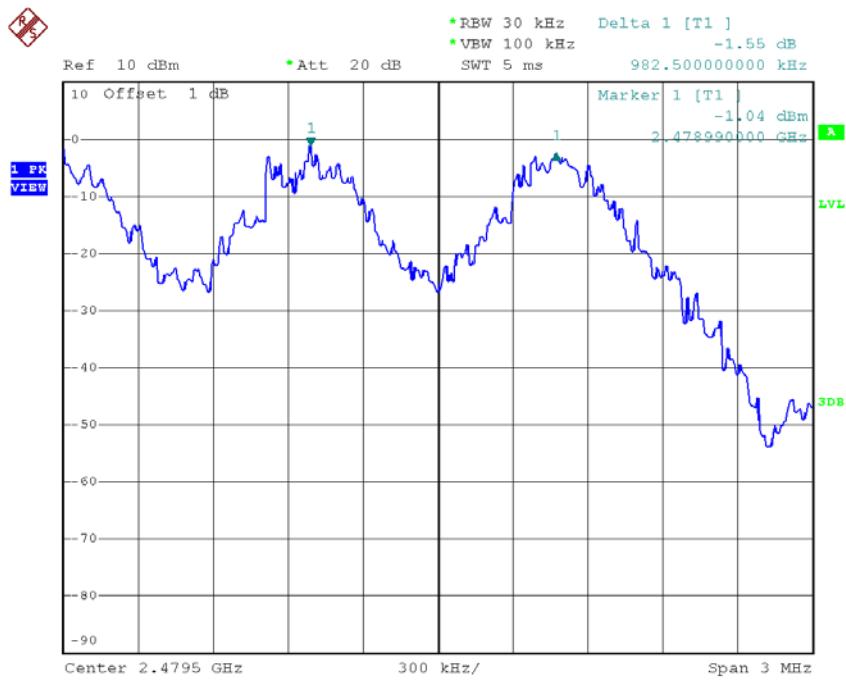
Date: 30.NOV.2015 14:39:42

## CH39



Date: 30.NOV.2015 14:40:46

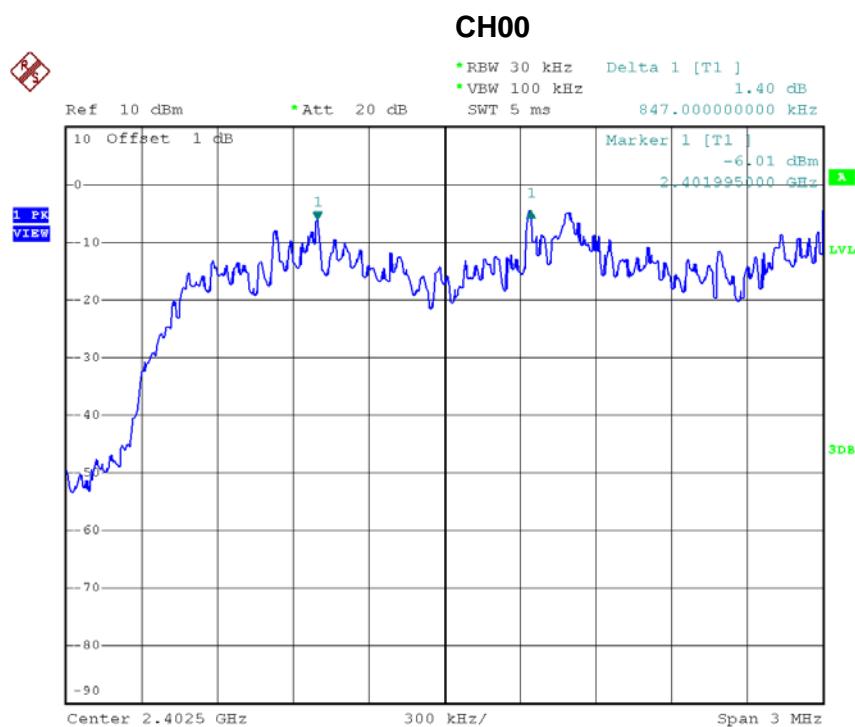
## CH78



Date: 30.NOV.2015 14:41:54

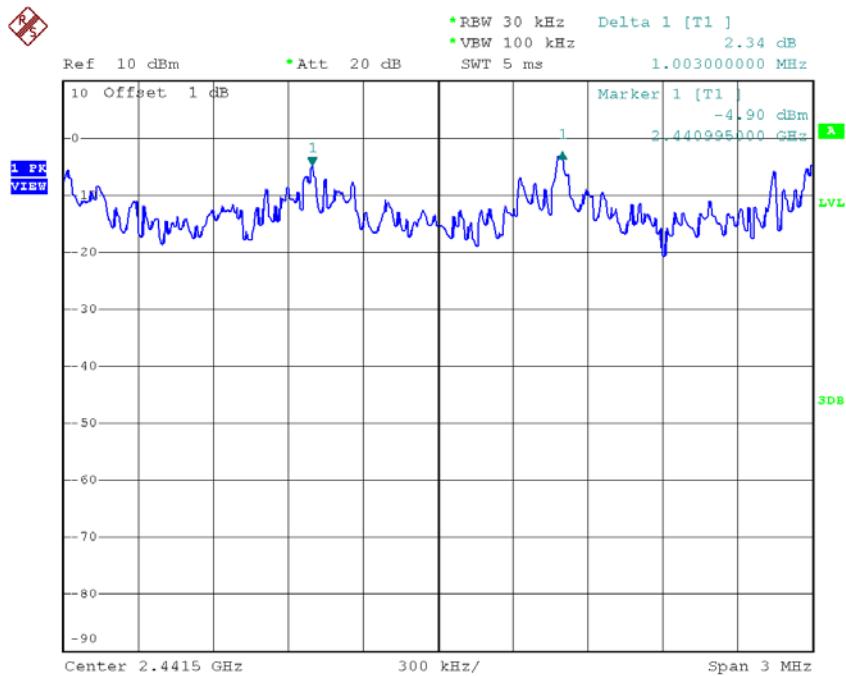
Test Mode : Hopping on \_3Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	0.847	0.807	Pass
2441	1.003	0.809	Pass
2480	0.834	0.804	Pass



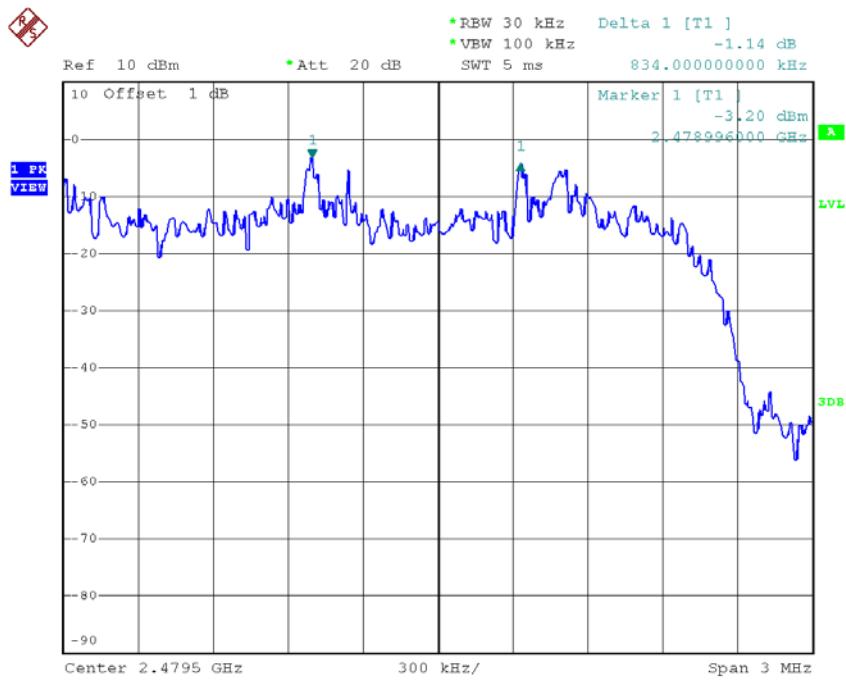
Date: 30.NOV.2015 14:53:29

## CH39



Date: 30.NOV.2015 14:54:37

## CH78



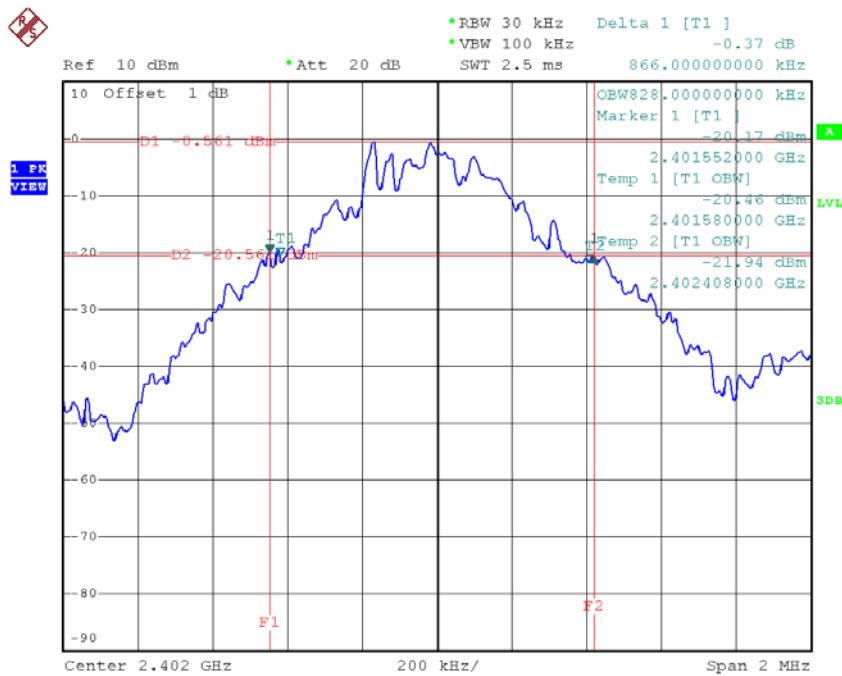
Date: 30.NOV.2015 14:55:41

## ATTACHMENT H - BANDWIDTH

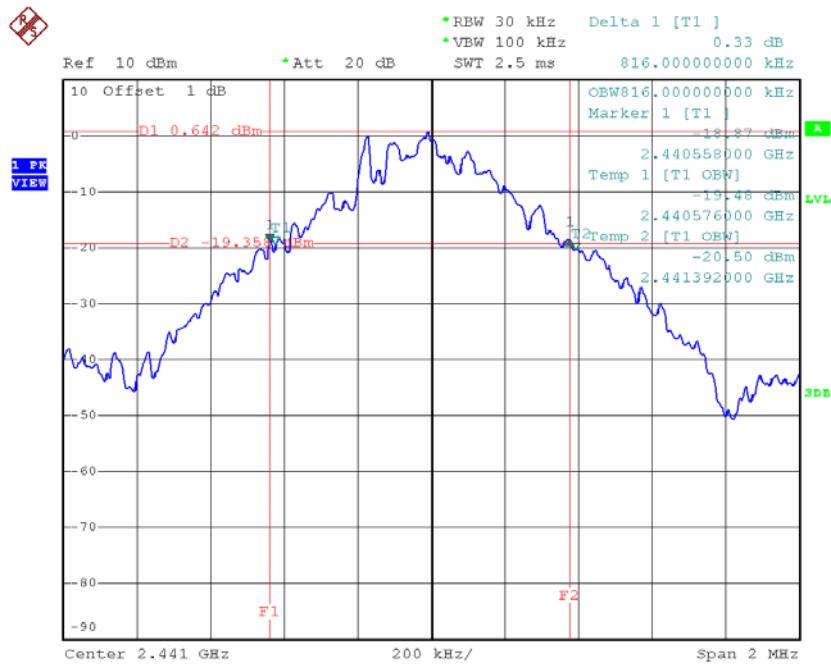
Test Mode : TX Mode \_1Mbps

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	0.866	0.828	Pass
2441	0.816	0.816	Pass
2480	0.788	0.824	Pass

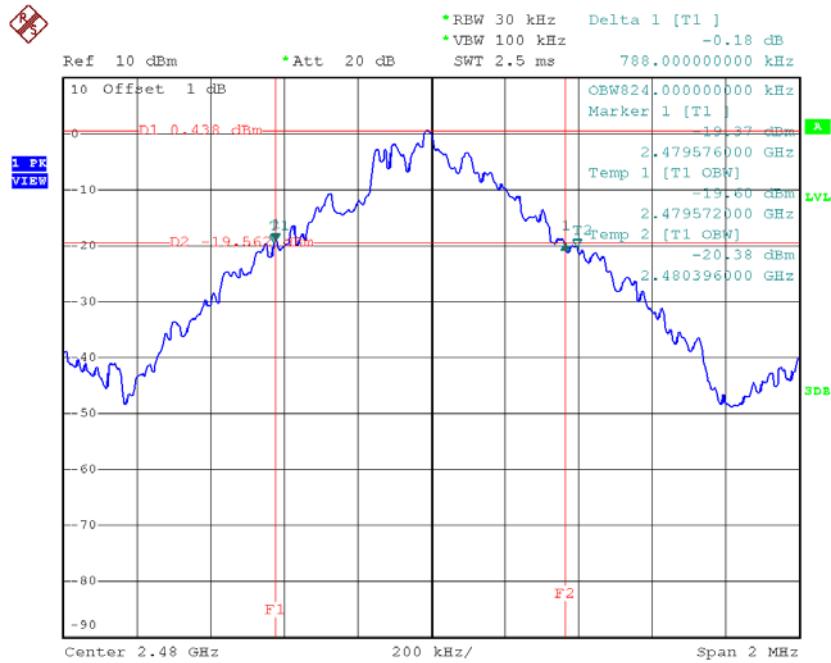
### CH00



Date: 30.NOV.2015 14:34:03

**CH39**

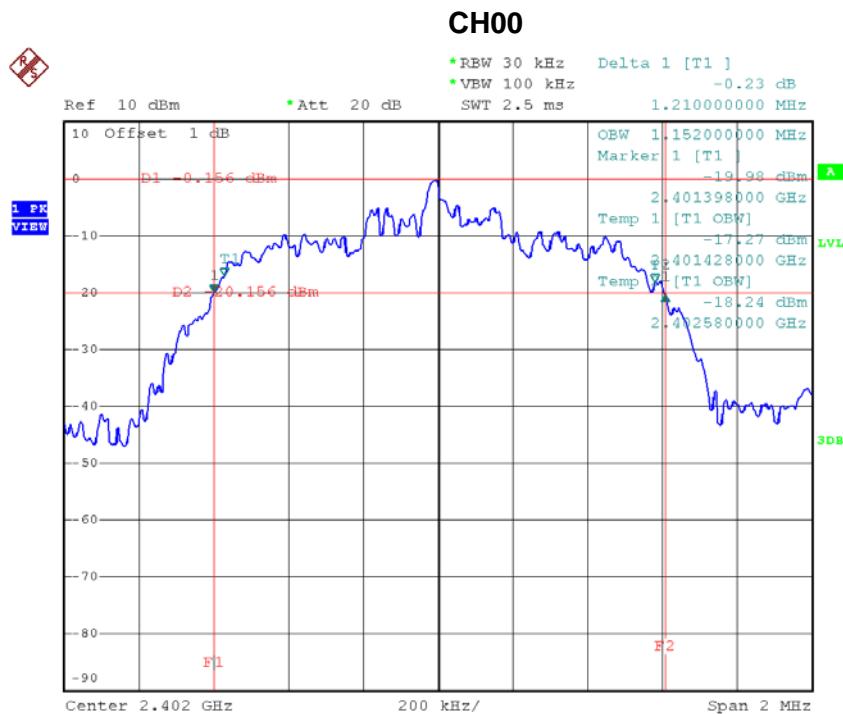
Date: 30.NOV.2015 14:35:33

**CH78**

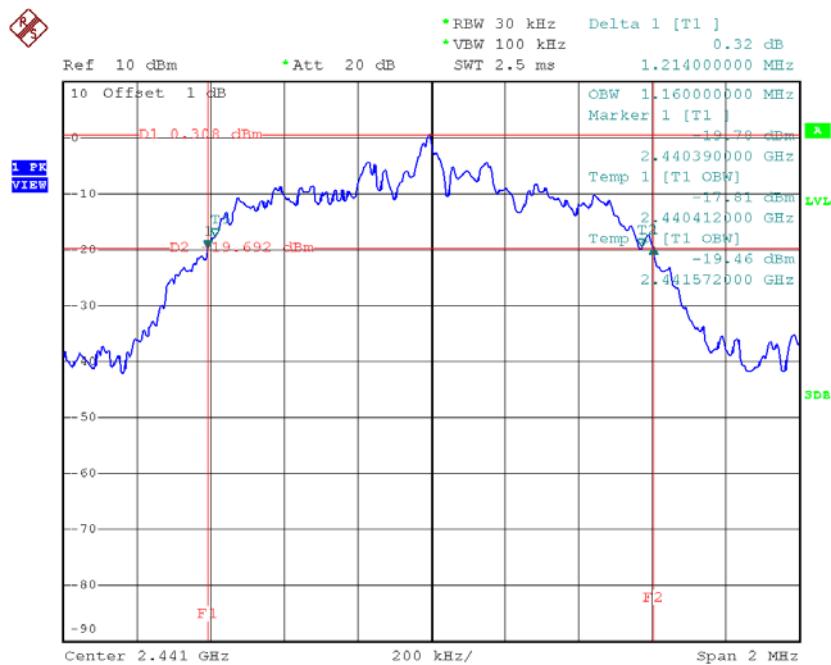
Date: 30.NOV.2015 14:36:31

Test Mode :	TX Mode _3Mbps
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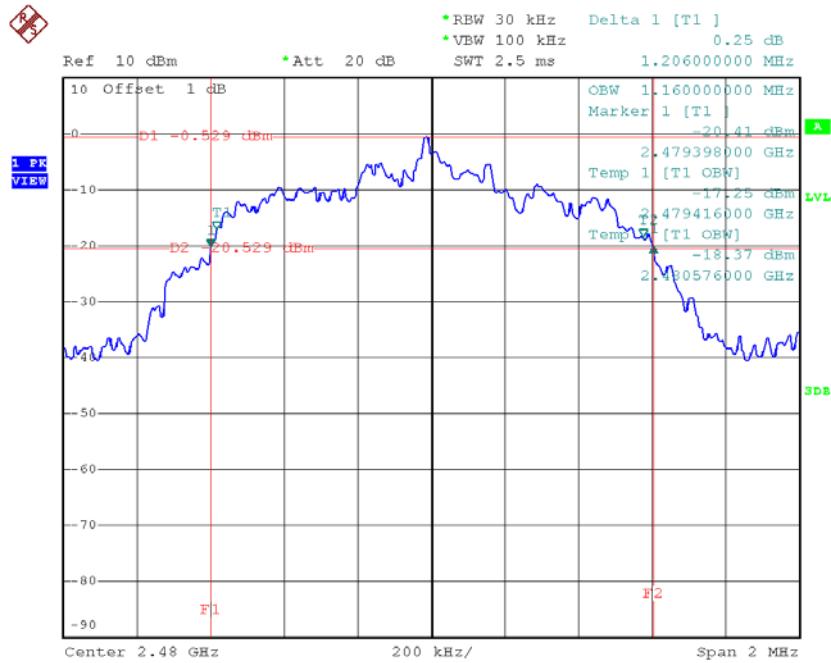
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.210	1.152	Pass
2441	1.214	1.160	Pass
2480	1.206	1.160	Pass



Date: 30.NOV.2015 14:49:32

**CH39**

Date: 30.NOV.2015 14:50:33

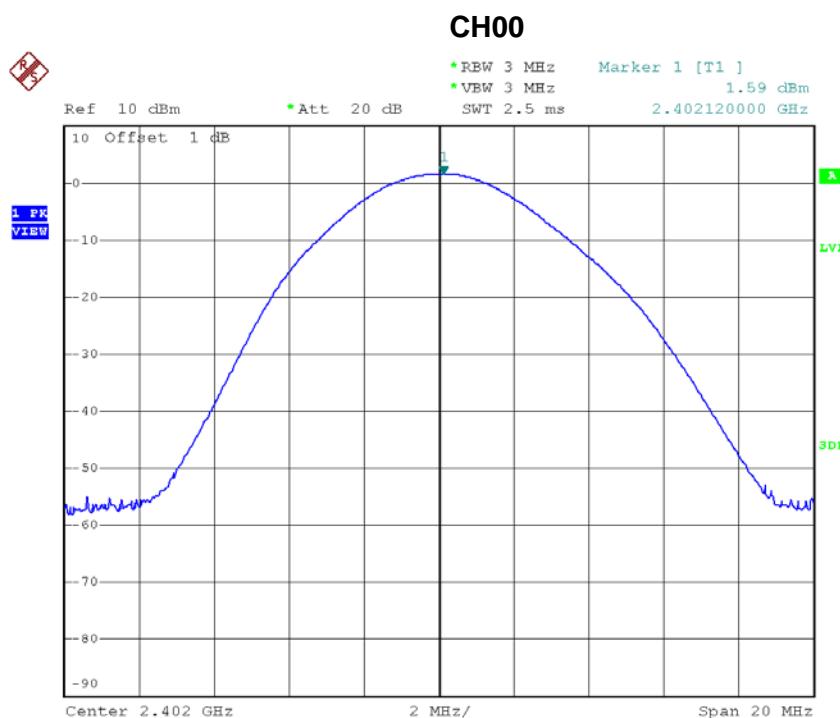
**CH78**

Date: 30.NOV.2015 14:51:14

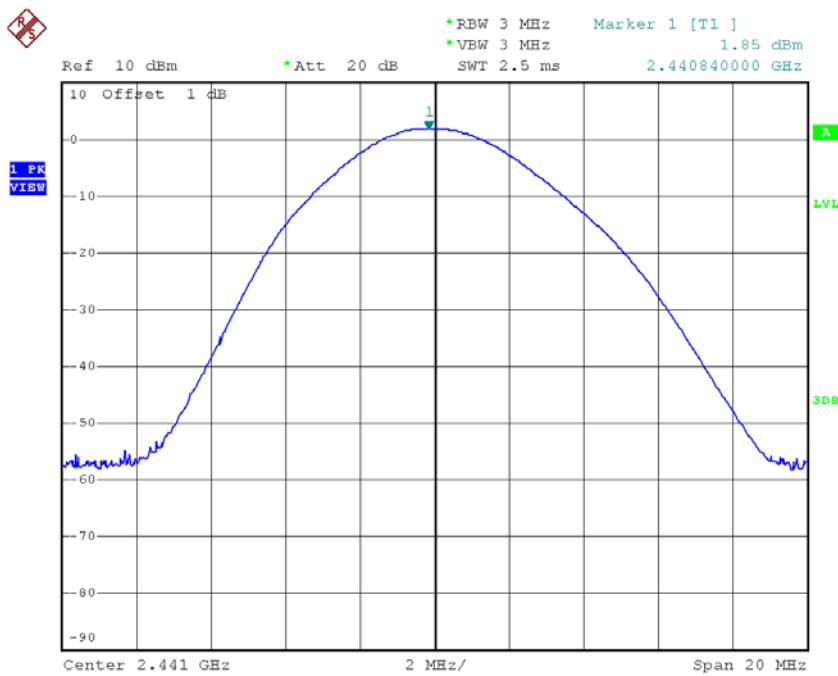
## ATTACHMENT I - PEAK OUTPUT POWER

Test Mode :	TX Mode _1Mbps
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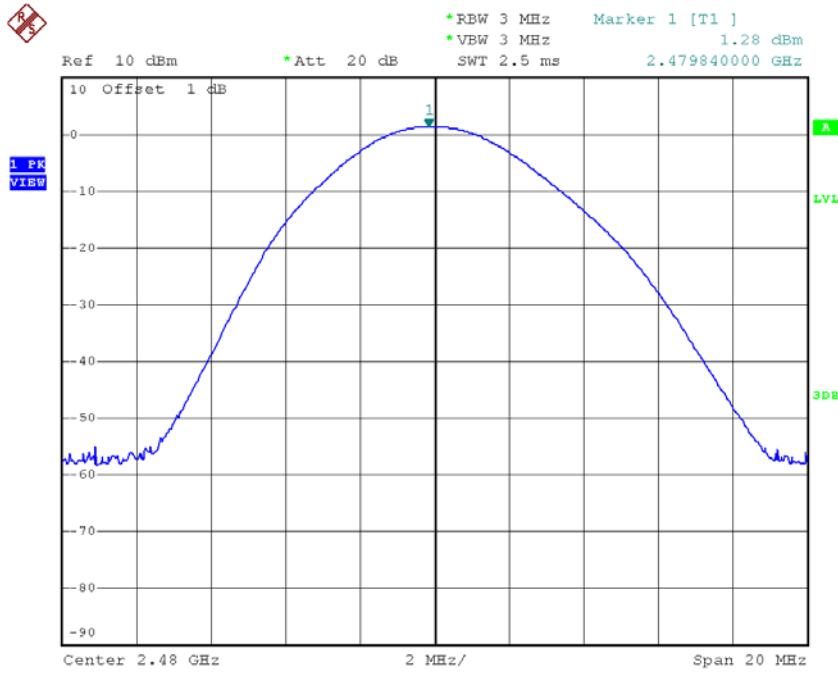
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	1.59	0.0014	30.00	1.00	Pass
2441	1.85	0.0015	30.00	1.00	Pass
2480	1.28	0.0013	30.00	1.00	Pass



Date: 30.NOV.2015 14:19:31

**CH39**

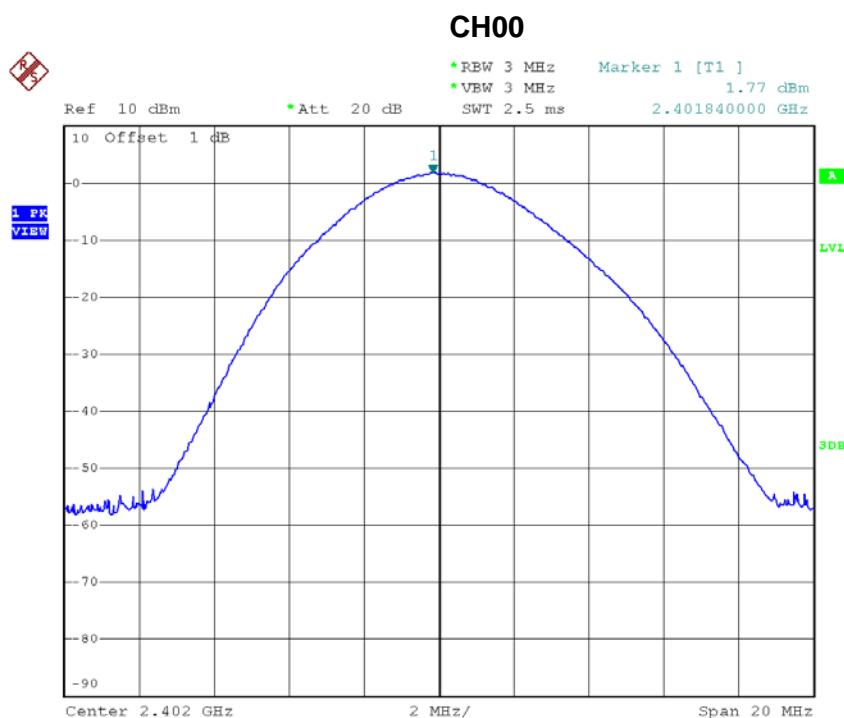
Date: 30.NOV.2015 14:20:45

**CH78**

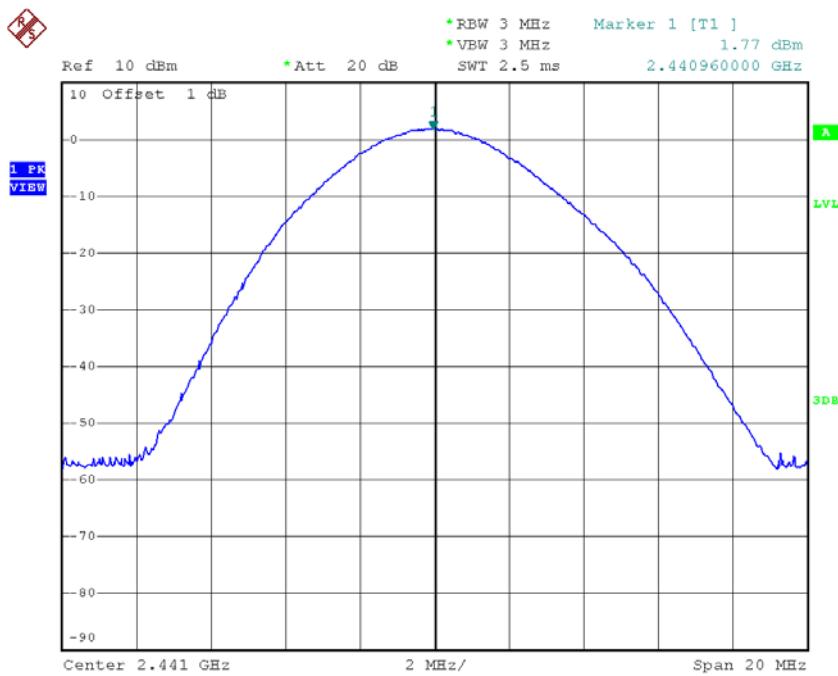
Date: 30.NOV.2015 14:23:20

Test Mode :	TX Mode _3Mbps
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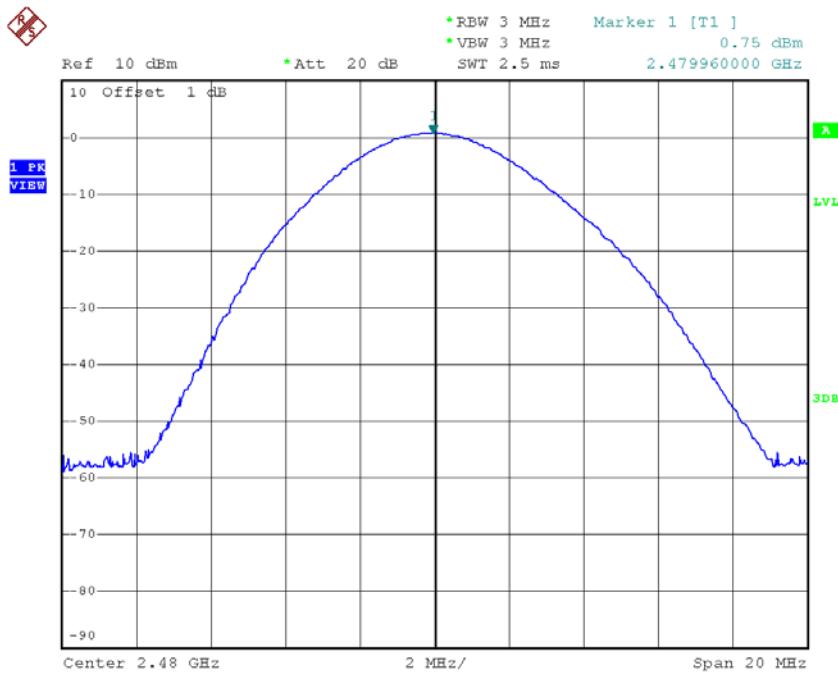
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	1.77	0.0015	30.00	1.00	Pass
2441	1.77	0.0015	30.00	1.00	Pass
2480	0.75	0.0012	30.00	1.00	Pass



Date: 30.NOV.2015 14:24:53

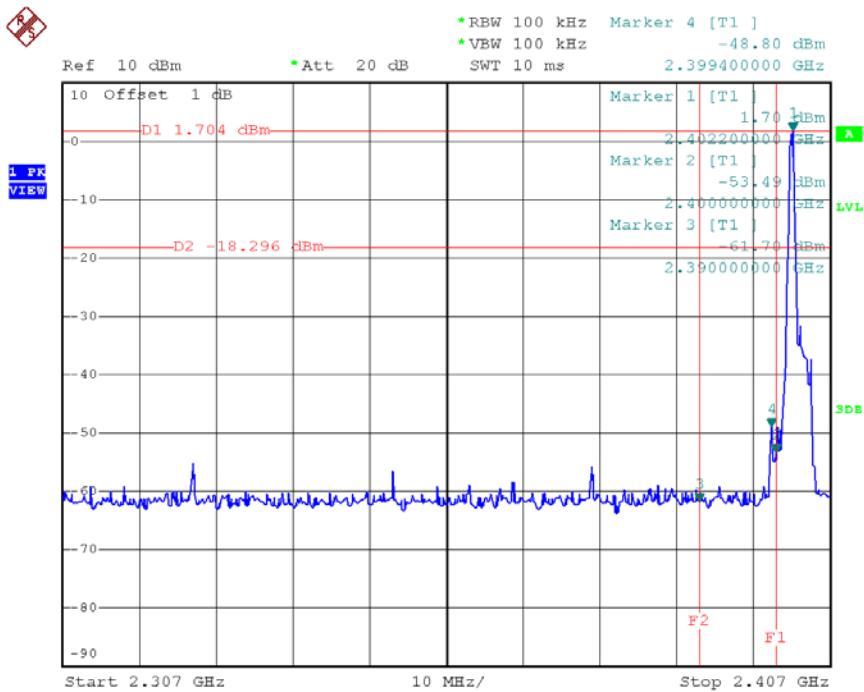
**CH39**

Date: 30.NOV.2015 14:25:33

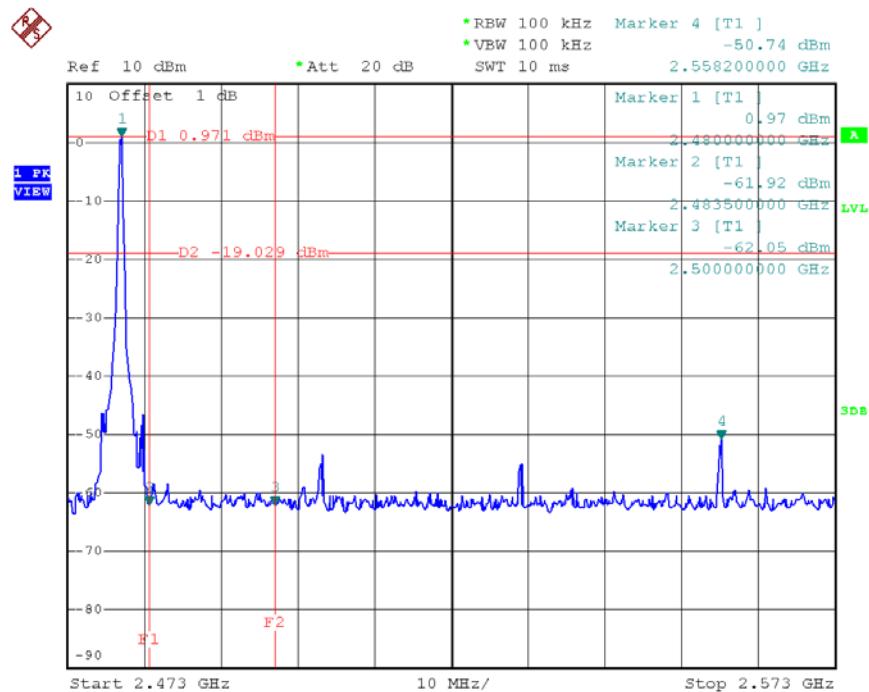
**CH78**

Date: 30.NOV.2015 14:27:50

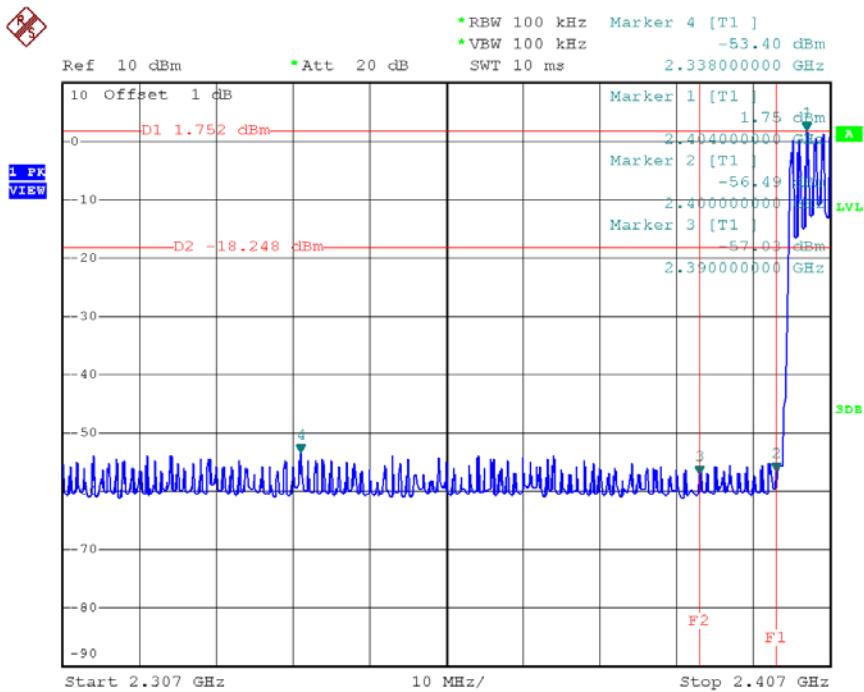
## **ATTACHMENT J - ANTENNA CONDUCTED SPURIOUS EMISSION**

**CH00 (Lower) \_1Mbps**

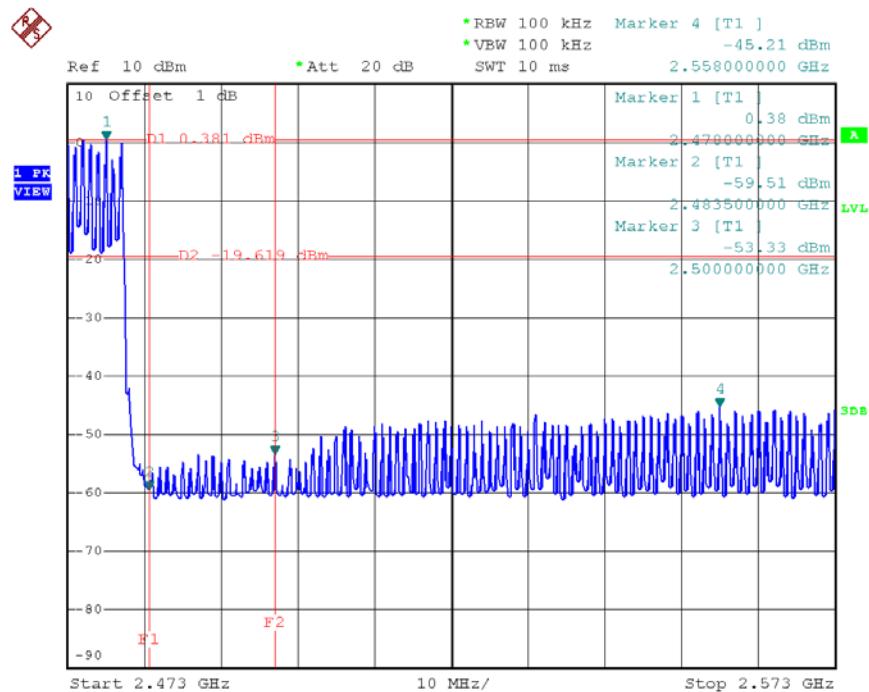
Date: 30.NOV.2015 14:33:34

**CH78 (Upper) \_1Mbps**

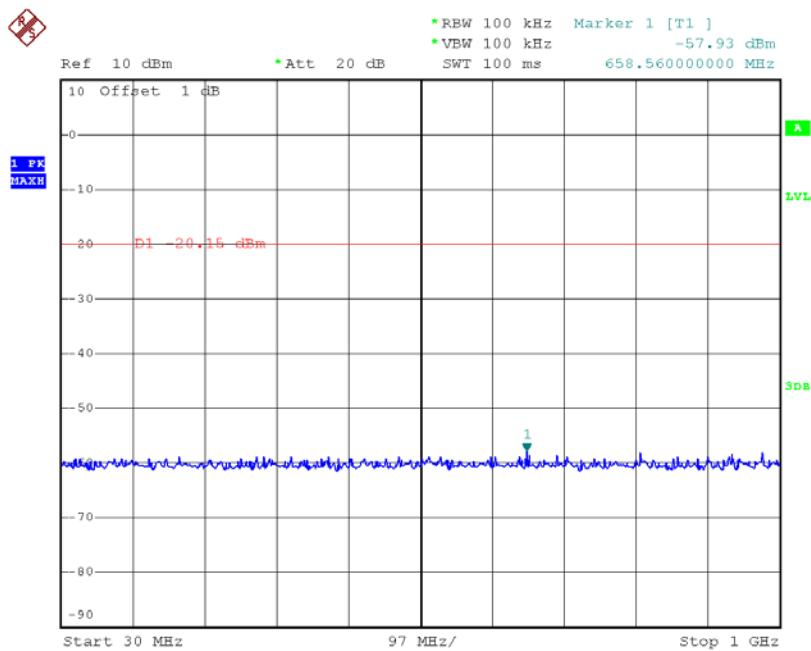
Date: 30.NOV.2015 14:36:02

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

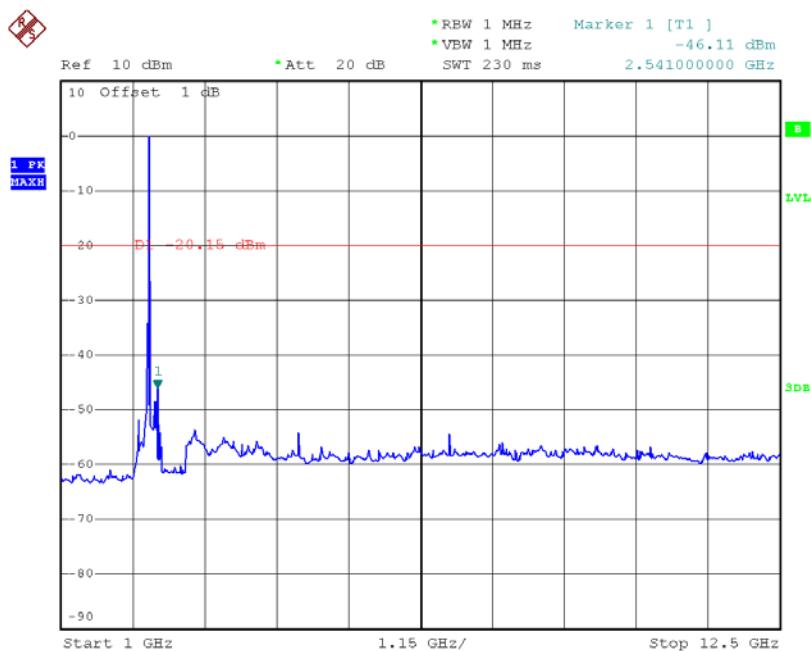
Date: 30.NOV.2015 14:44:19

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

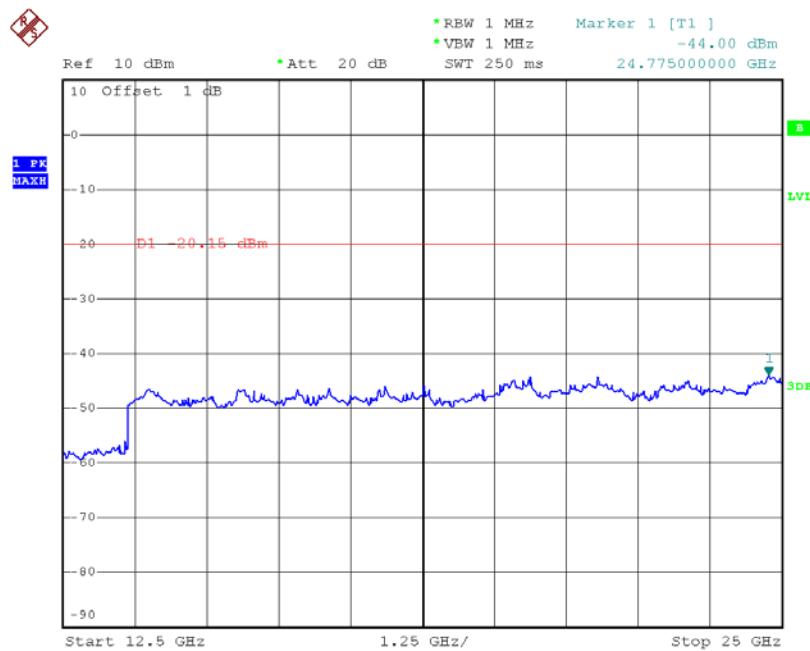
Date: 30.NOV.2015 14:44:59

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

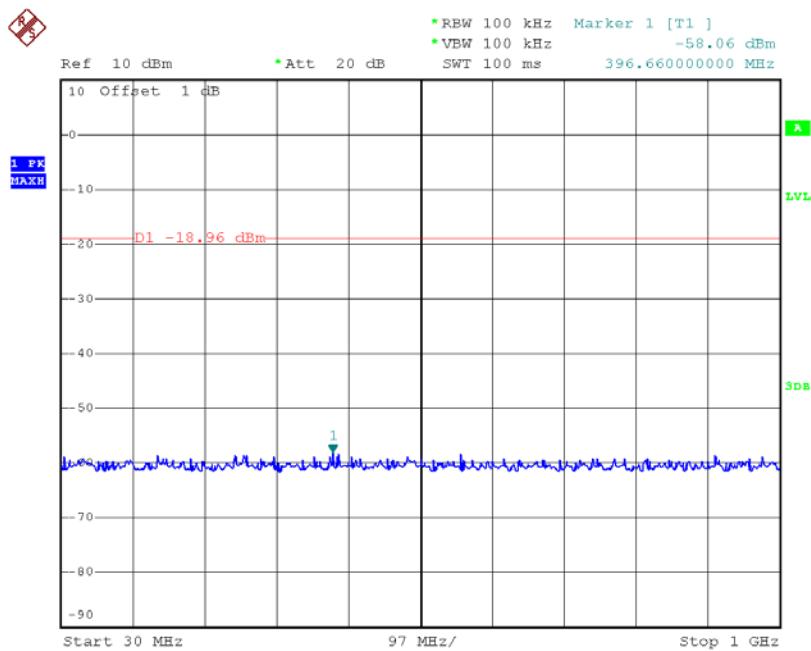
Date: 29.FEB.2016 10:07:44



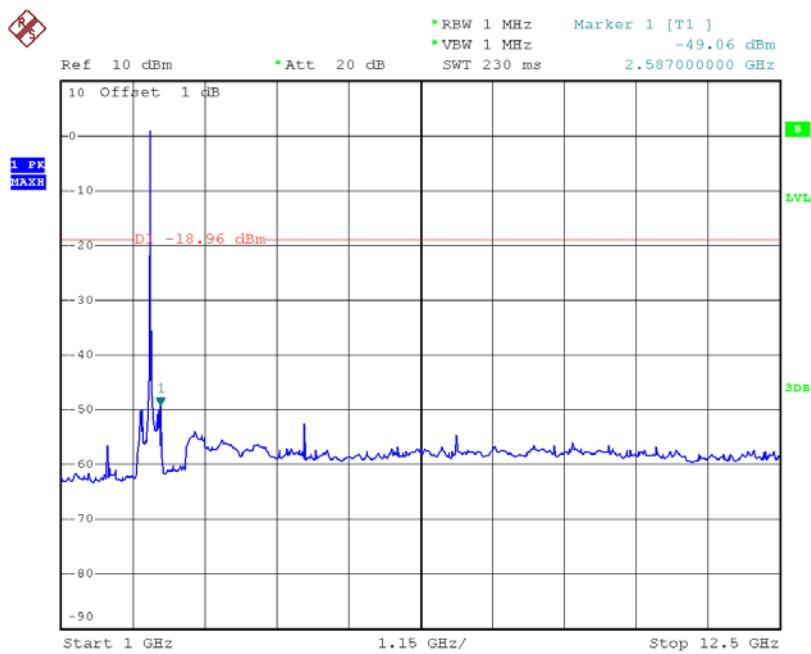
Date: 29.FEB.2016 10:06:02



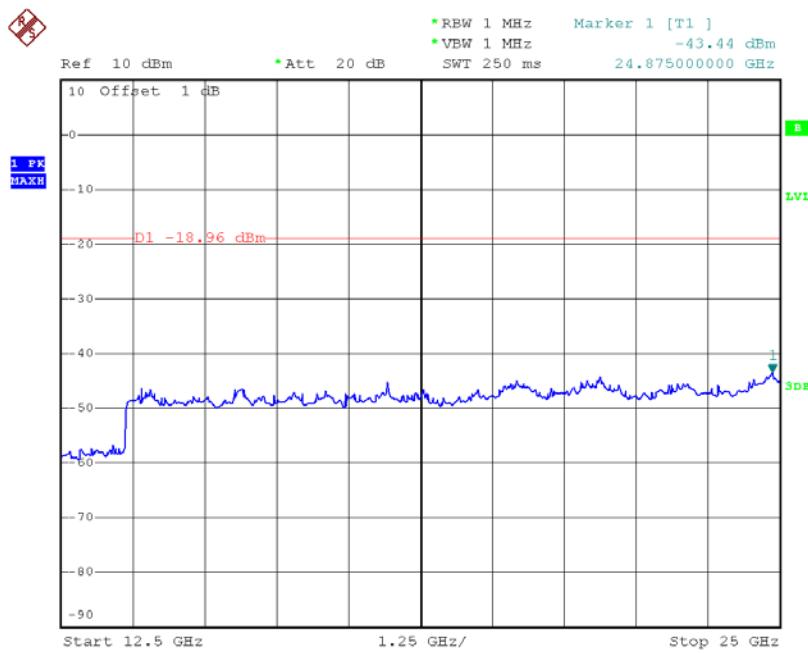
Date: 29.FEB.2016 10:07:09

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

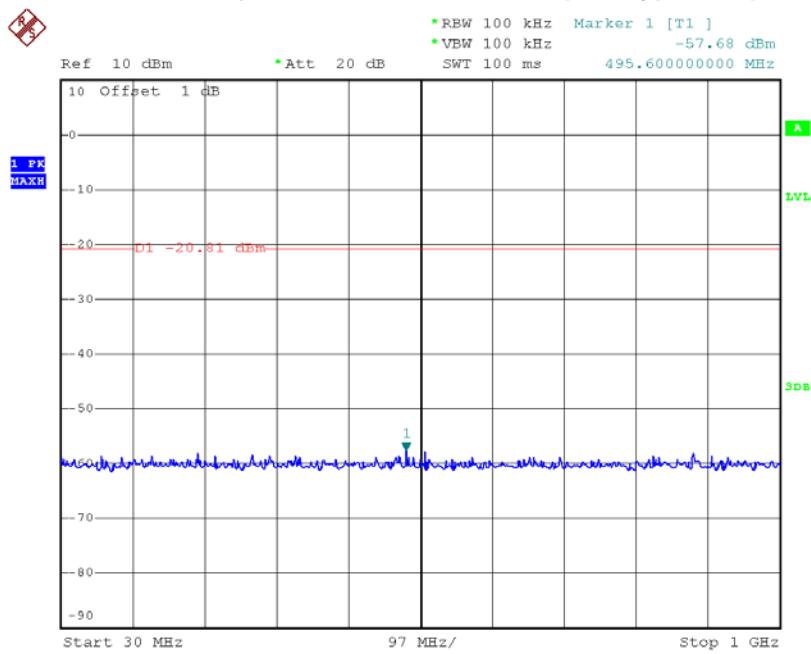
Date: 29.FEB.2016 10:14:30



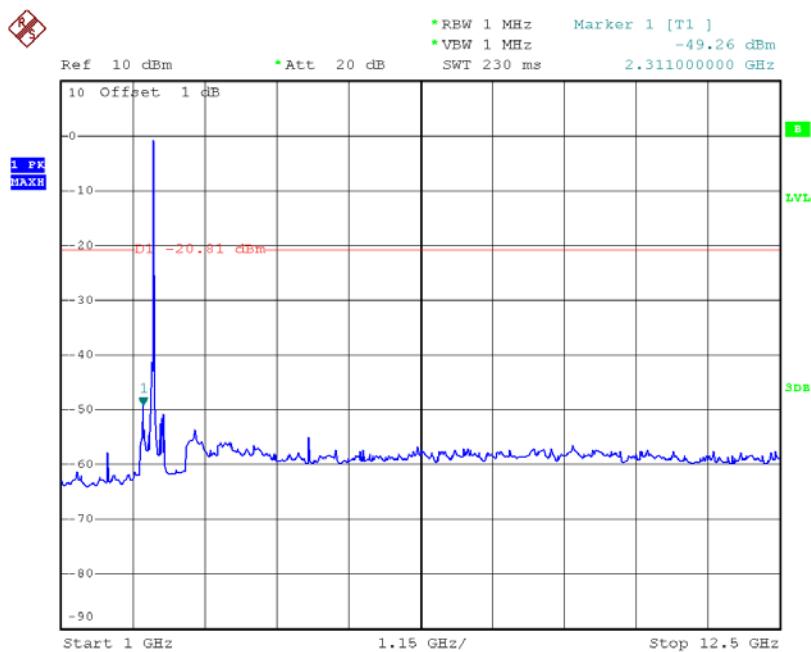
Date: 29.FEB.2016 10:13:18



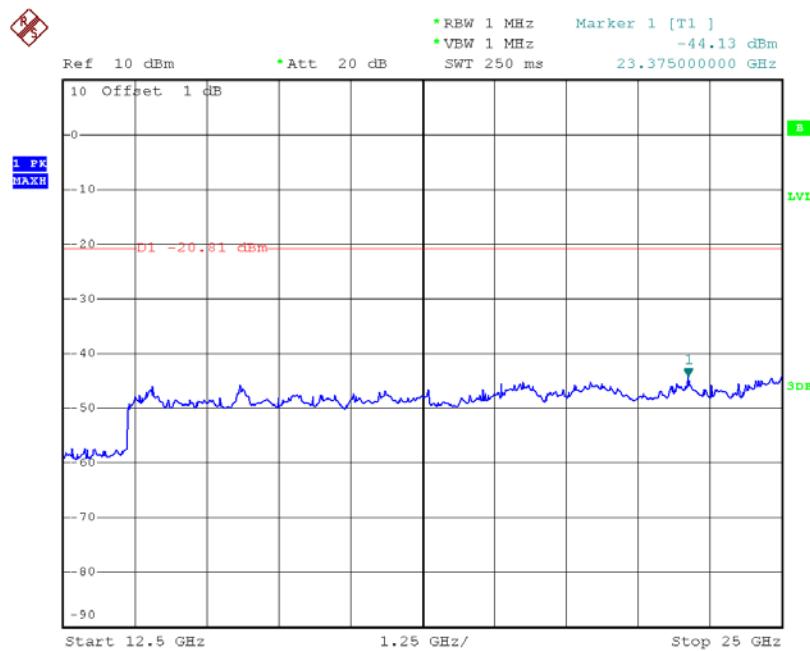
Date: 29.FEB.2016 10:13:57

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

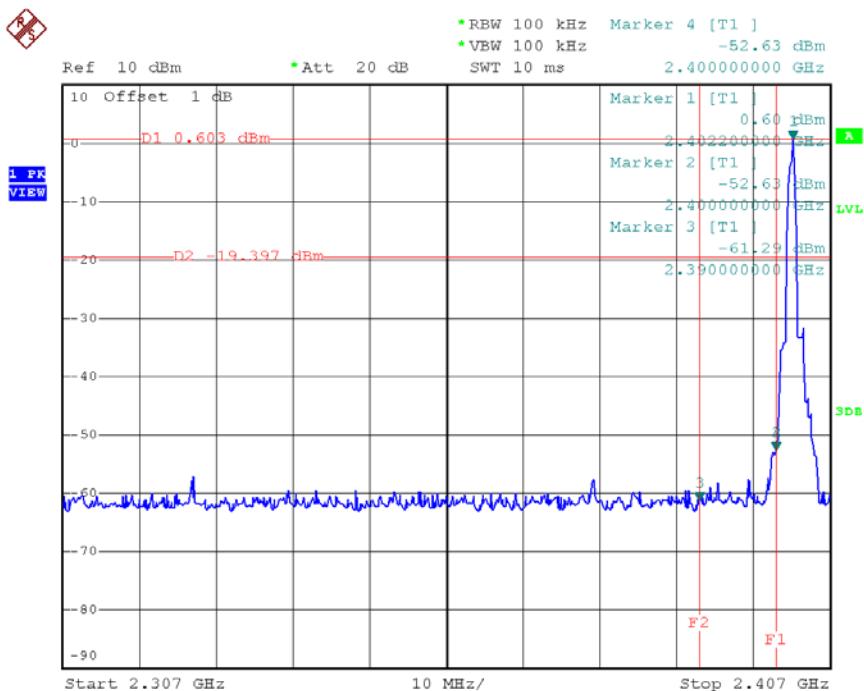
Date: 29.FEB.2016 10:19:46



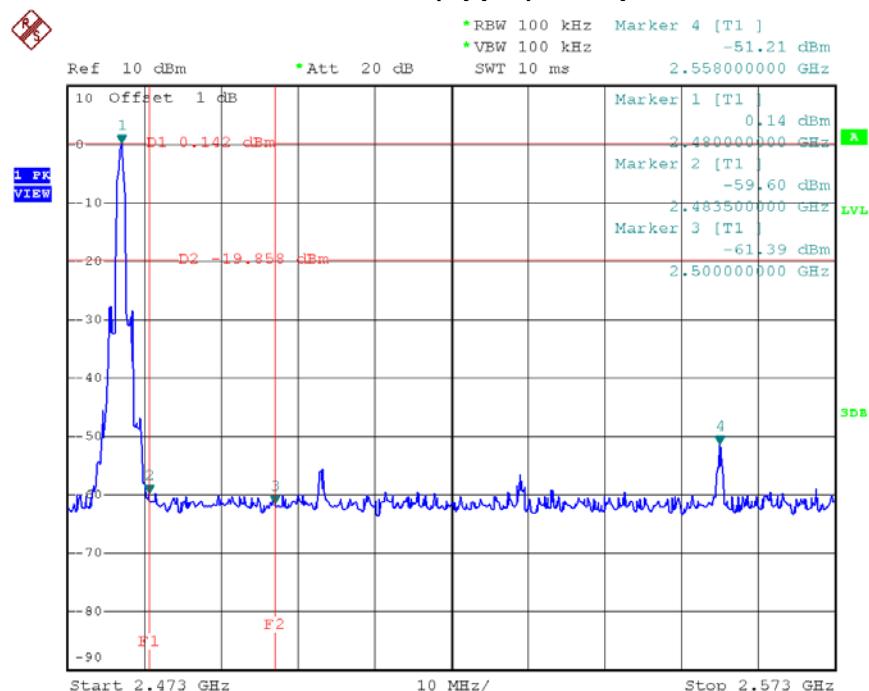
Date: 29.FEB.2016 10:18:23



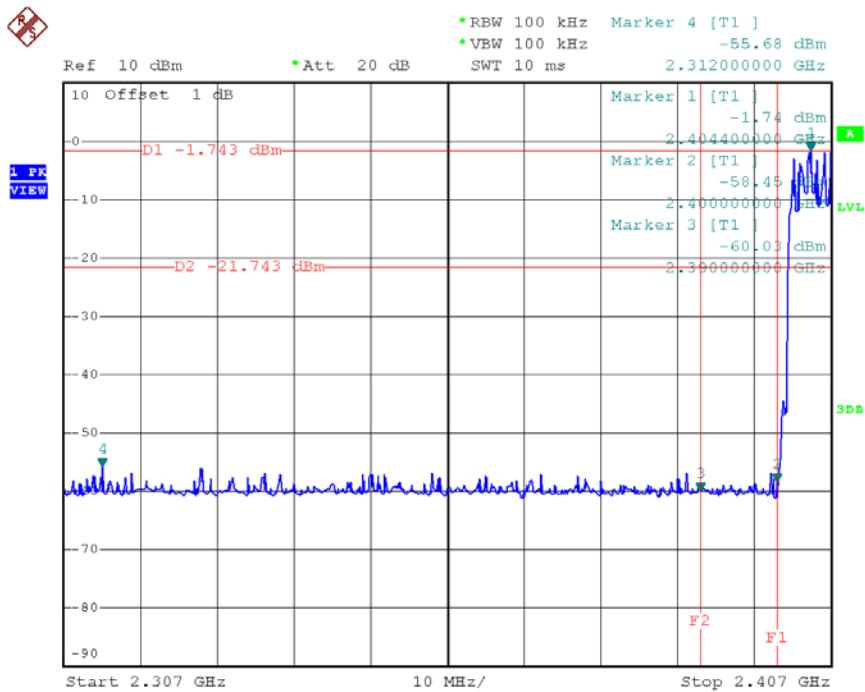
Date: 29.FEB.2016 10:18:50

**CH00 (Lower) \_3Mbps**

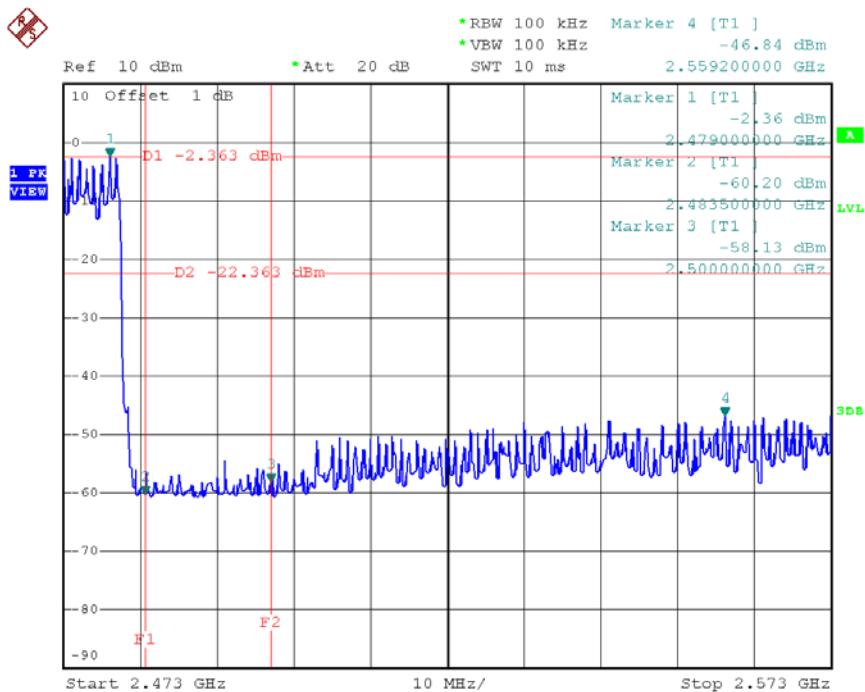
Date: 30.NOV.2015 14:49:10

**CH78 (Upper) \_3Mbps**

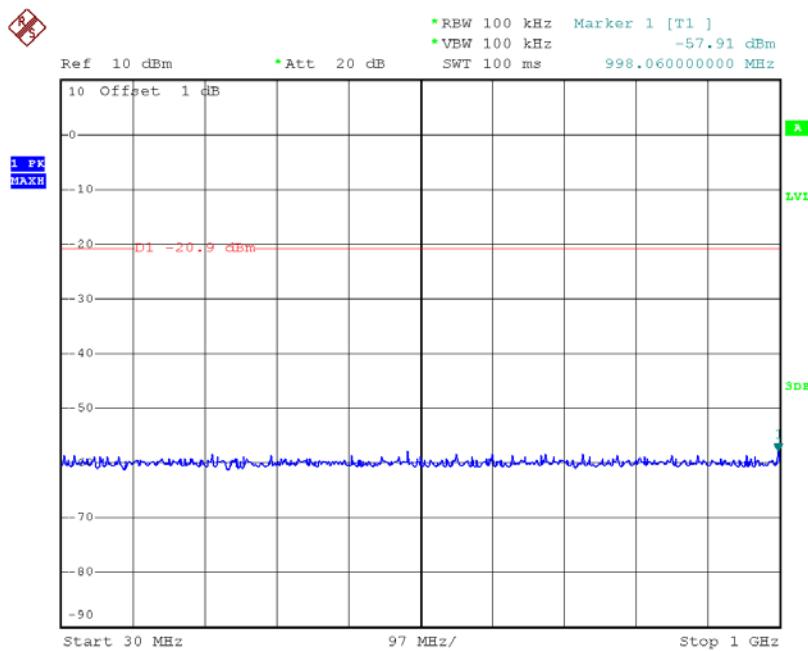
Date: 30.NOV.2015 14:50:52

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

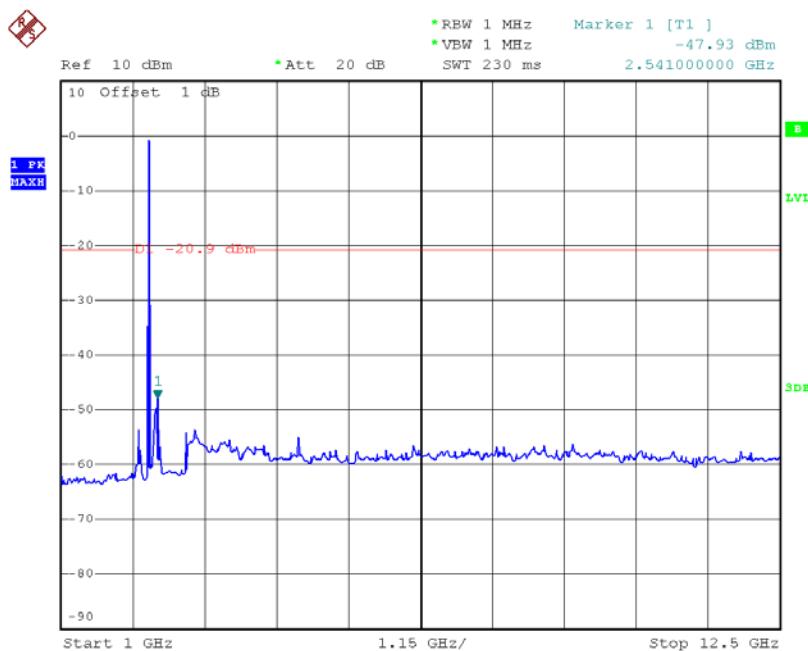
Date: 30.NOV.2015 15:04:13

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

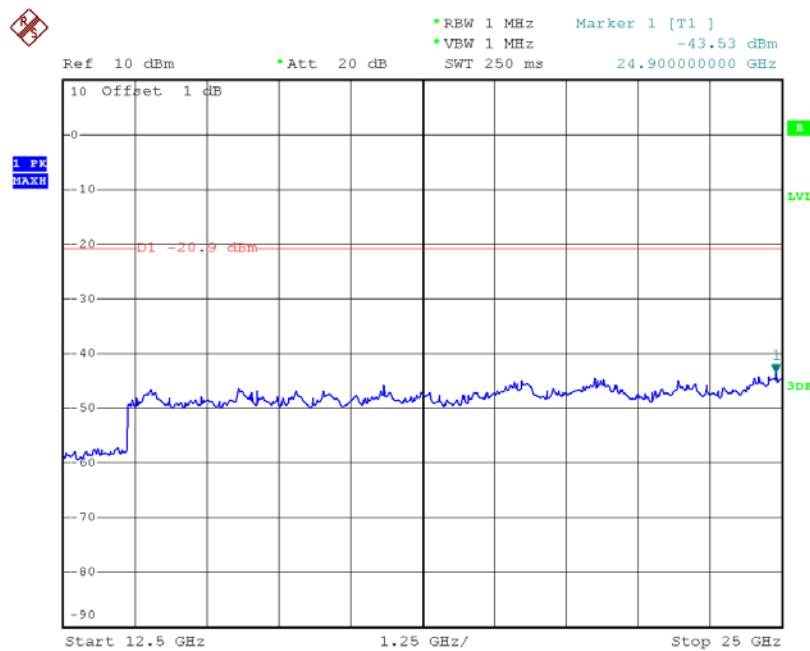
Date: 30.NOV.2015 15:05:06

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

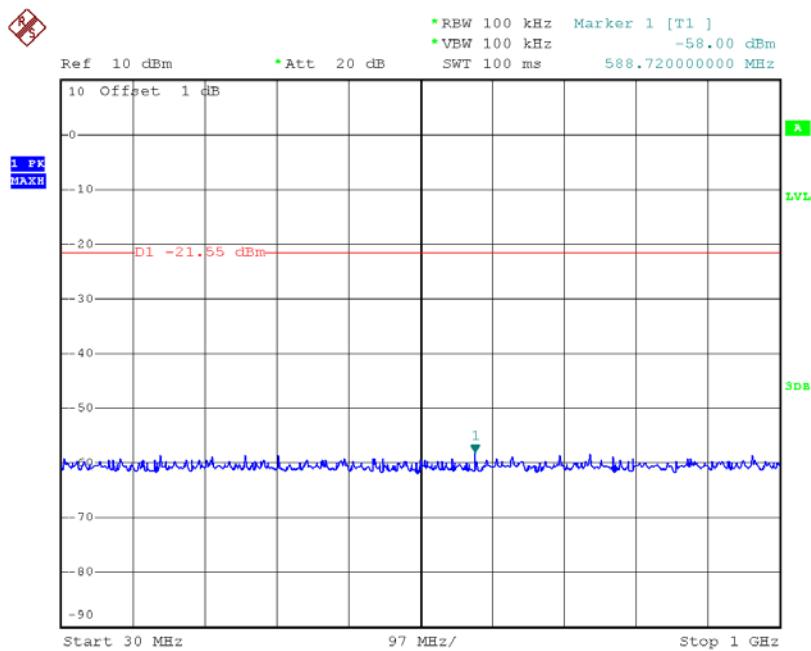
Date: 29.FEB.2016 10:25:28



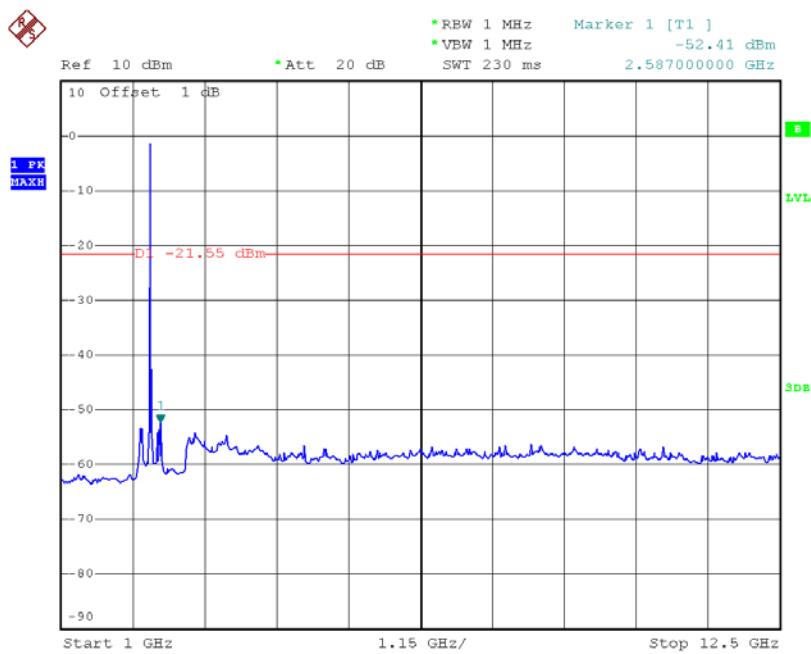
Date: 29.FEB.2016 10:23:26



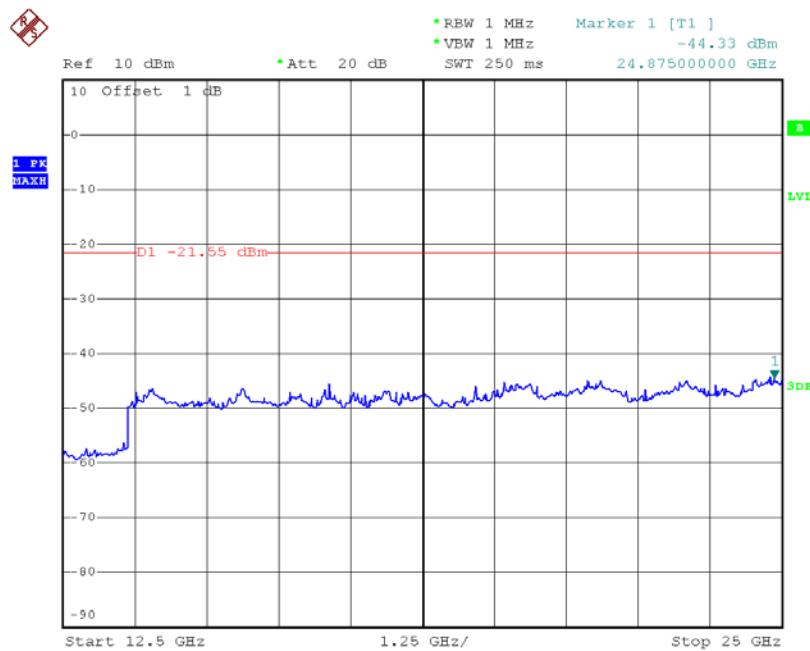
Date: 29.FEB.2016 10:24:01

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

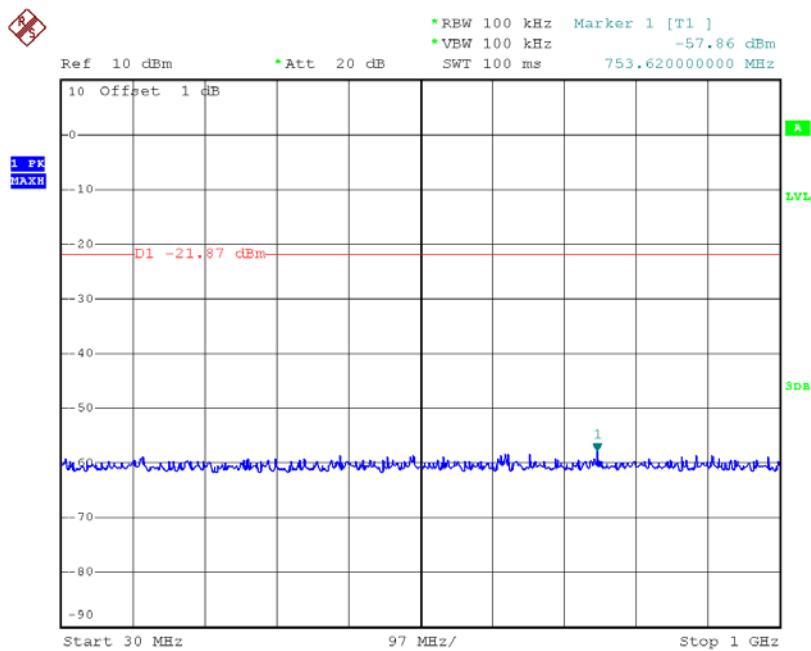
Date: 29.FEB.2016 10:30:30



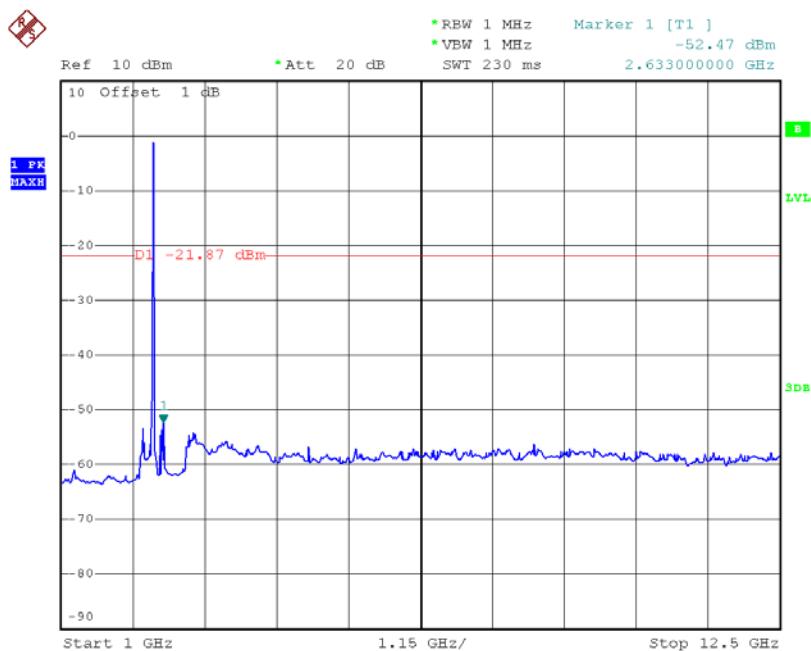
Date: 29.FEB.2016 10:27:32



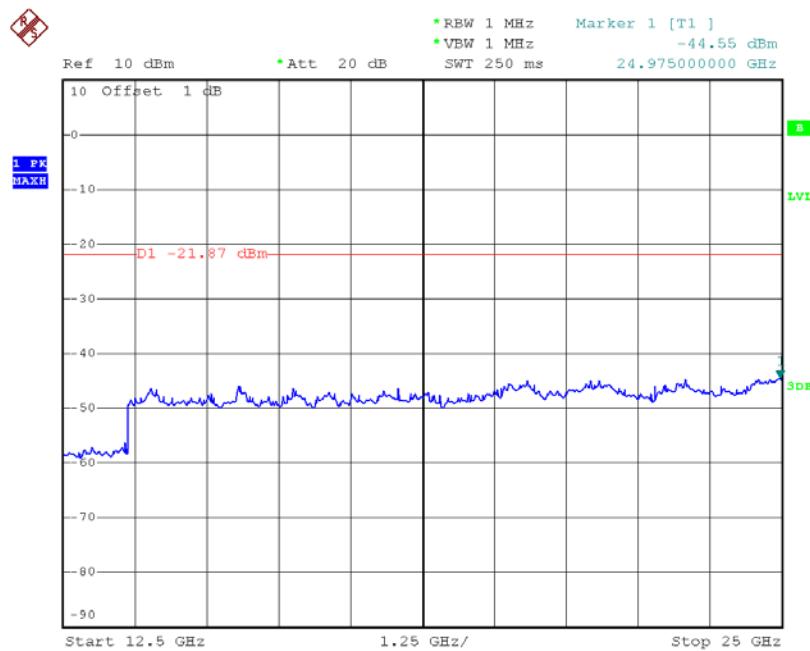
Date: 29.FEB.2016 10:29:54

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

Date: 29.FEB.2016 10:35:16



Date: 29.FEB.2016 10:34:03



Date: 29.FEB.2016 10:34:40