

# FCC&ISED Radio Test Report

## FCC ID: EMOICVBT6

## IC: 986B-ICVBT6

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

**Project No.** : 1806C136  
**Equipment** : iHome Beauty MAGNIFY  
**Model Name For FCC** : iCVBT6, iCVBT6X("X"= A to Z; denote as the color of cabinet)  
**Model Name For ISEDR** : iCVBT6  
**Applicant** : SDI TECHNOLOGIES INC.  
**Address** : 1299 Main Street, Rahway, NJ 07065, U.S.A

**Date of Receipt** : Jun. 26, 2018  
**Date of Test** : Jun. 27, 2018 ~ Jul. 27, 2018  
**Issued Date** : Aug. 10, 2018  
**Tested by** : BTL Inc.

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

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

### **Limitation**

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

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FICP-1-1806C136	Original Issue.	Aug. 10, 2018

## 1. CERTIFICATION

Equipment : iHome Beauty MAGNIFY  
Brand Name : iHome  
Model Name : iCVBT6, iCVBT6X("X"= A to Z; denote as the color of cabinet)  
For FCC  
Model Name : iCVBT6  
For ISEDR  
Applicant : SDI TECHNOLOGIES INC.  
Manufacturer : SDI TECHNOLOGIES INC.  
Address : 1299 Main Street, Rahway, NJ 07065, U.S.A  
Factory : Arts Electronics Co., Ltd.  
Address : NO. 1, SHANGXING LU, SHANGJIAO COMMUNITY, CHANGAN TOWN,  
DONGGUAN CITY, GUANGDONG PROVINCE, CHINA.  
Date of Test : Jun. 27, 2018 ~ Jul. 27, 2018  
Test Sample : Engineering Sample No.: D180605288  
Standard(s) : FCC Part15, Subpart C (15.247)/ ANSI C63.10-2013  
RSS-247 Issue 2, Feb. 2017  
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-1-1806C136) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP according to the ISO-17025 quality assessment standard and technical standard(s).

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15, Subpart C (15.247) RSS-247 Issue 2, Feb. 2017, RSS-GEN Issue 4, Nov. 2014				
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 (b)	Hopping Channel Separation	PASS	
15.247(a)(1)	RSS-247 5.1 (a)	Bandwidth	PASS	
15.247 (a)(1)	RSS-247 5.1 (b)	Maximum output power	PASS	
15.247(d) 15.209 15.205	RSS-247 5.5 RSS-GEN 8.9 RSS-GEN 8.10	Radiated Spurious Emission	PASS	
15.247 (a)(1)(iii)	RSS-247 5.1 (d)	Number of Hopping Frequency	PASS	
15.247 (a)(1)(iii)	RSS-247 5.1 (d)	Average Time Of Occupancy	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: 854385

BTL's designation number for FCC: CN5020

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

## 2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor)  $k=1.96$  or  $k=2$  (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %,  $U=2xUc(y)$ .

The BTL measurement uncertainty as below table:

### A. Conducted Measurement :

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

### B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9KHz~30MHz	V	3.79
		9KHz~30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06
		1GHz~18GHz	V	3.12
		1GHz~18GHz	H	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	H	4.14

### C. Other Measurement:

Test Item	Uncertainty
Conducted Spurious Emission	2.67dB
Hopping Channel Separation	53.46MHz
Peak Output Power	0.95dB
Number of Hopping Frequency	53.46MHz
Temperature	0.08℃
Humidity	1.5%

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	iHome Beauty MAGNIFY	
Brand Name	iHome	
Model Name For FCC	iCVBT6, iCVBT6X	
Model Name For ISEDR	iCVBT6	
Model Difference	"X"=A to Z; denote as the color of cabinet	
Hardware Version	V02	
Software Version	V29	
Output Power (Max.)	Operation Frequency	2402 ~ 2480 MHz
	Modulation Technology	GFSK(1Mbps) $\pi$ /4-DQPSK(2Mbps)
	Bit Rate of Transmitter	8-DPSK(3Mbps)
	Output Power Max.	3.67 dBm(1Mbps) 1.13 dBm(3Mbps)
Power Source	DC voltage supplied from AC/DC adapter. Model: SW0902000-H04	
Power Rating	I/P: 100-240V~50/60Hz Max 500mA O/P: 9V --- 2000mA	

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	PCB	N/A	0

### 3.2 DESCRIPTION OF TEST MODES

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

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

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

For 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:**

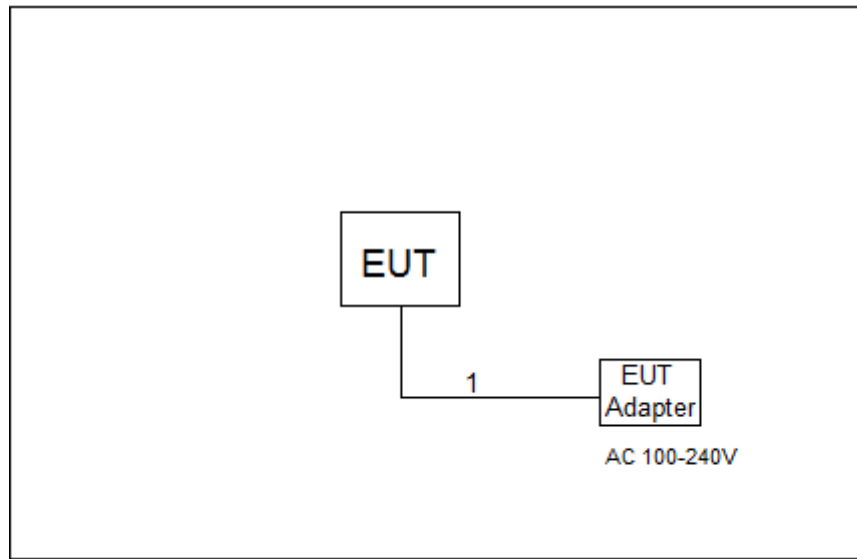
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

### 3.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

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

Test Software Version	FCC TOOL V1.02		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	2	2	2
Parameters(3Mbps)	1	1	1

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



**3.5 DESCRIPTION OF SUPPORT UNITS**

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

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

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	2m	DC 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 -0.50	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

- (1) The limit of " \* " decreases with the logarithm of the frequency
- (2) The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)  
 Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

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

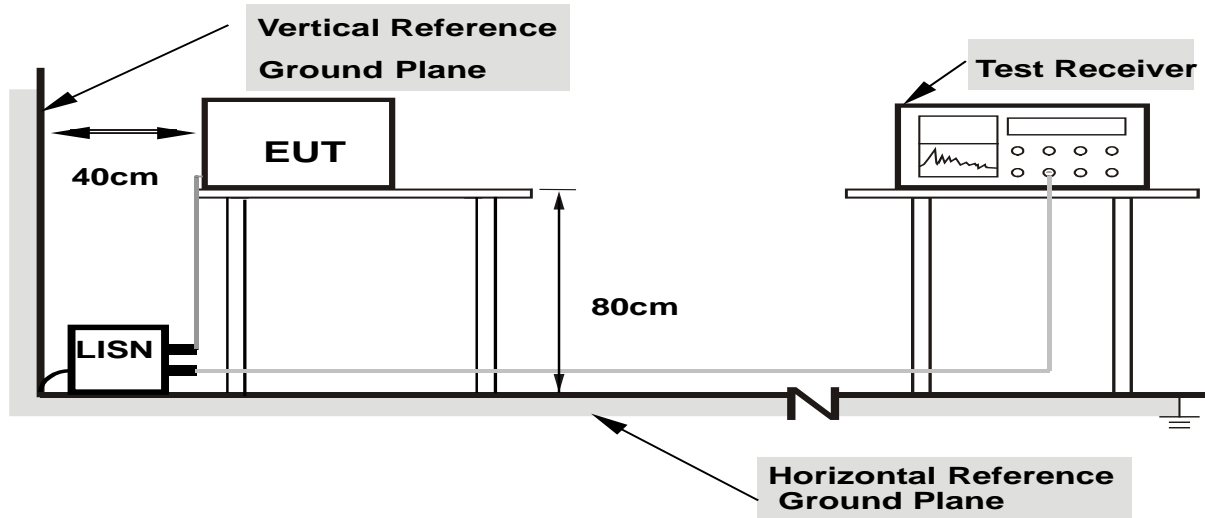
#### 4.1.2 TEST PROCEDURE

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

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.4 TEST SETUP



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

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical 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: 25°C  
 Relative Humidity: 55%  
 Test Voltage: AC 120V/60Hz

#### 4.1.7 TEST RESULTS

Please refer to the Appendix 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-GEN 8.10, then the 15.209(a) & RSS-GEN 8.9 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)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C/RSS-247.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)  
 Margin Level = Measurement Value - Limit Value



Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (emission in restricted band)	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

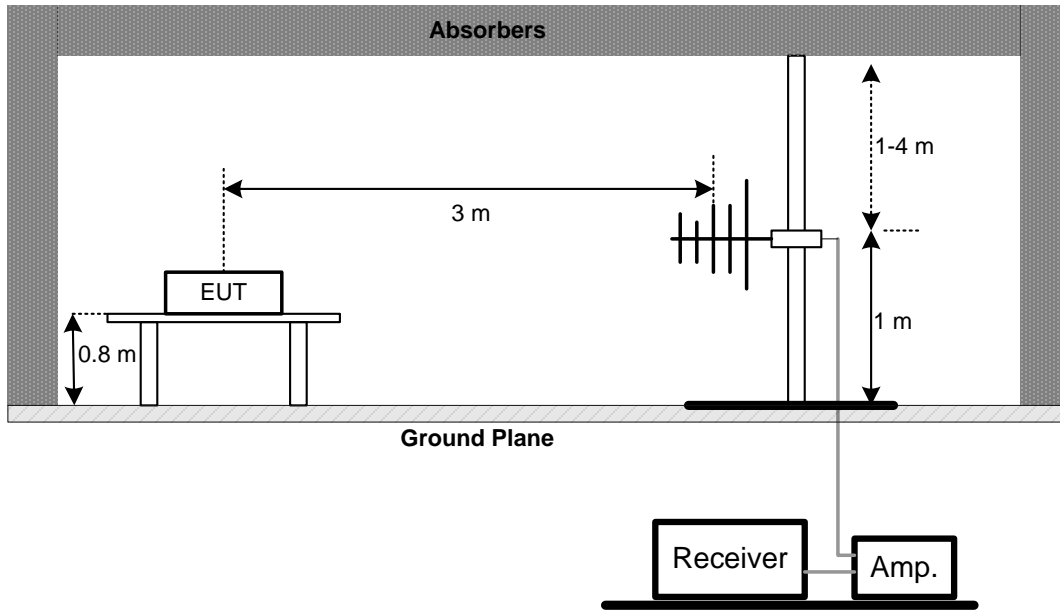
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance 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 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. 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.
- g. 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)
- h. 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)
- i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.2.3 DEVIATION FROM TEST STANDARD

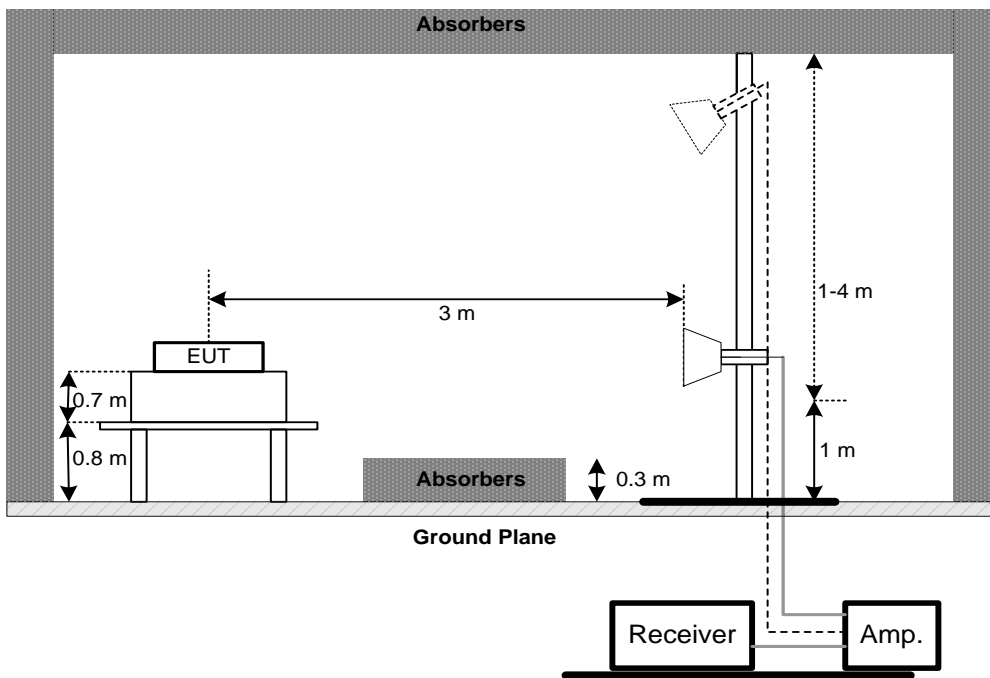
No deviation

**4.2.4 TEST SETUP**

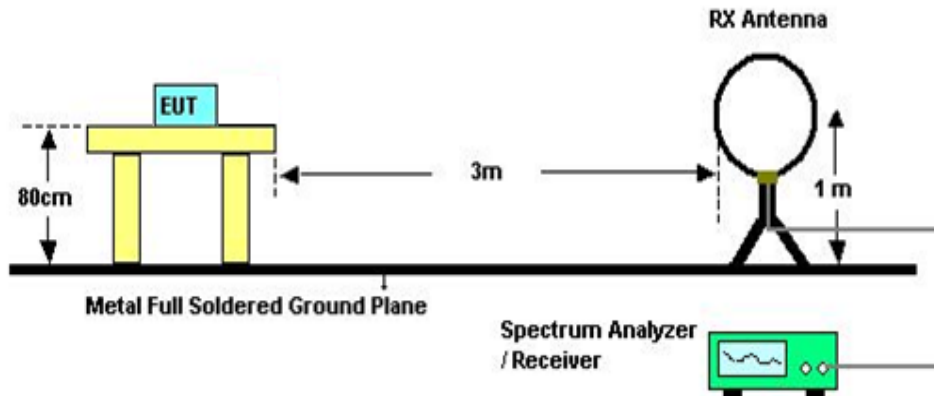
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For Radiated Emissions Below 30MHz



#### 4.2.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 4.2.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

#### 4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix 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 1000MHZ)

Please refer to the Appendix C.

#### 4.2.9 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the Appendix D.

Remark:

- (1) 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 (d)	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: 25°C  
 Relative Humidity: 55%  
 Test Voltage: AC 120V/60Hz

#### 5.1.6 TEST RESULTS

Please refer to the Appendix 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 (d)	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: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

#### **6.1.6 TEST RESULTS**

Please refer to the Appendix 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

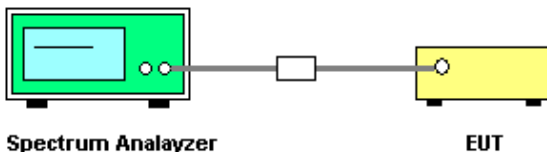
#### 7.1.1 TEST PROCEDURE

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

#### 7.1.5 TEST RESULTS

Please refer to the Appendix 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 (a)	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: 25°C  
 Relative Humidity: 55%  
 Test Voltage: AC 120V/60Hz

#### 8.1.6 TEST RESULTS

Please refer to the Appendix H



## 9. MAXIMUM 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(a)(1) RSS-247 5.1 (b)	Maximum Output Power	0.125Watt or 21dBm	2400-2483.5	PASS

Note: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125 mW.

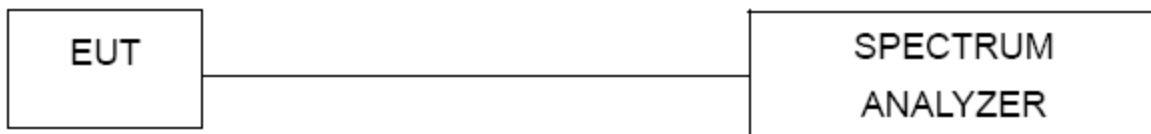
#### 9.1.1 TEST PROCEDURE

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

#### 9.1.6 TEST RESULTS

Please refer to the Appendix I

## 10. ANTENNA CONDUCTED SPURIOUS EMISSION

### 10.1 APPLIED PROCEDURES / LIMIT

For FCC

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

For ISEDR

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. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

#### 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: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

#### **10.1.6 TEST RESULTS**

Please refer to the Appendix J

## 11. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019
2	LISN	EMCO	3816/2	52765	Mar. 11, 2019
3	50Ω Terminator	SHX	TF2-3G-A	8122901	Mar. 11, 2019
4	TWO-LINE V-NETWORK	R&S	ENV216	101447	Mar. 11, 2019
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Oct. 19, 2018

Radiated Emission Measurement - 9KHZ TO 30MHZ					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EM	EM-6876-1	230	Feb. 07, 2019
2	Cable	N/A	RG 213/U	C-102	Jun. 01, 2019
3	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019

Radiated Emission Measurement - 30MHZ TO 1000MHZ					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 11, 2019
2	Amplifier	HP	8447D	2944A09673	Oct. 19, 2018
3	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May. 25, 2019
5	Controller	CT	SC100	N/A	N/A
6	Controller	MF	MF-7802	MF780208416	N/A
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
8	Loop Antenna	EM	EM-6876-1	230	Feb. 07, 2019

**Radiated Emission Measurement - Above 1GHz**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 11, 2019
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2019
3	Amplifier	Agilent	8449B	3008A02274	Mar. 11, 2019
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 11, 2019
5	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	emci	CA500-SMSM-12M (1-26.5GHz)	N/A	Sep. 29, 2018
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

**Number of Hopping Channel**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

**Average Time of Occupancy**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

**Hopping Channel Separation Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

Peak Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

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

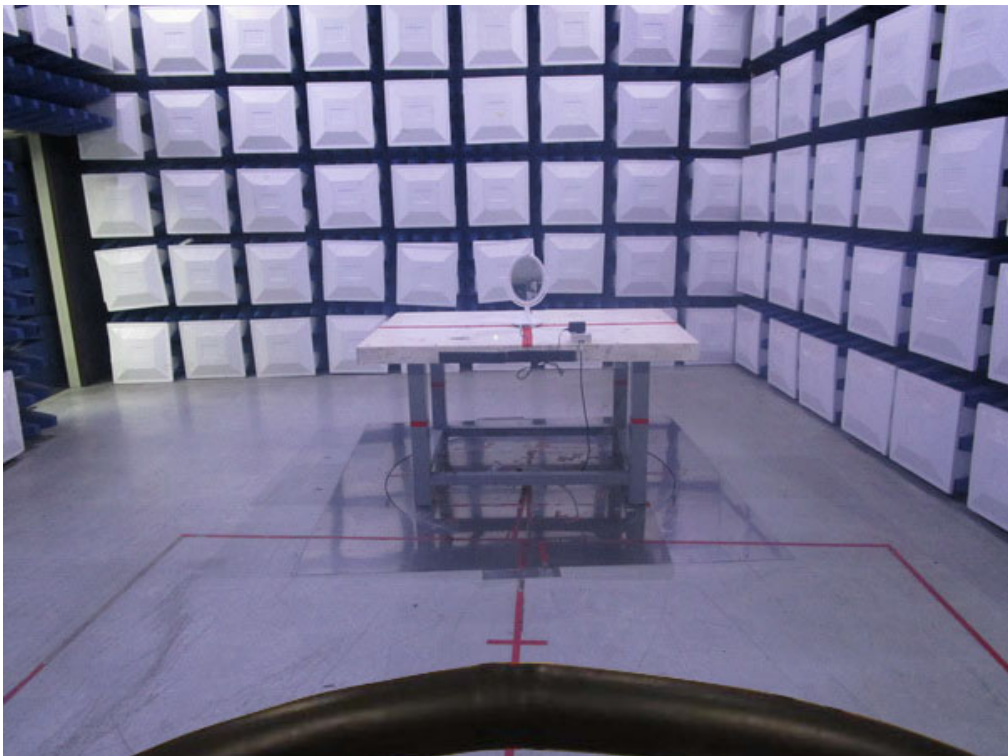
### Conducted Measurement Photos





**Radiated Measurement Photos**

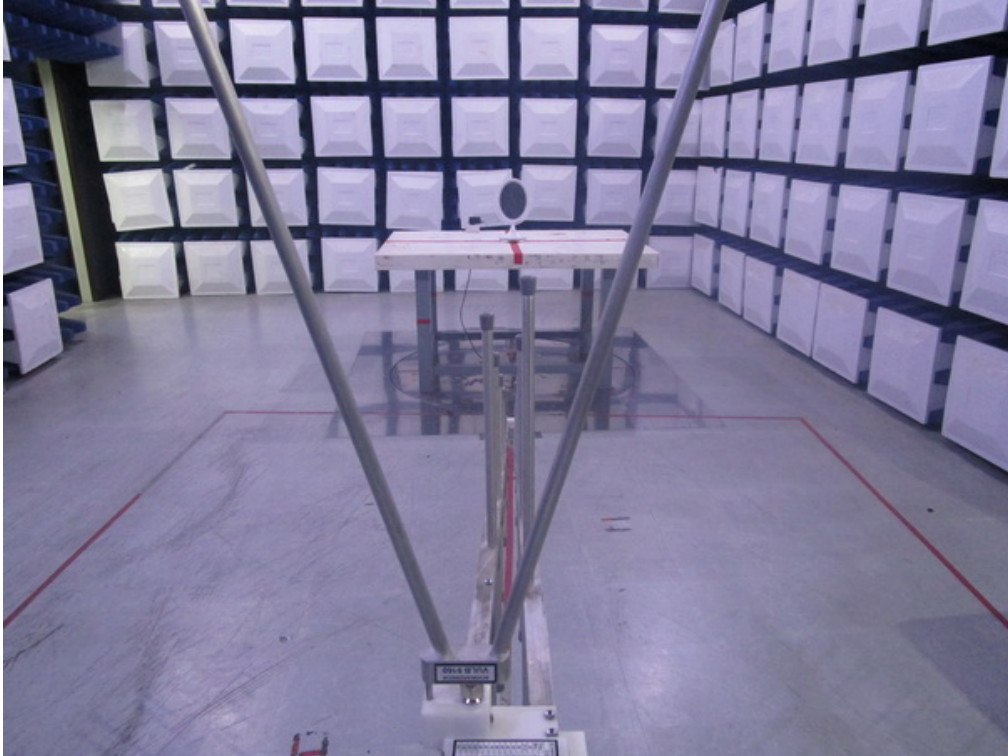
**9KHz to 30MHz**





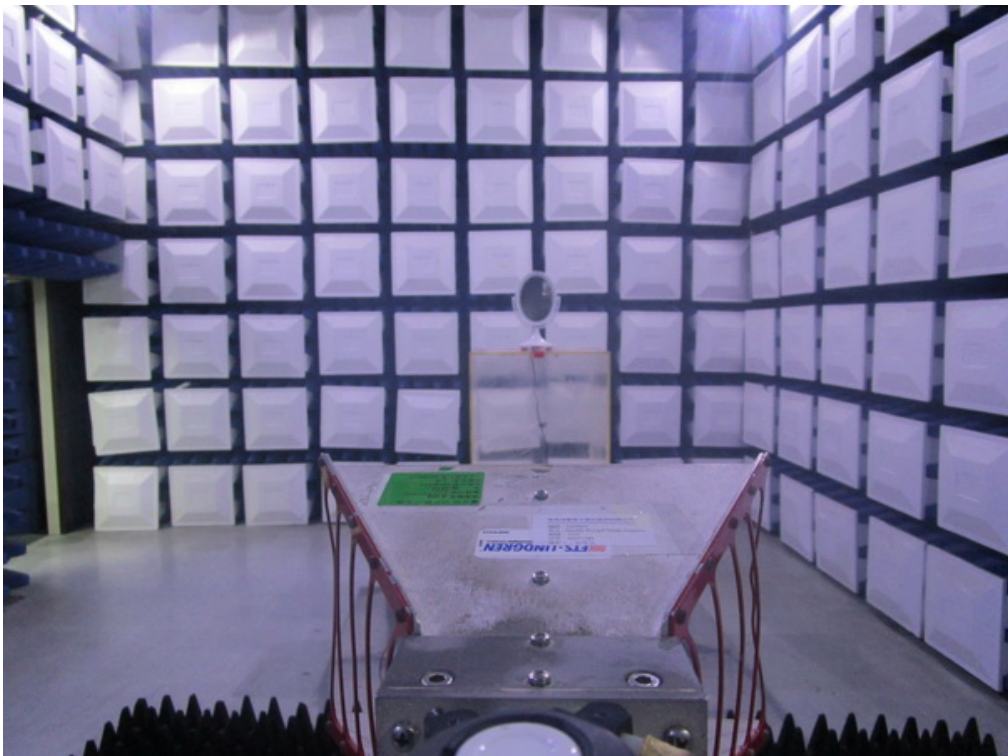
**Radiated Measurement Photos**

**30MHz to 1000MHz**



**Radiated Measurement Photos**

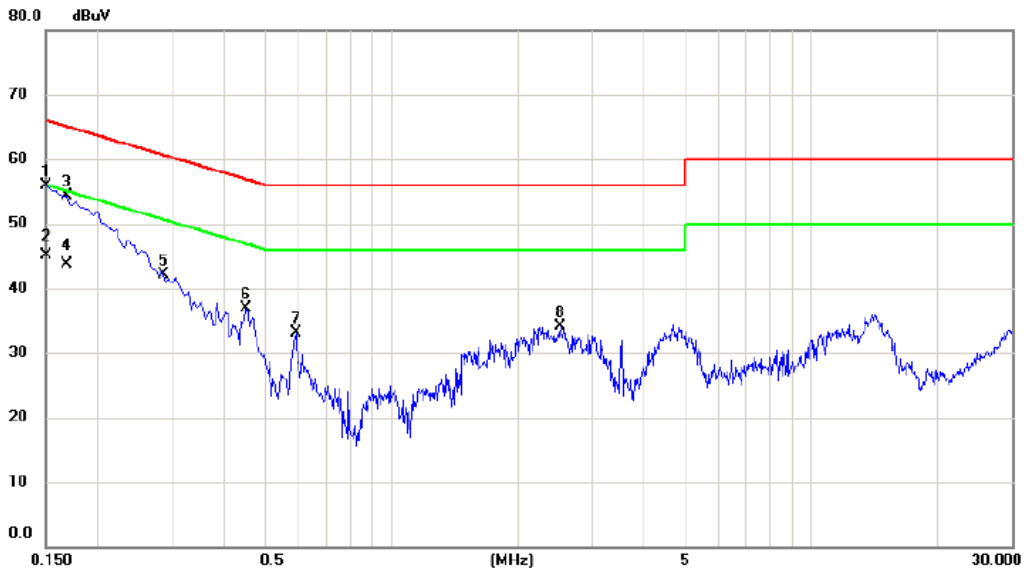
**Above 1000MHz**



## APPENDIX A - CONDUCTED EMISSION

Test Mode: TX Mode

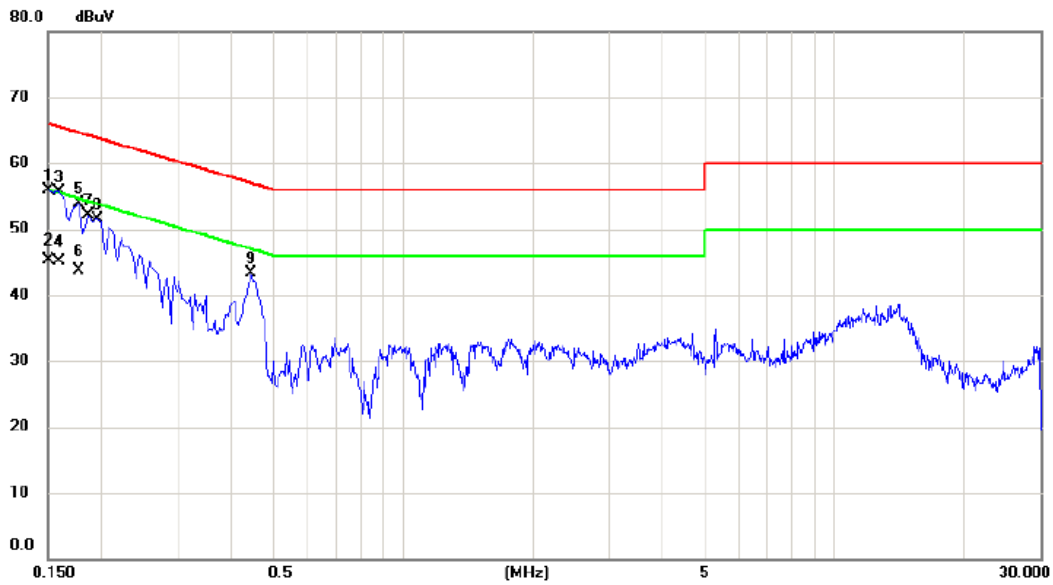
### Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1500	46.14	9.82	55.96	66.00	-10.04	peak	
2		0.1500	35.20	9.82	45.02	56.00	-10.98	AVG	
3		0.1680	44.44	9.82	54.26	65.06	-10.80	peak	
4		0.1680	33.80	9.82	43.62	55.06	-11.44	AVG	
5		0.2863	32.36	9.82	42.18	60.63	-18.45	peak	
6		0.4515	27.07	9.80	36.87	56.85	-19.98	peak	
7		0.5910	23.37	9.83	33.20	56.00	-22.80	peak	
8		2.5260	24.00	10.02	34.02	56.00	-21.98	peak	

Test Mode: TX Mode

### Neutral

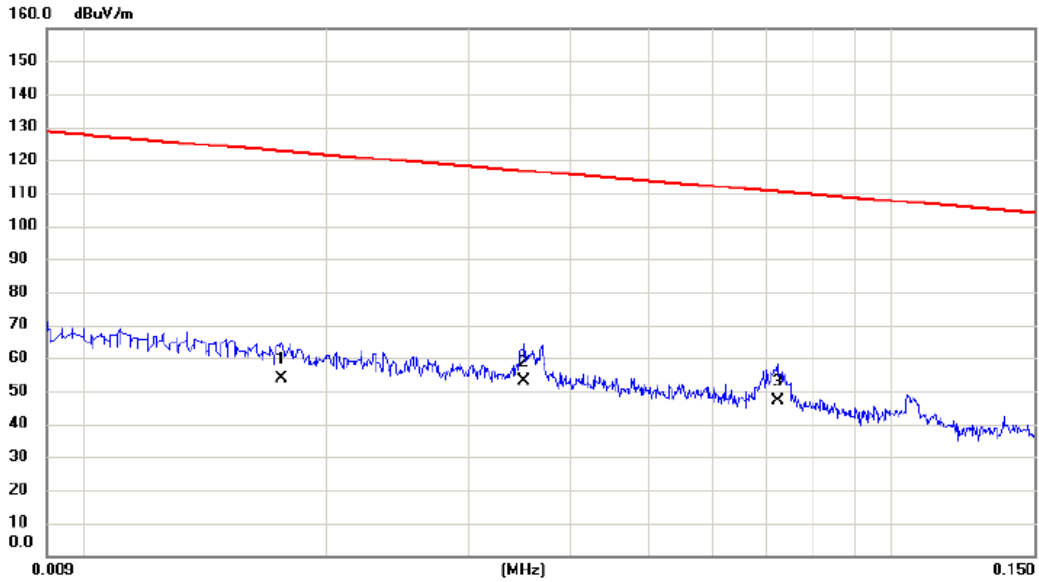


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	46.03	9.91	55.94	66.00	-10.06	peak	
2		0.1500	35.40	9.91	45.31	56.00	-10.69	AVG	
3	*	0.1590	45.81	9.91	55.72	65.52	-9.80	peak	
4		0.1590	35.20	9.91	45.11	55.52	-10.41	AVG	
5		0.1770	44.00	9.92	53.92	64.63	-10.71	peak	
6		0.1770	33.70	9.92	43.62	54.63	-11.01	AVG	
7		0.1860	42.18	9.91	52.09	64.21	-12.12	peak	
8		0.1950	41.58	9.91	51.49	63.82	-12.33	peak	
9		0.4425	33.34	9.94	43.28	57.01	-13.73	peak	

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

Test Mode: TX Mode

Ant 0°

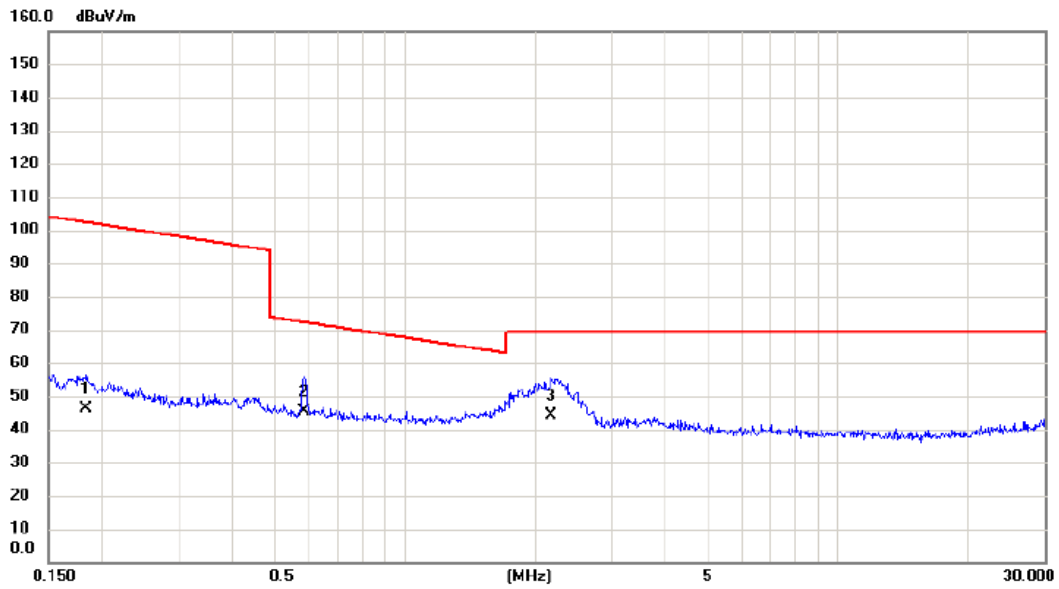


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0176	33.40	20.36	53.76	122.69	-68.93	AVG	
2		0.0351	33.30	19.77	53.07	116.70	-63.63	AVG	
3	*	0.0724	27.90	19.08	46.98	110.41	-63.43	AVG	



Test Mode: TX Mode

Ant 0°

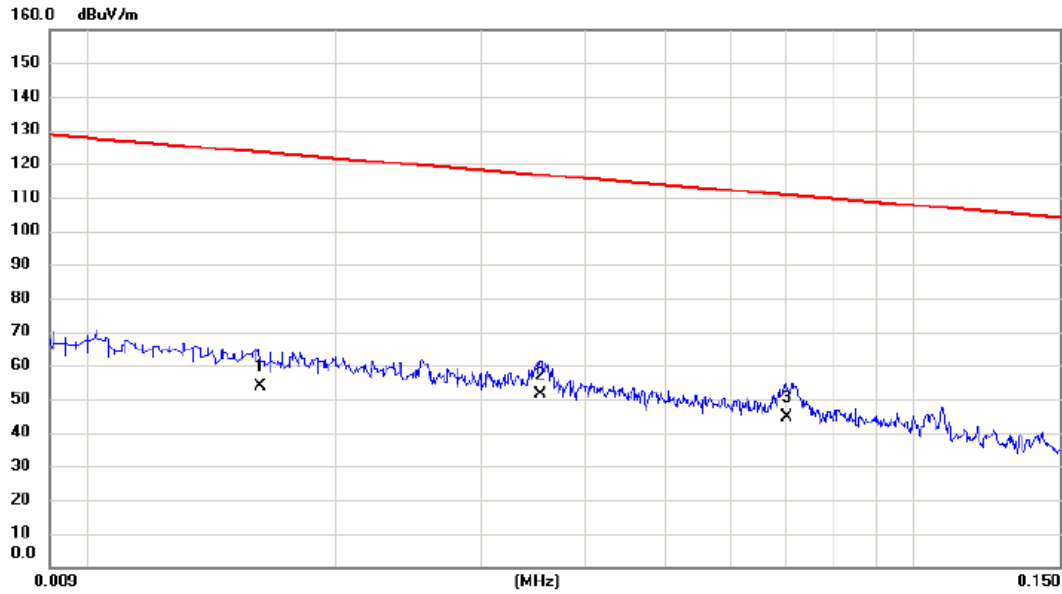


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.1835	29.20	17.18	46.38	102.33	-55.95	AVG	
2		0.5854	28.50	16.94	45.44	72.25	-26.81	QP	
3	*	2.1783	27.30	17.00	44.30	69.54	-25.24	QP	



Test Mode: TX Mode

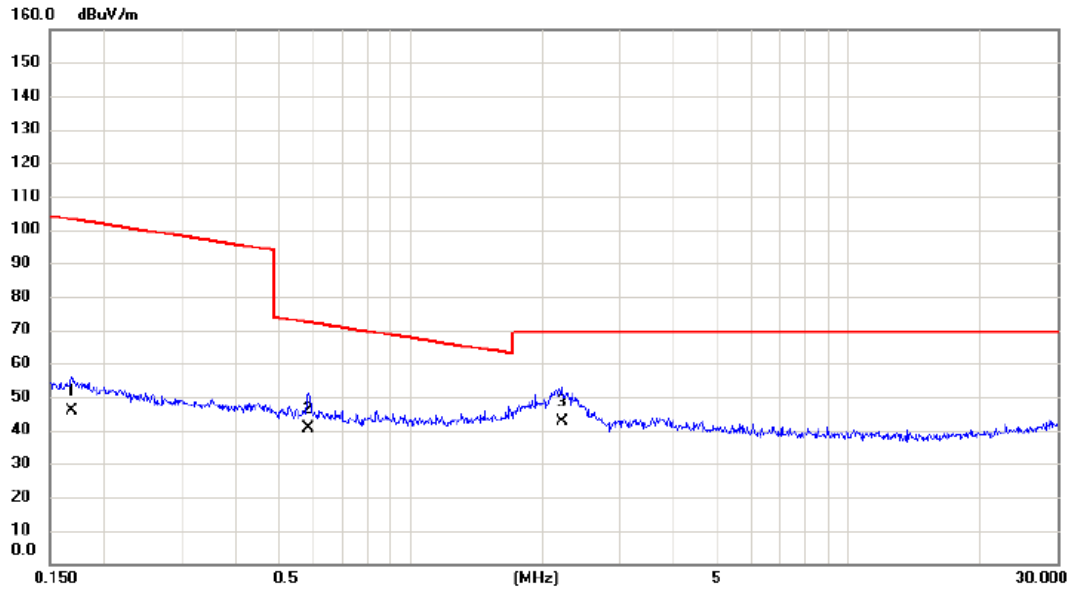
Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0162	33.40	20.55	53.95	123.41	-69.46	AVG	
2	*	0.0353	31.50	19.77	51.27	116.65	-65.38	AVG	
3		0.0702	25.30	19.13	44.43	110.68	-66.25	AVG	

Test Mode: TX Mode

Ant 90°

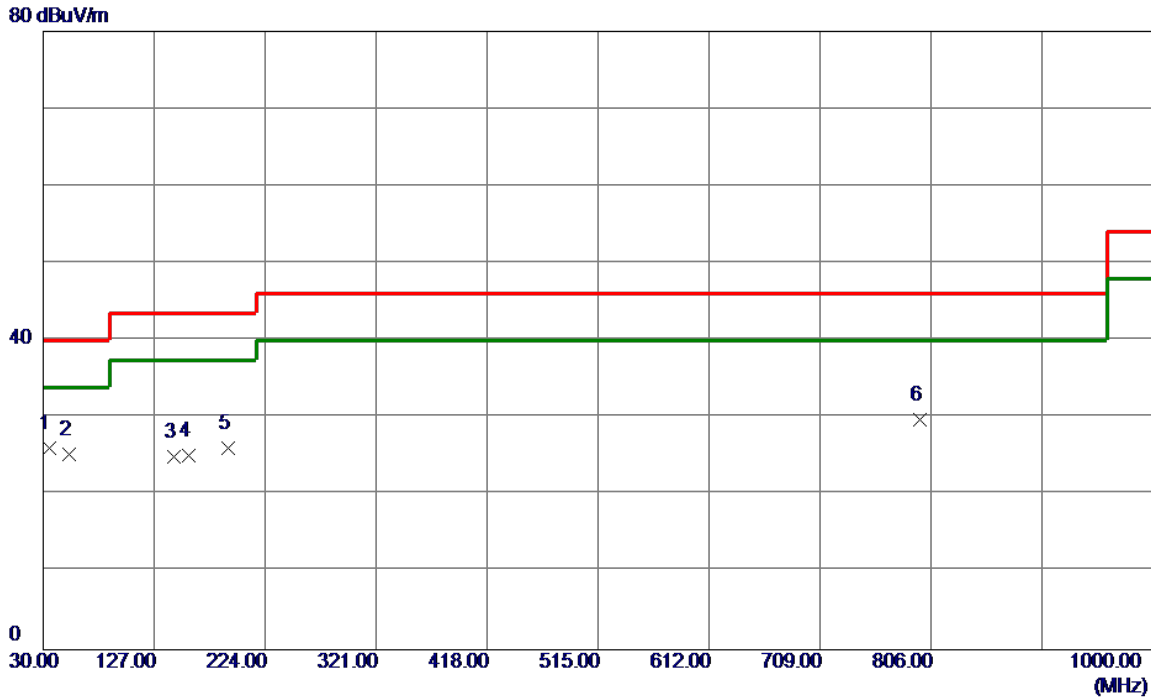


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.1685	28.70	17.21	45.91	103.07	-57.16	AVG	
2		0.5854	23.80	16.94	40.74	72.25	-31.51	QP	
3	*	2.2132	25.70	16.98	42.68	69.54	-26.86	QP	

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

Test Mode: TX 2402MHz \_CH00\_1Mbps

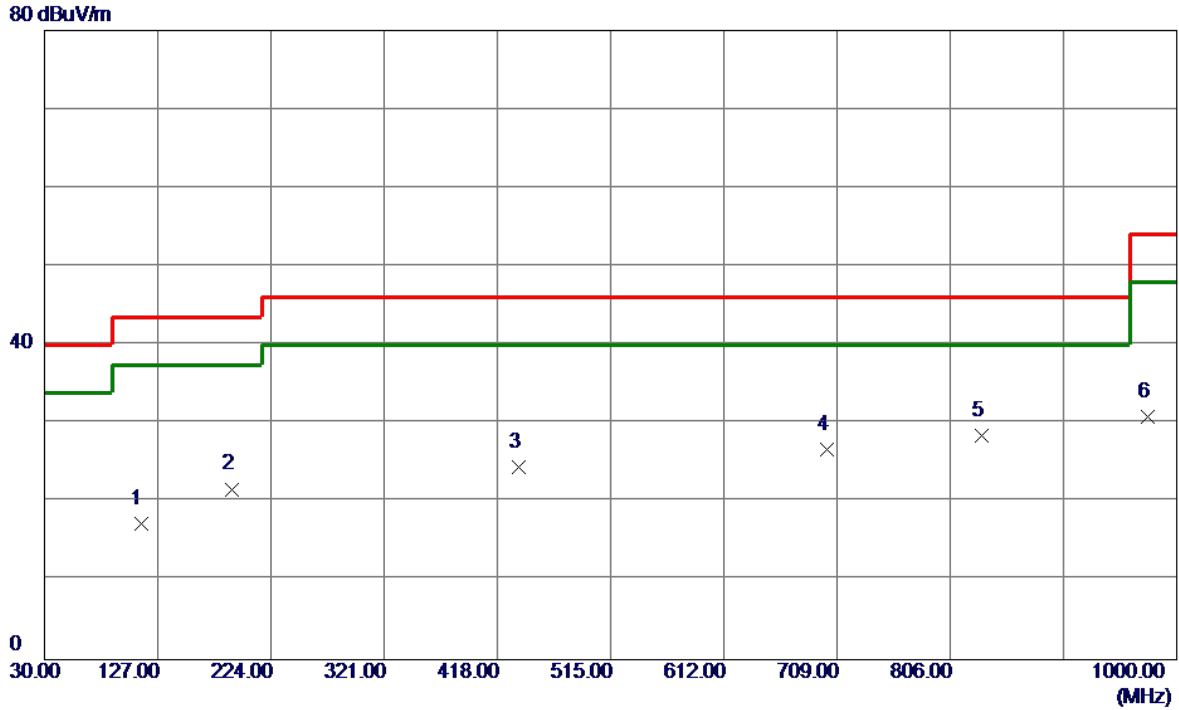
### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	34.8500	40.97	-14.89	26.08	40.00	-13.92	Peak	
2	52.3100	40.24	-14.89	25.35	40.00	-14.65	Peak	
3	144.4600	36.86	-11.83	25.03	43.50	-18.47	Peak	
4	157.0700	35.91	-10.86	25.05	43.50	-18.45	Peak	
5	191.9900	40.63	-14.49	26.14	43.50	-17.36	Peak	
6	796.3000	31.00	-1.26	29.74	46.00	-16.26	Peak	

Test Mode: TX 2402MHz \_CH00\_1Mbps

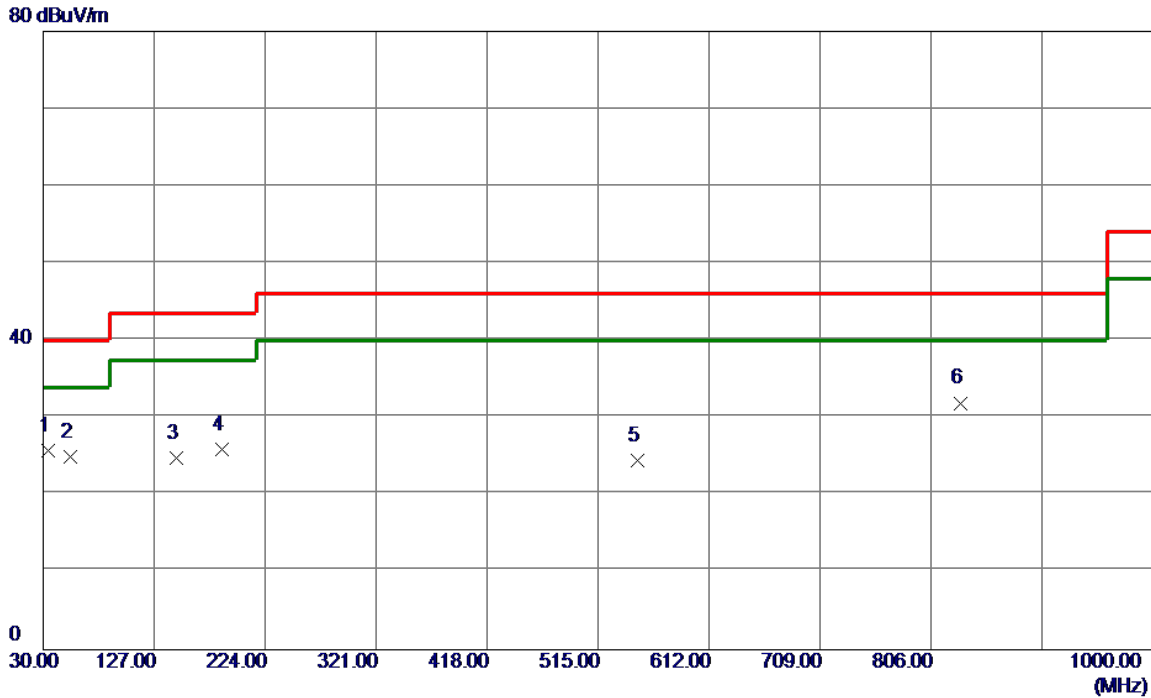
### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	112.4500	33.18	-15.89	17.29	43.50	-26.21	Peak	
2	191.0200	36.08	-14.40	21.68	43.50	-21.82	Peak	
3	436.4300	32.38	-7.94	24.44	46.00	-21.56	Peak	
4	700.2700	29.41	-2.75	26.66	46.00	-19.34	Peak	
5 *	833.1599	30.00	-1.56	28.44	46.00	-17.56	Peak	
6	974.7800	30.13	0.82	30.95	54.00	-23.05	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

### Vertical

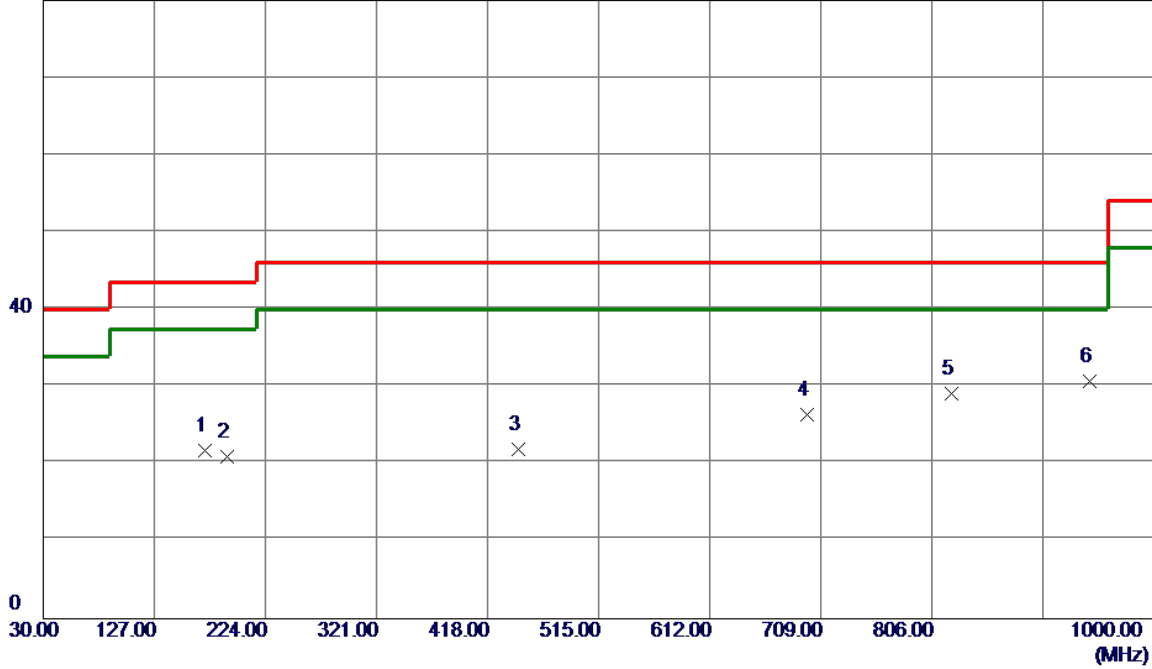


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	33.8800	40.56	-14.83	25.73	40.00	-14.27	Peak	
2	53.2800	39.92	-14.92	25.00	40.00	-15.00	Peak	
3	146.4000	36.56	-11.71	24.85	43.50	-18.65	Peak	
4	186.1700	39.65	-13.73	25.92	43.50	-17.58	Peak	
5	549.9200	29.99	-5.47	24.52	46.00	-21.48	Peak	
6 *	832.1900	33.46	-1.54	31.92	46.00	-14.08	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

### Horizontal

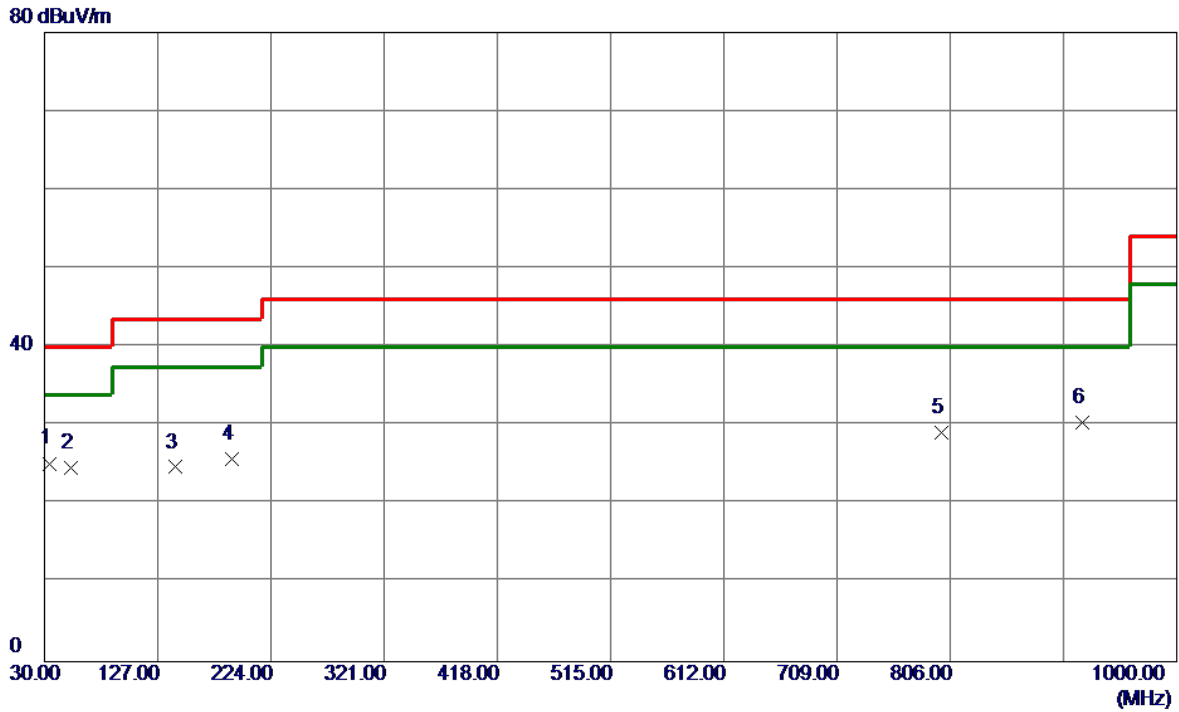
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	171.6200	33.16	-11.46	21.70	43.50	-21.80	Peak	
2	191.0200	35.35	-14.40	20.95	43.50	-22.55	Peak	
3	445.1600	29.45	-7.60	21.85	46.00	-24.15	Peak	
4	697.3600	29.25	-2.87	26.38	46.00	-19.62	Peak	
5	823.4600	30.50	-1.41	29.09	46.00	-16.91	Peak	
6 *	943.7400	29.51	1.16	30.67	46.00	-15.33	Peak	

Test Mode: TX 2480MHz \_CH78\_1Mbps

### Vertical



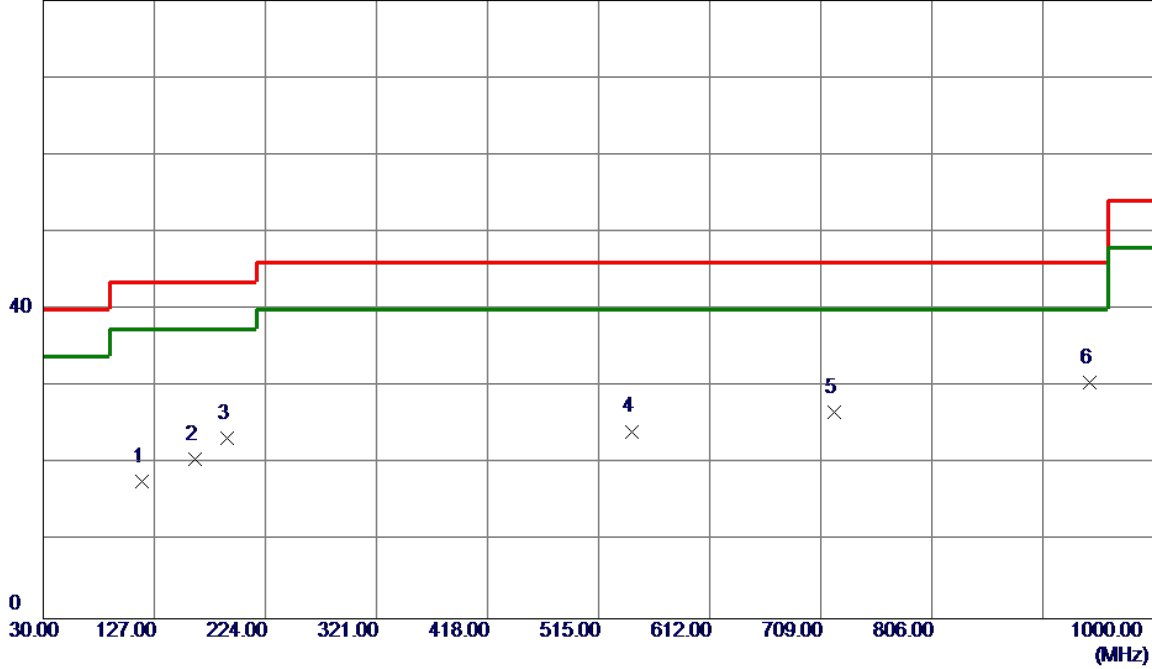
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	33.8800	40.03	-14.83	25.20	40.00	-14.80	Peak	
2	52.3100	39.55	-14.89	24.66	40.00	-15.34	Peak	
3	142.5200	36.66	-11.94	24.72	43.50	-18.78	Peak	
4	191.0200	40.18	-14.40	25.78	43.50	-17.72	Peak	
5	798.2400	30.30	-1.15	29.15	46.00	-16.85	Peak	
6	919.4900	30.15	0.18	30.33	46.00	-15.67	Peak	



Test Mode: TX 2480MHz \_CH78\_1Mbps

### Horizontal

80 dBuV/m

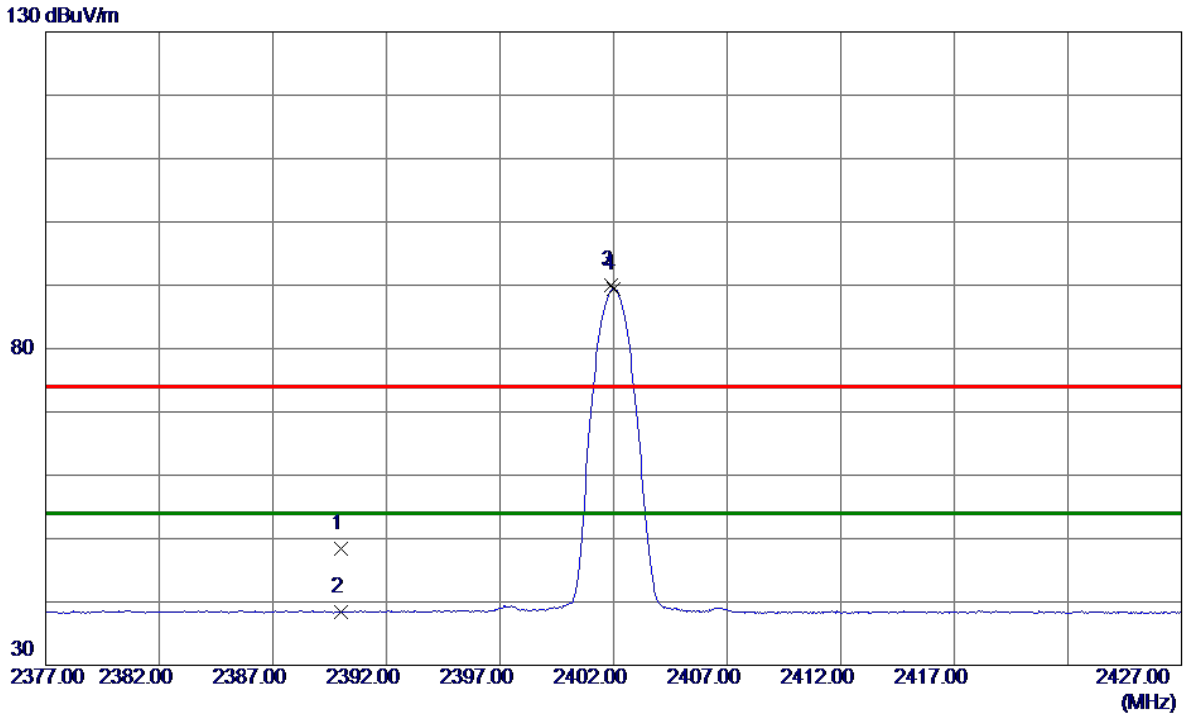


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	116.3300	32.98	-15.27	17.71	43.50	-25.79	Peak	
2	162.8900	31.34	-10.77	20.57	43.50	-22.93	Peak	
3	190.0500	37.62	-14.31	23.31	43.50	-20.19	Peak	
4	544.1000	30.06	-5.82	24.24	46.00	-21.76	Peak	
5	720.6400	30.07	-3.28	26.79	46.00	-19.21	Peak	
6 *	943.7400	29.44	1.16	30.60	46.00	-15.40	Peak	

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

Test Mode : TX 2402MHz \_CH00\_1Mbps

Vertical

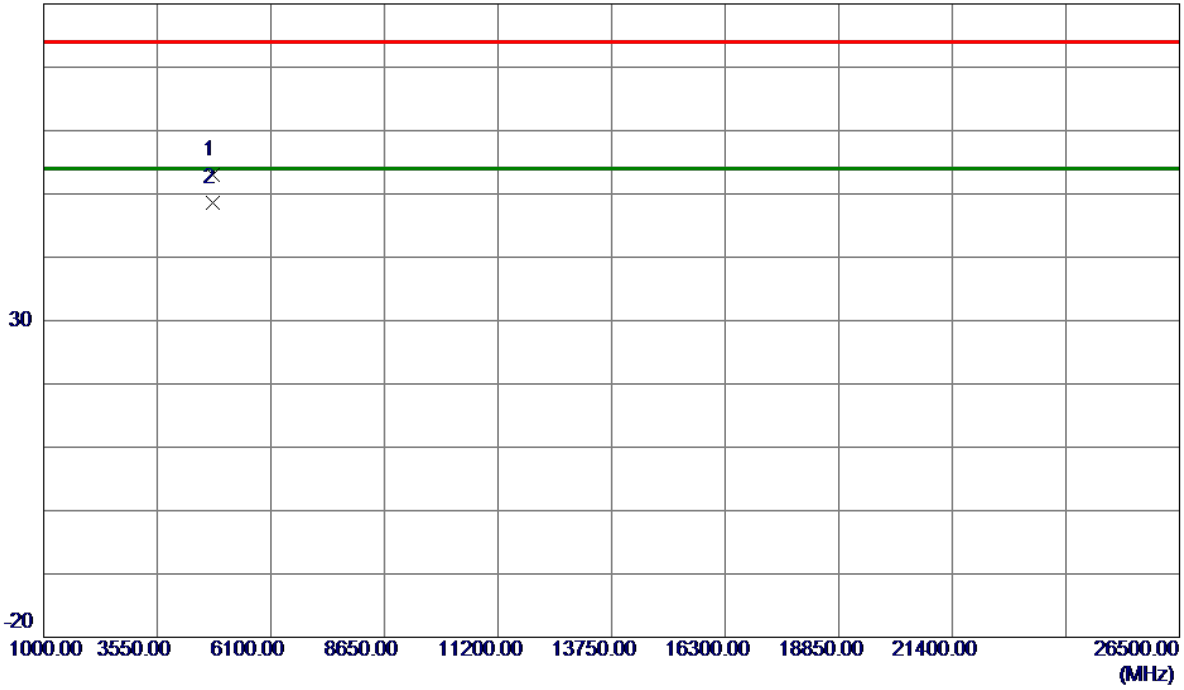


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	37.00	11.32	48.32	74.00	-25.68	Peak	
2	2390.0000	27.08	11.32	38.40	54.00	-15.60	AVG	
3	2401.9000	78.67	11.32	89.99	74.00	15.99	Peak	No Limit
4 *	2402.0000	78.04	11.32	89.36	54.00	35.36	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps

**Vertical**

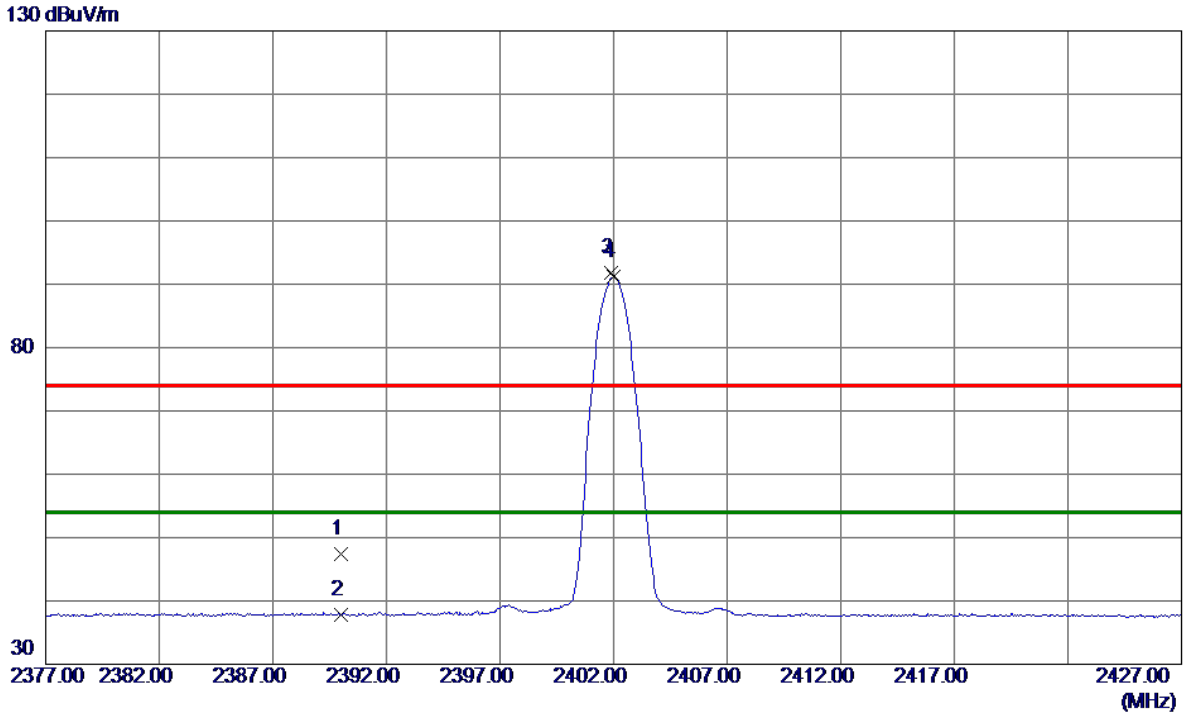
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4803.6460	43.03	9.96	52.99	74.00	-21.01	Peak	
2 *	4804.0250	38.64	9.96	48.60	54.00	-5.40	AVG	

Test Mode : TX 2402MHz \_CH00\_1Mbps

**Horizontal**

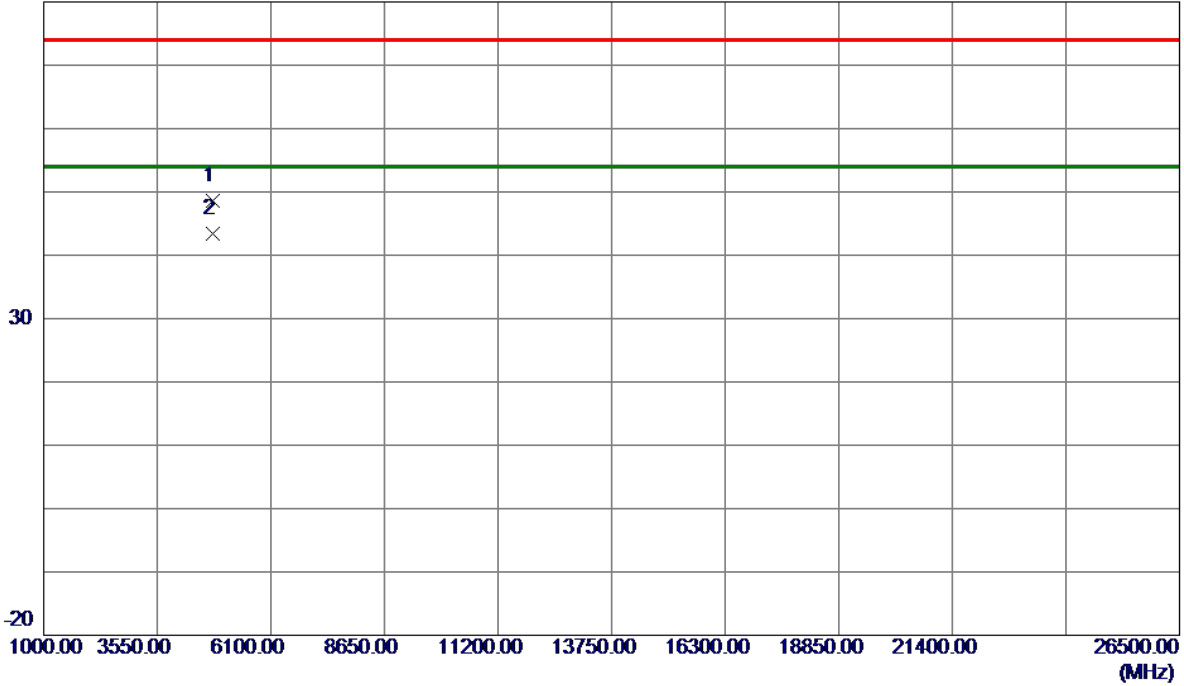


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	36.14	11.32	47.46	74.00	-26.54	Peak	
2	2390.0000	26.54	11.32	37.86	54.00	-16.14	AVG	
3	2401.9000	80.48	11.32	91.80	74.00	17.80	Peak	No Limit
4 *	2402.0000	79.81	11.32	91.13	54.00	37.13	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps

### Horizontal

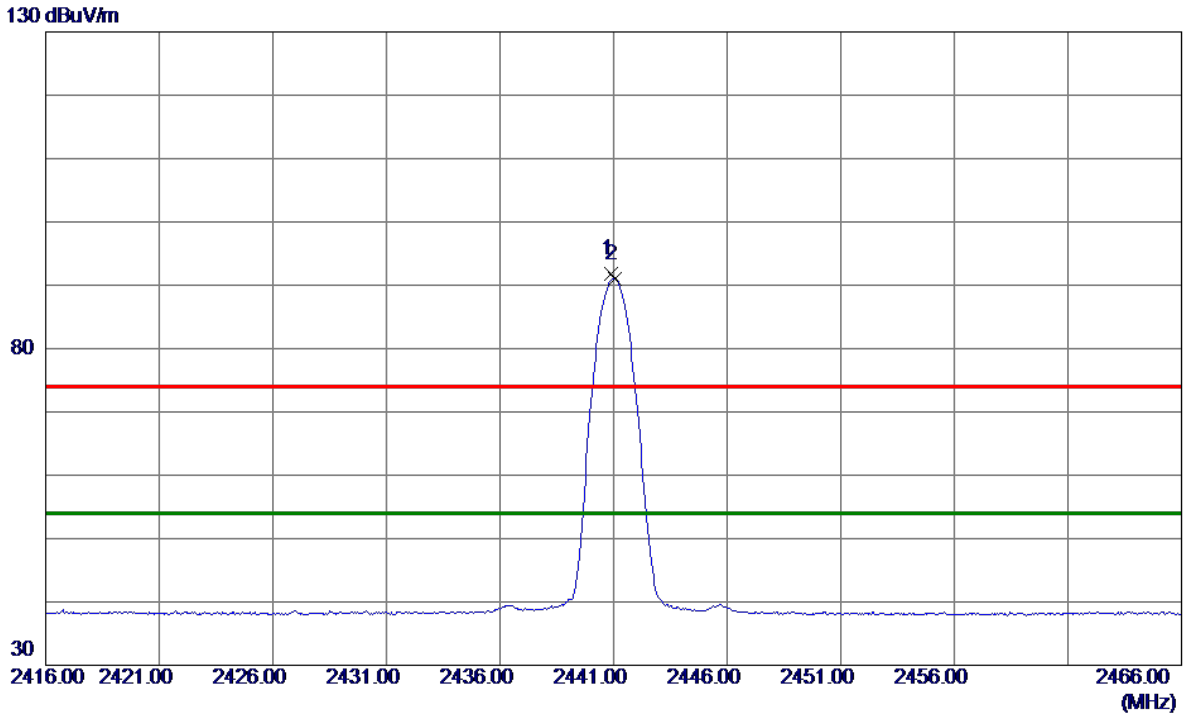
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4803.7810	38.63	9.96	48.59	74.00	-25.41	Peak	
2 *	4803.9530	33.38	9.96	43.34	54.00	-10.66	AVG	

Test Mode : TX 2441MHz \_CH39\_1Mbps

**Vertical**

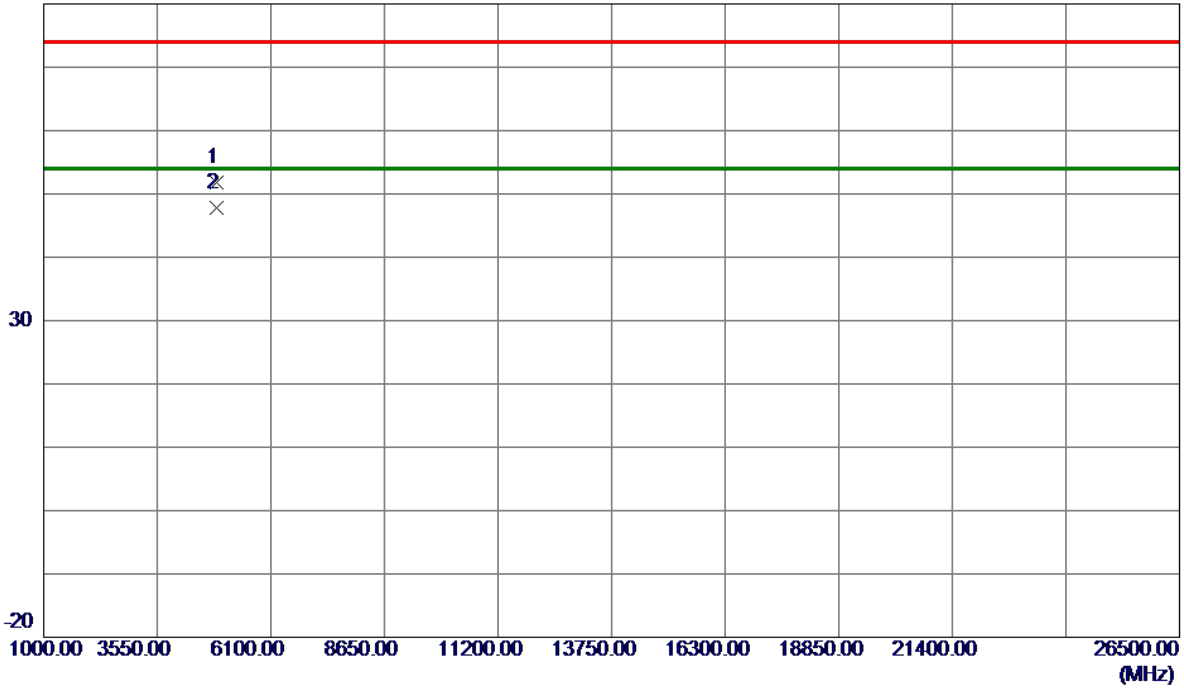


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2440.9000	80.38	11.33	91.71	74.00	17.71	Peak	No Limit
2 *	2441.0500	79.77	11.33	91.10	54.00	37.10	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_1Mbps

**Vertical**

80 dBuV/m

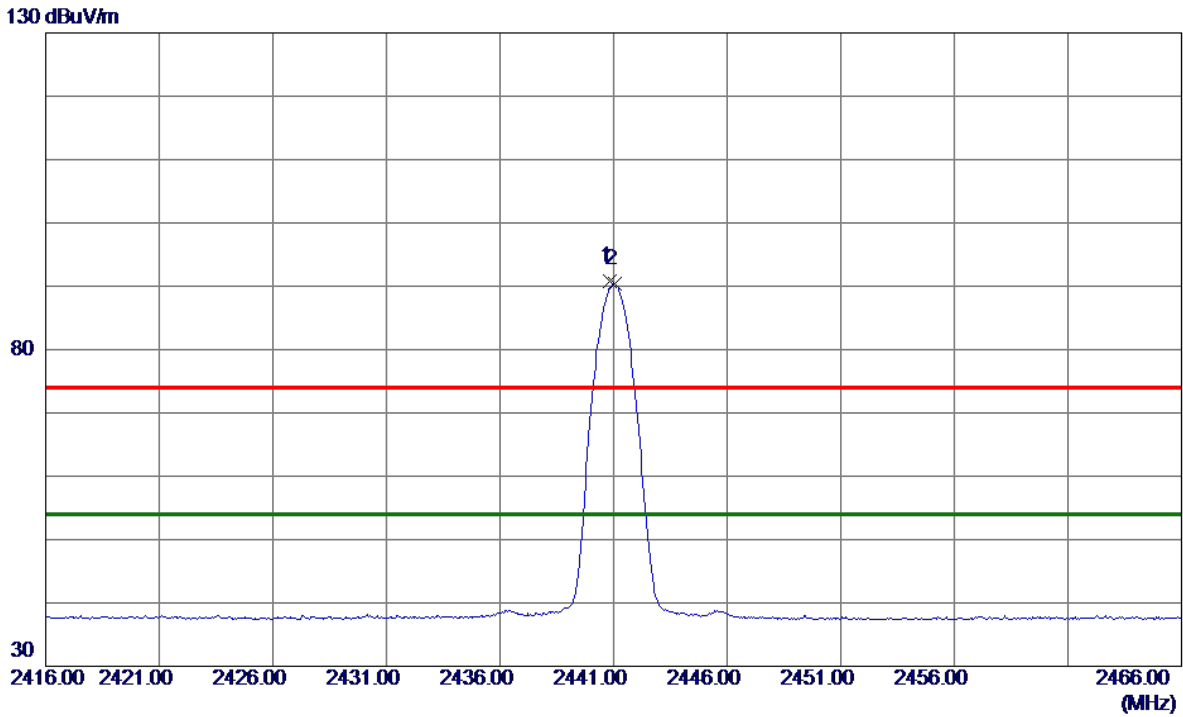


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4881.6660	41.62	10.17	51.79	74.00	-22.21	Peak	
2 *	4882.0050	37.56	10.17	47.73	54.00	-6.27	AVG	



Test Mode : TX 2441MHz \_CH39\_1Mbps

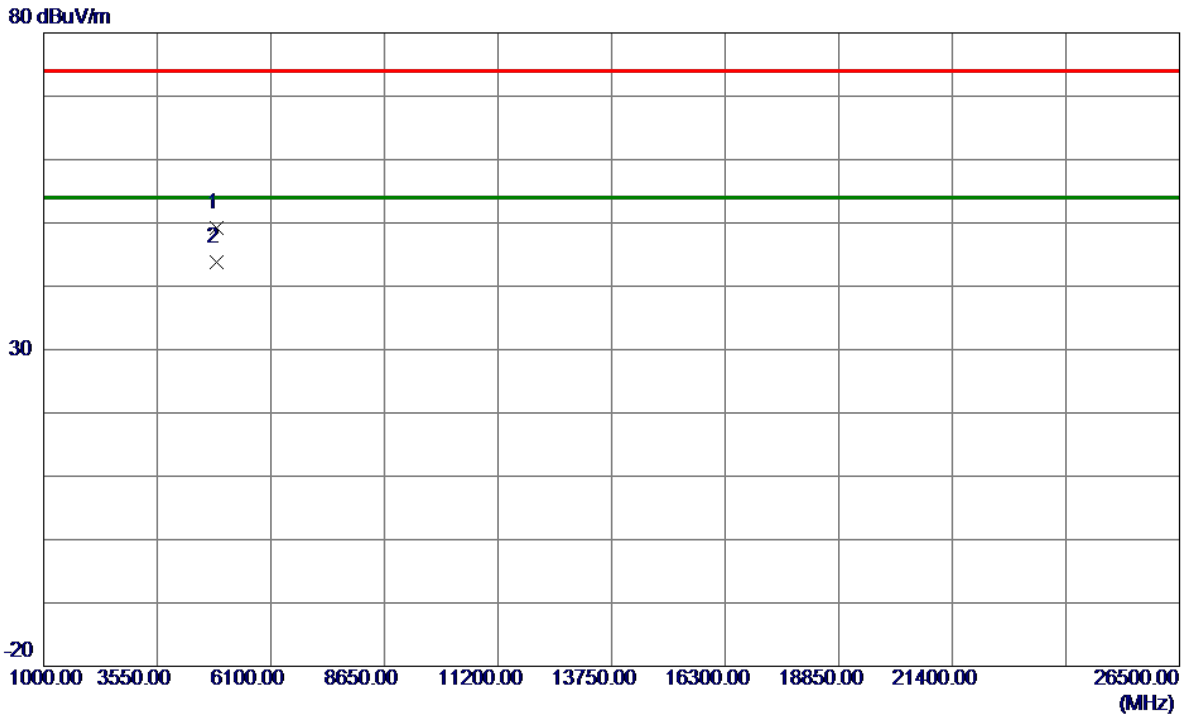
**Horizontal**



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2440.8500	79.48	11.33	90.81	74.00	16.81	Peak	No Limit
2 *	2441.0500	79.02	11.33	90.35	54.00	36.35	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_1Mbps

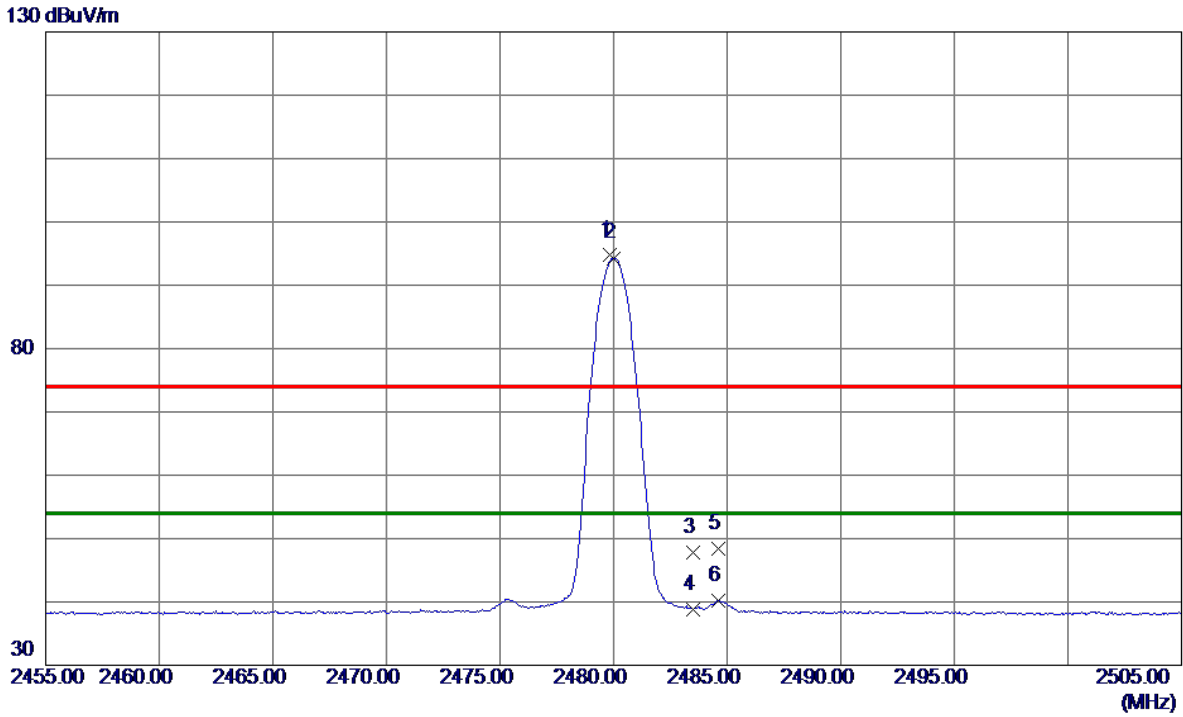
Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4881.6280	38.96	10.17	49.13	74.00	-24.87	Peak	
2 *	4882.0590	33.69	10.17	43.86	54.00	-10.14	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

Vertical

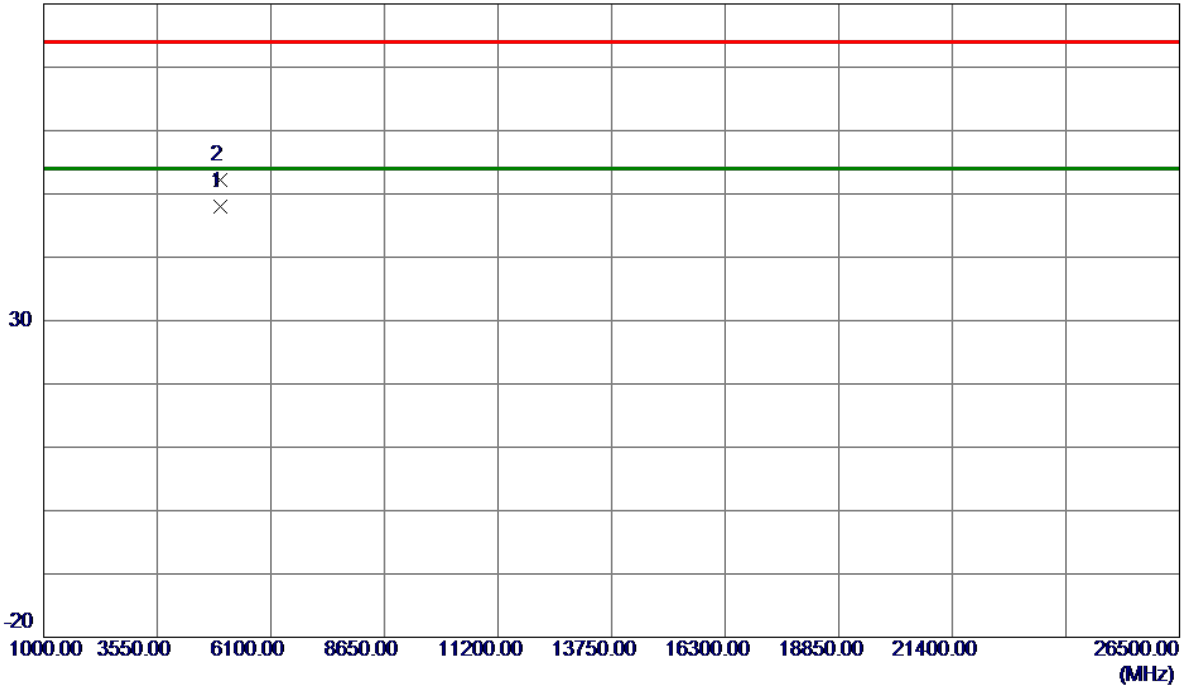


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.8500	83.51	11.34	94.85	74.00	20.85	Peak	No Limit
2 *	2480.0000	82.96	11.34	94.30	54.00	40.30	AVG	No Limit
3	2483.5000	36.45	11.35	47.80	74.00	-26.20	Peak	
4	2483.5000	27.51	11.35	38.86	54.00	-15.14	AVG	
5	2484.6000	37.09	11.35	48.44	74.00	-25.56	Peak	
6	2484.6000	28.87	11.35	40.22	54.00	-13.78	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

Vertical

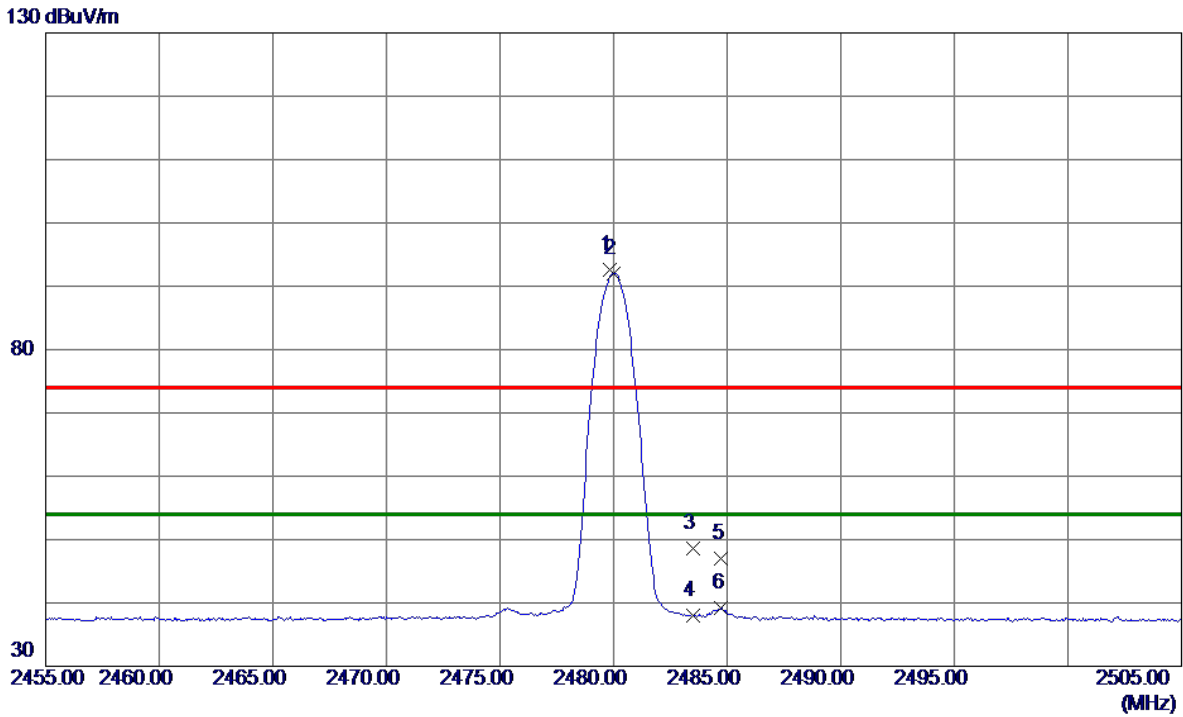
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4960.0150	37.60	10.38	47.98	54.00	-6.02	AVG	
2	4960.3320	41.74	10.38	52.12	74.00	-21.88	Peak	

Test Mode : TX 2480MHz \_CH78\_1Mbps

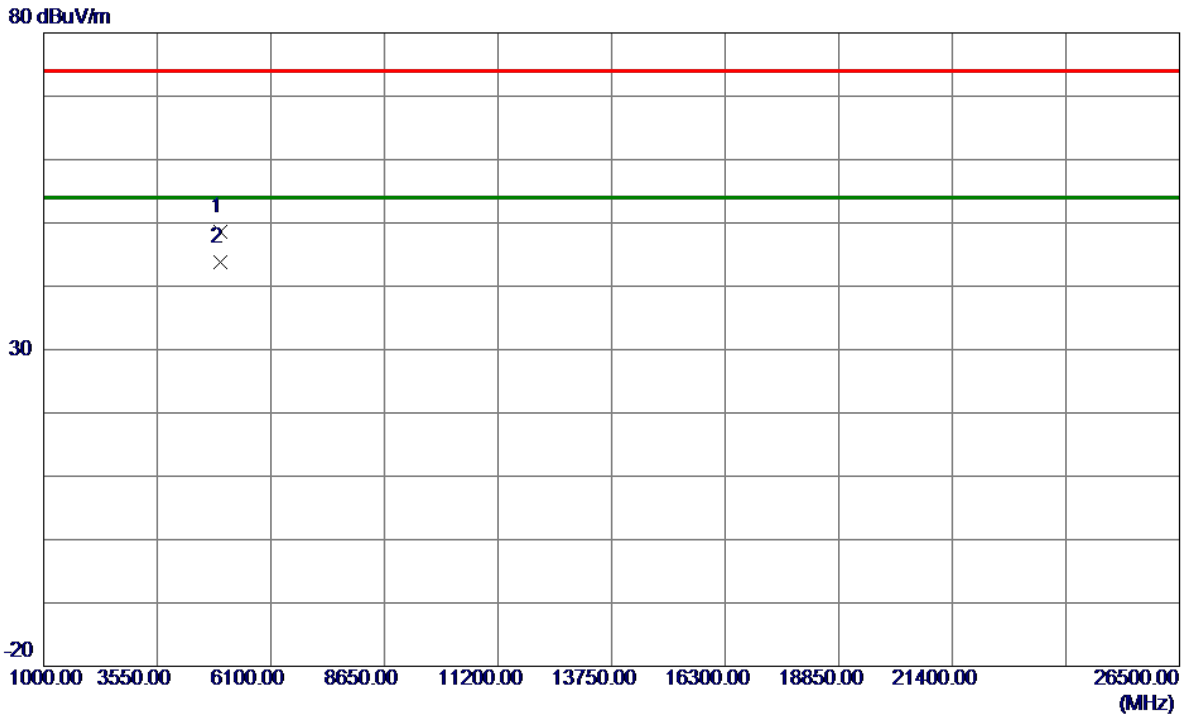
Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.8500	81.33	11.34	92.67	74.00	18.67	Peak	No Limit
2 *	2480.0000	80.75	11.34	92.09	54.00	38.09	AVG	No Limit
3	2483.5000	37.18	11.35	48.53	74.00	-25.47	Peak	
4	2483.5000	26.67	11.35	38.02	54.00	-15.98	AVG	
5	2484.7500	35.59	11.35	46.94	74.00	-27.06	Peak	
6	2484.7500	27.76	11.35	39.11	54.00	-14.89	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

**Horizontal**

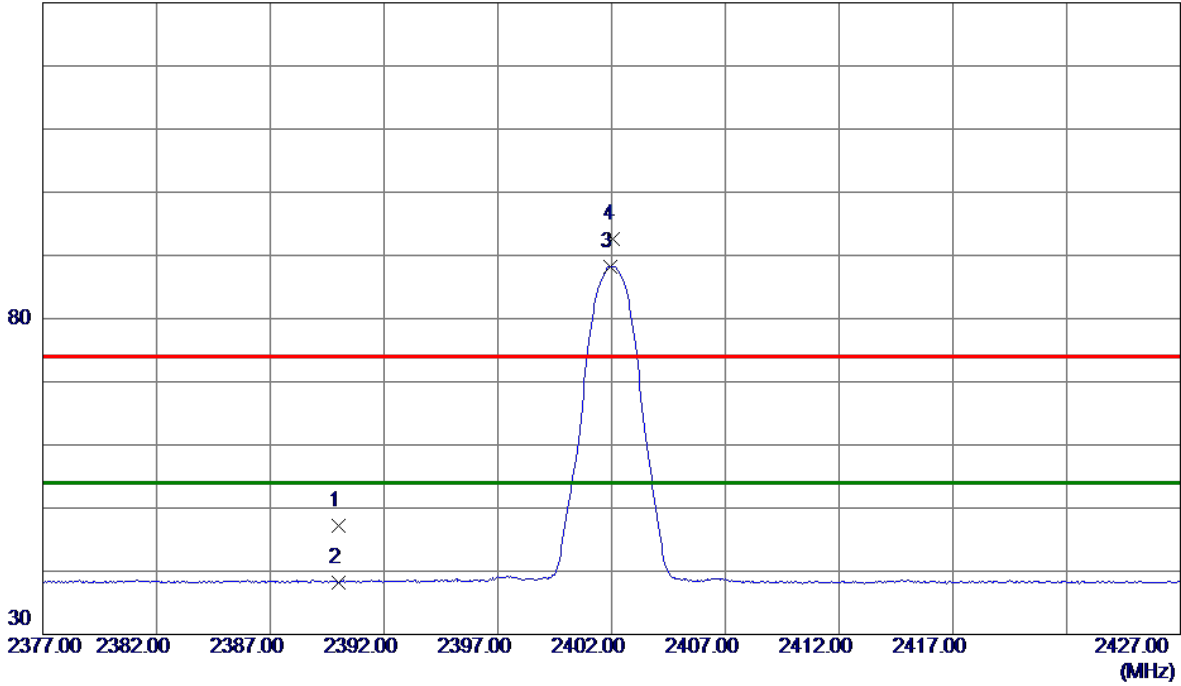


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4959.8280	38.31	10.38	48.69	74.00	-25.31	Peak	
2 *	4960.0190	33.50	10.38	43.88	54.00	-10.12	AVG	

Test Mode : TX 2402MHz \_CH00\_3Mbps

**Vertical**

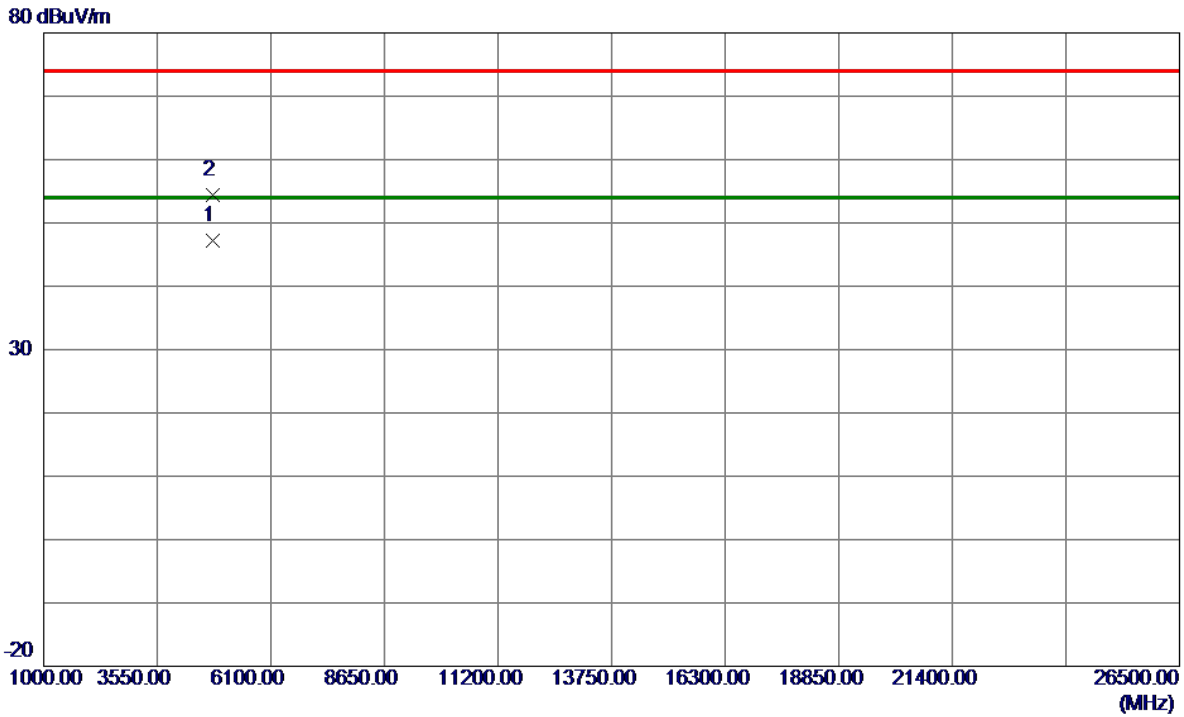
130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	35.96	11.32	47.28	74.00	-26.72	Peak	
2	2390.0000	26.94	11.32	38.26	54.00	-15.74	AVG	
3 *	2401.9500	76.95	11.32	88.27	54.00	34.27	AVG	No Limit
4	2402.0500	81.24	11.32	92.56	74.00	18.56	Peak	No Limit

Test Mode : TX 2402MHz \_CH00\_3Mbps

**Vertical**

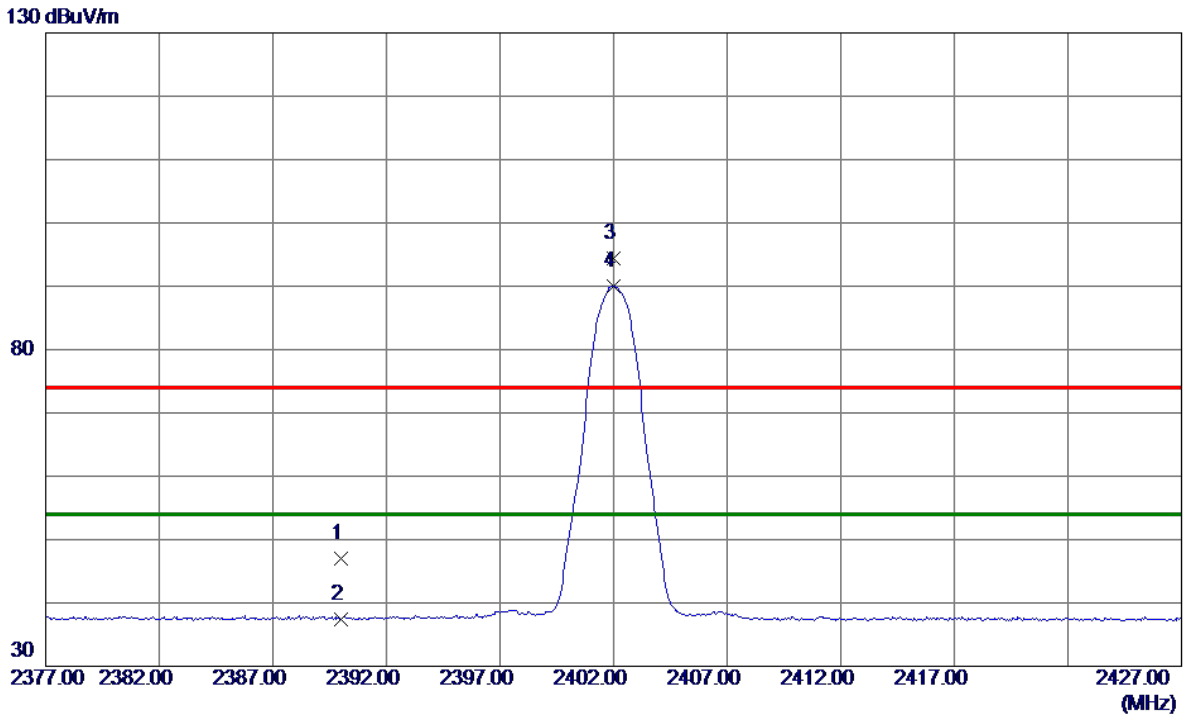


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4804.0230	37.32	9.96	47.28	54.00	-6.72	AVG	
2	4804.0830	44.52	9.96	54.48	74.00	-19.52	Peak	



Test Mode : TX 2402MHz \_CH00\_3Mbps

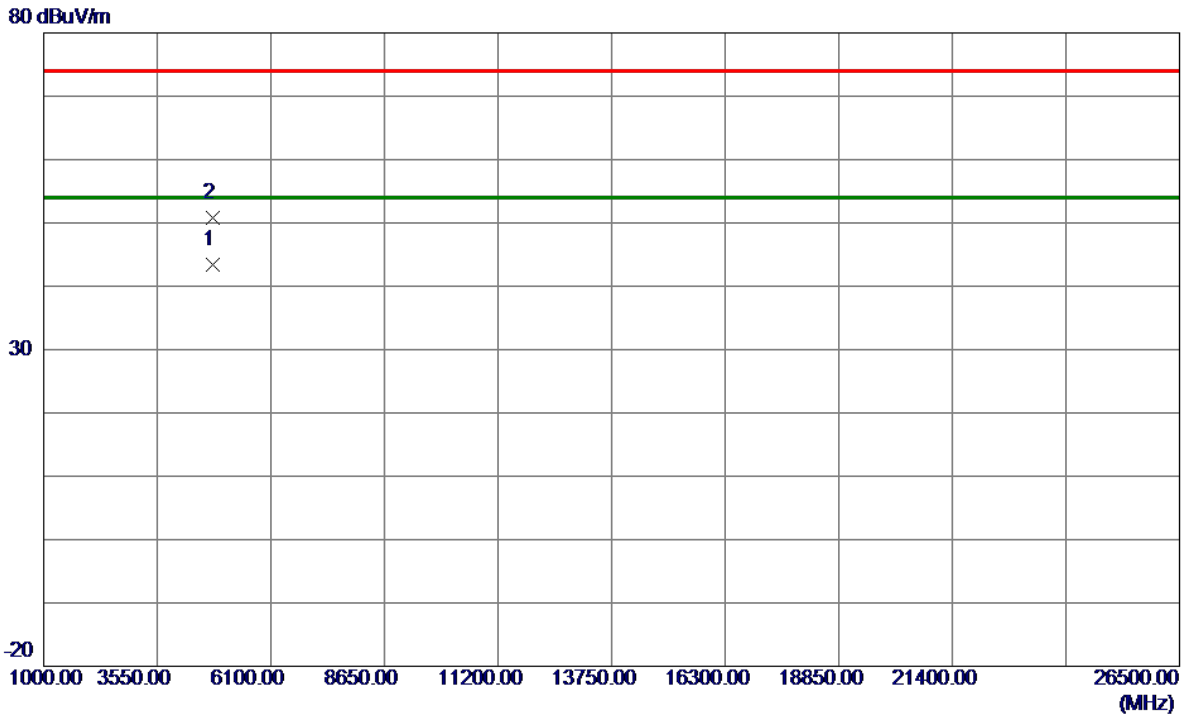
**Horizontal**



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	35.77	11.32	47.09	74.00	-26.91	Peak	
2	2390.0000	26.15	11.32	37.47	54.00	-16.53	AVG	
3	2402.0000	83.03	11.32	94.35	74.00	20.35	Peak	No Limit
4 *	2402.0000	78.64	11.32	89.96	54.00	35.96	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_3Mbps

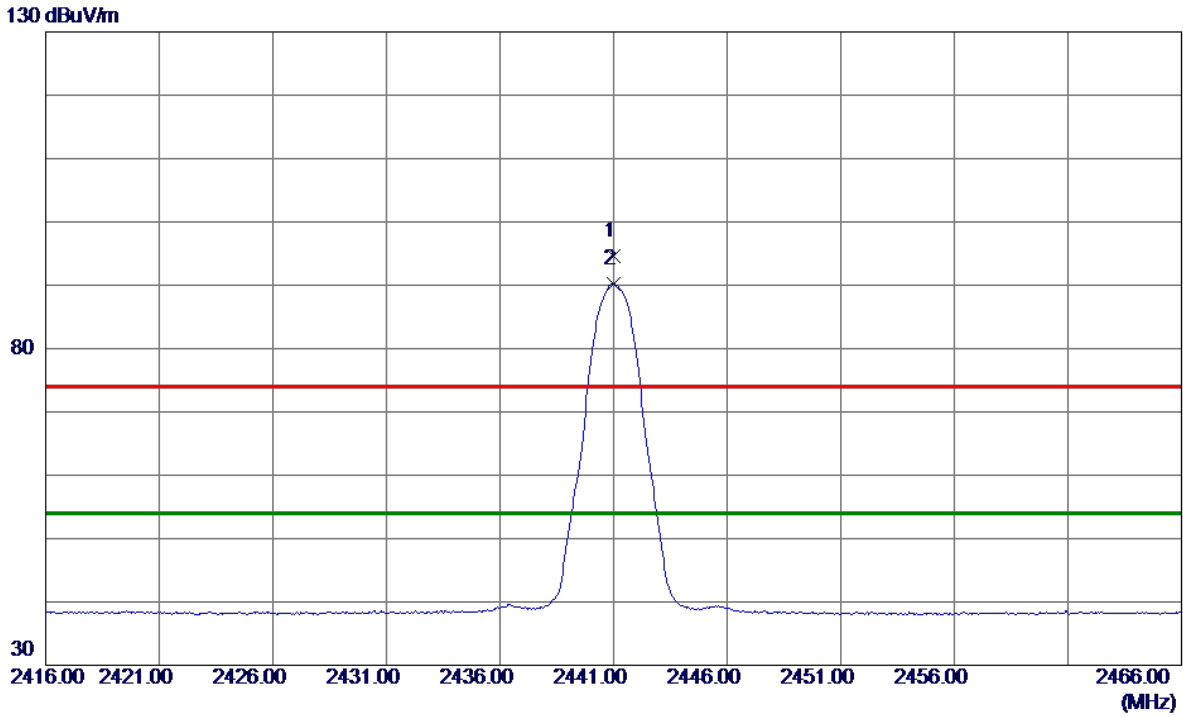
### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4803.9300	33.48	9.96	43.44	54.00	-10.56	AVG	
2	4804.0860	40.88	9.96	50.84	74.00	-23.16	Peak	

Test Mode : TX 2441MHz \_CH39\_3Mbps

**Vertical**

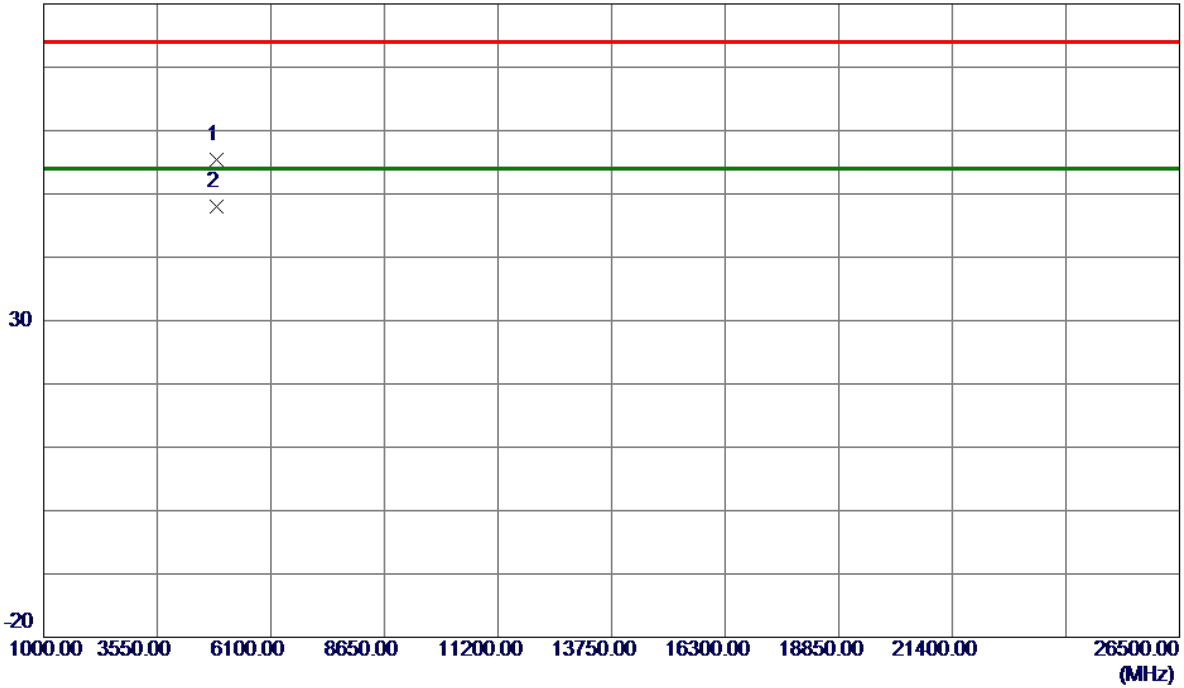


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	83.26	11.33	94.59	74.00	20.59	Peak	No Limit
2 *	2441.0000	78.79	11.33	90.12	54.00	36.12	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_3Mbps

**Vertical**

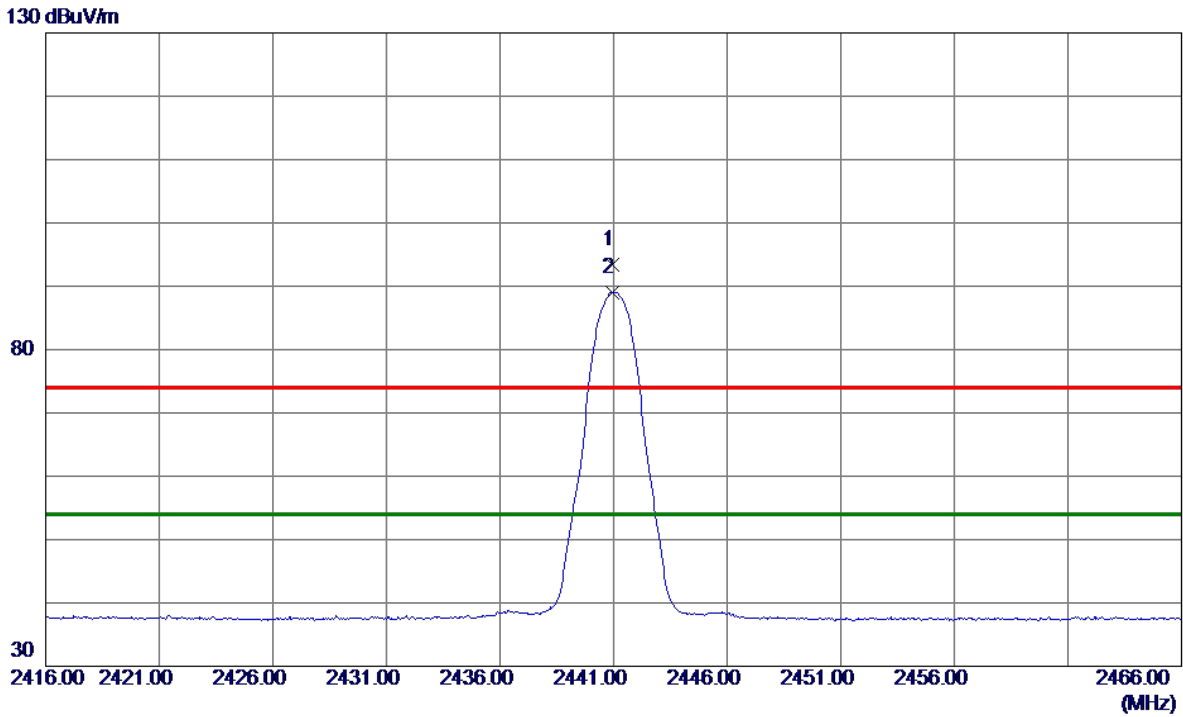
80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4882.0250	45.23	10.17	55.40	74.00	-18.60	Peak	
2 *	4882.0510	37.92	10.17	48.09	54.00	-5.91	AVG	

Test Mode : TX 2441MHz \_CH39\_3Mbps

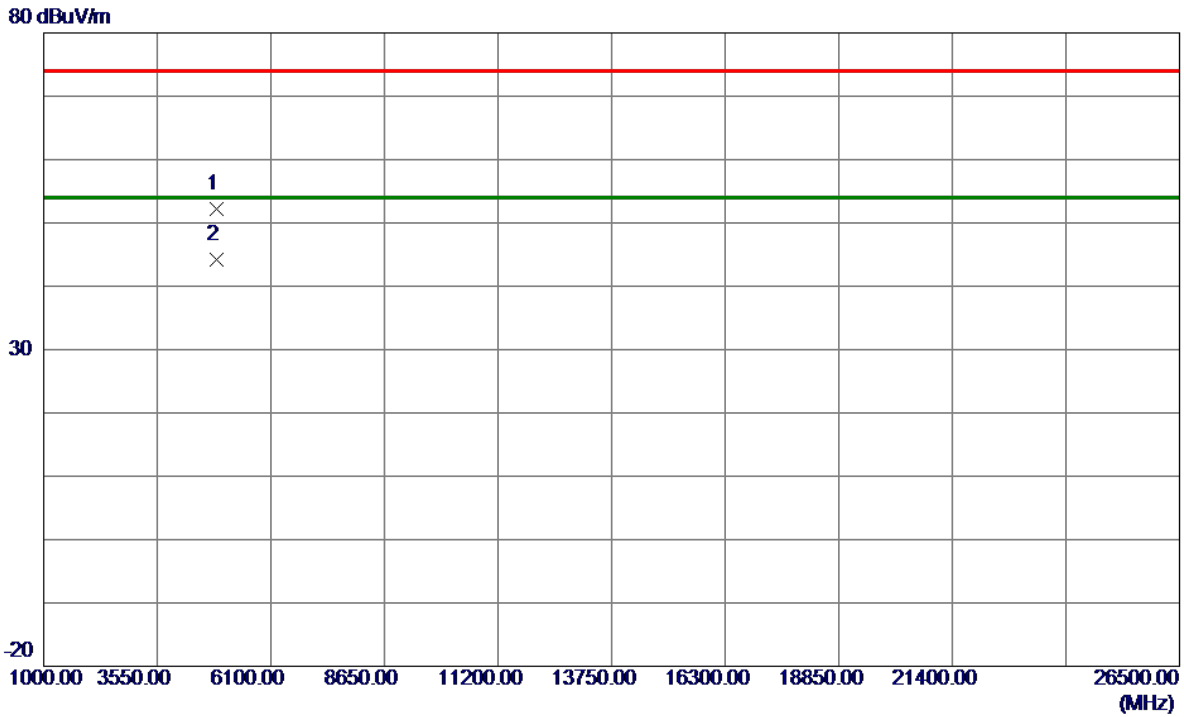
**Horizontal**



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2440.9500	82.01	11.33	93.34	74.00	19.34	Peak	No Limit
2 *	2440.9500	77.70	11.33	89.03	54.00	35.03	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_3Mbps

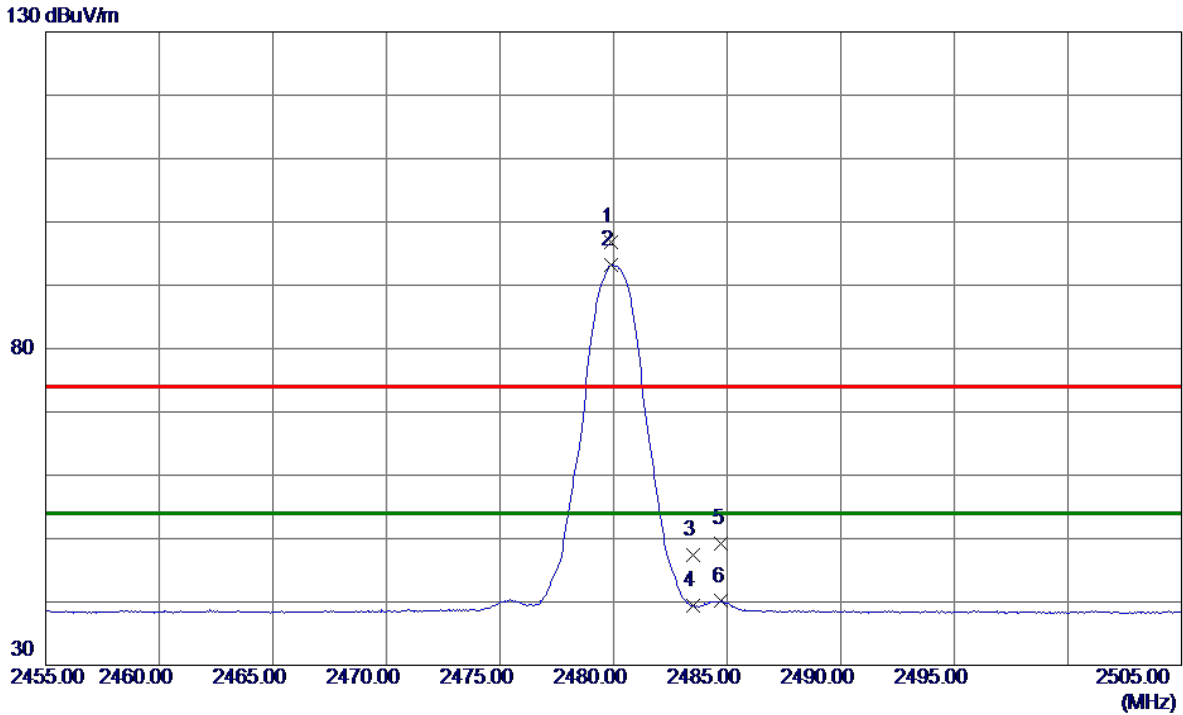
**Horizontal**



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4881.8929	42.09	10.17	52.26	74.00	-21.74	Peak	
2 *	4881.8940	33.94	10.17	44.11	54.00	-9.89	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

Vertical

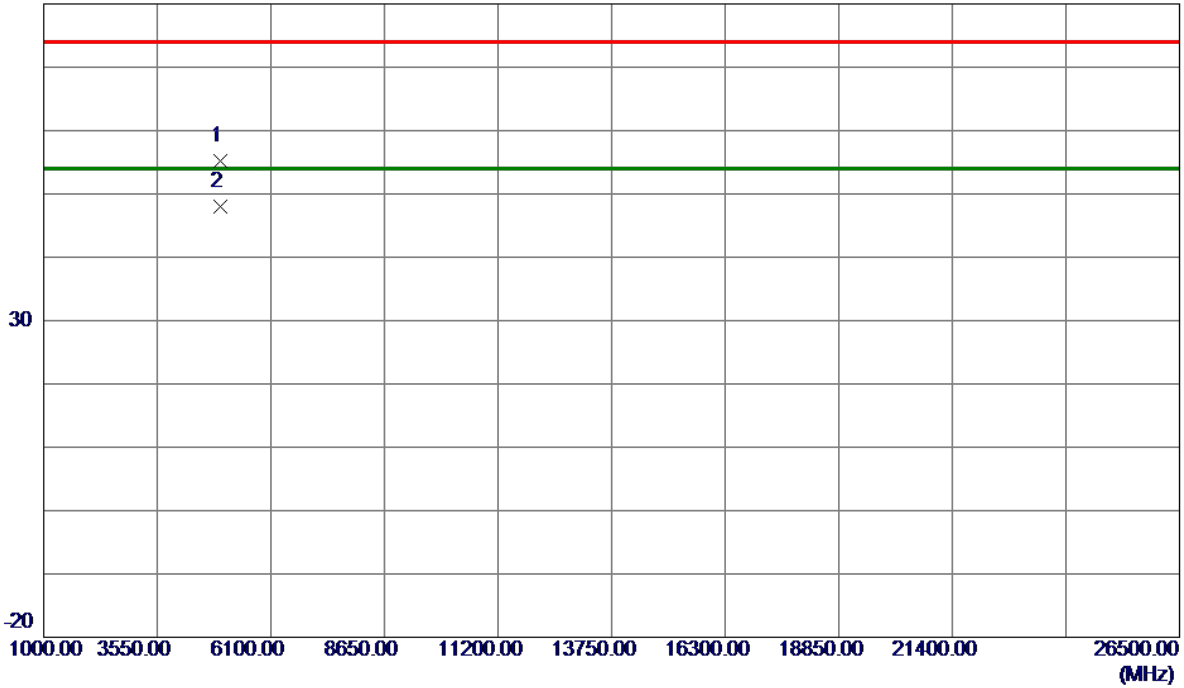


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.9000	85.48	11.34	96.82	74.00	22.82	Peak	No Limit
2 *	2479.9000	81.79	11.34	93.13	54.00	39.13	AVG	No Limit
3	2483.5000	36.12	11.35	47.47	74.00	-26.53	Peak	
4	2483.5000	28.02	11.35	39.37	54.00	-14.63	AVG	
5	2484.7500	37.90	11.35	49.25	74.00	-24.75	Peak	
6	2484.7500	28.75	11.35	40.10	54.00	-13.90	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

**Vertical**

80 dBuV/m

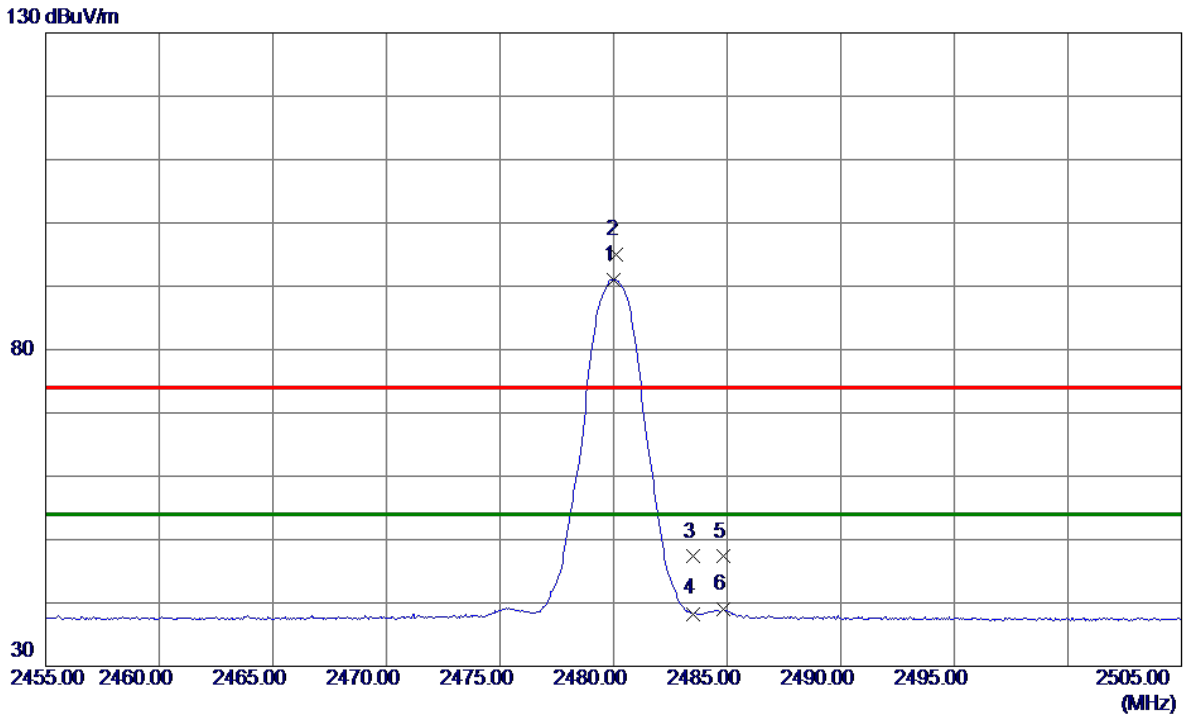


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4959.8330	44.91	10.38	55.29	74.00	-18.71	Peak	
2 *	4959.9450	37.61	10.38	47.99	54.00	-6.01	AVG	



Test Mode : TX 2480MHz \_CH78\_3Mbps

Horizontal

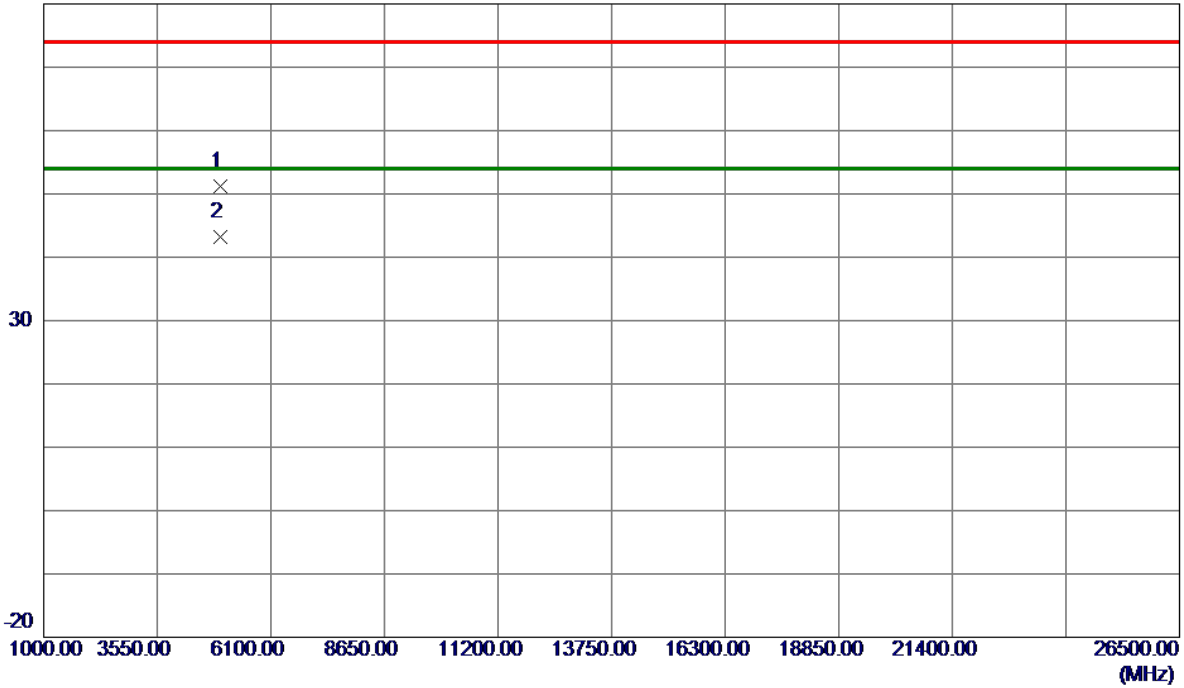


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2480.0000	79.71	11.34	91.05	54.00	37.05	AVG	No Limit
2	2480.1000	83.69	11.34	95.03	74.00	21.03	Peak	No Limit
3	2483.5000	35.95	11.35	47.30	74.00	-26.70	Peak	
4	2483.5000	26.95	11.35	38.30	54.00	-15.70	AVG	
5	2484.8500	35.95	11.35	47.30	74.00	-26.70	Peak	
6	2484.8500	27.59	11.35	38.94	54.00	-15.06	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

Horizontal

80 dBuV/m

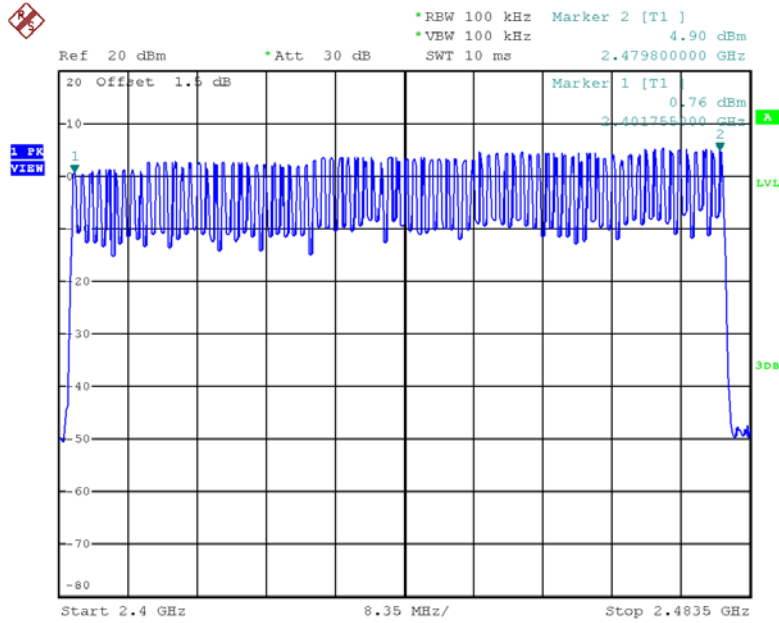


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4959.7370	40.81	10.38	51.19	74.00	-22.81	Peak	
2 *	4959.9430	32.88	10.38	43.26	54.00	-10.74	AVG	

## APPENDIX E - NUMBER OF HOPPING CHANNEL

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

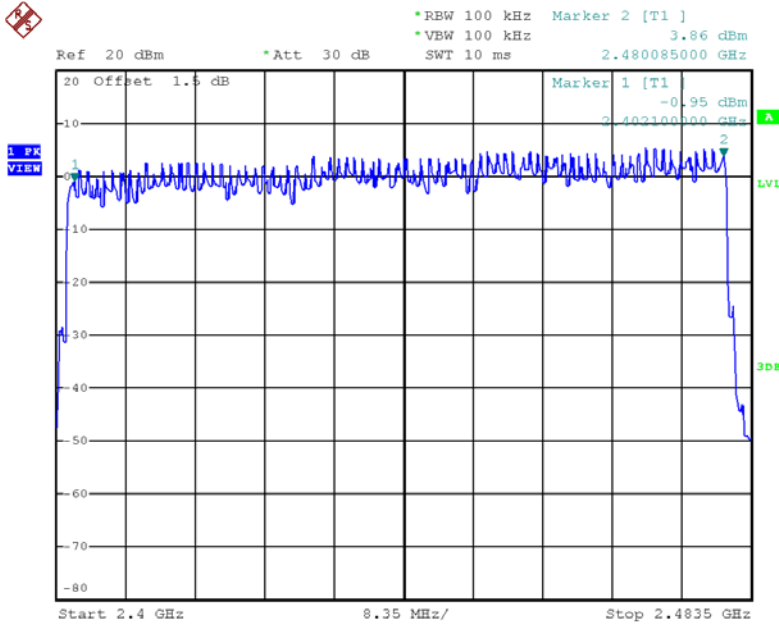
Number of Hopping Channel                      79



Date: 18.JUL.2018 18:05:15

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

Number of Hopping Channel                      79



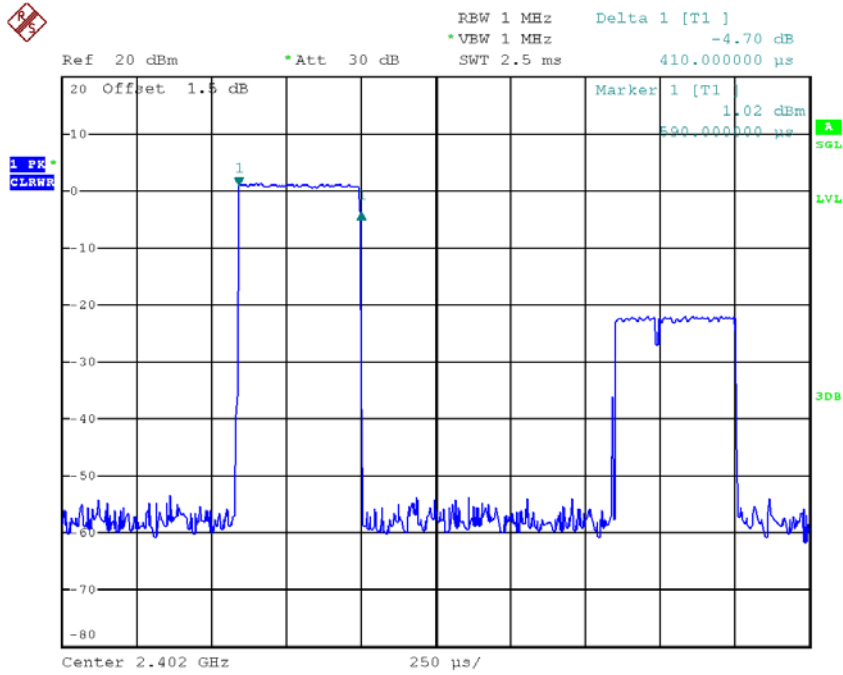
Date: 18.JUL.2018 19:00:01

## APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode :	TX Mode_1Mbps
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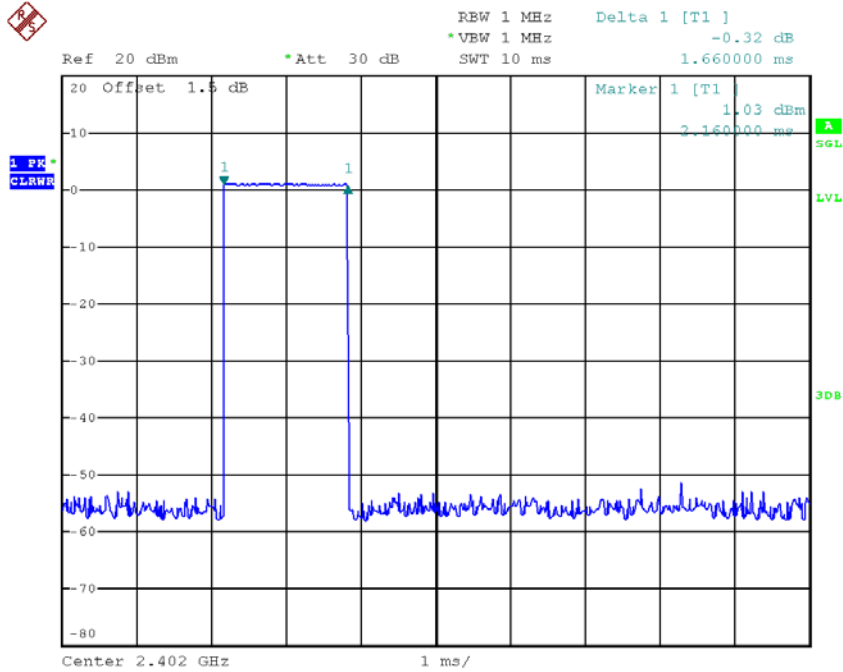
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.9200	0.3115	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH1	2402	0.4100	0.1312	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6600	0.2656	0.4000	Pass
DH1	2441	0.4050	0.1296	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass
DH3	2480	1.6600	0.2656	0.4000	Pass
DH1	2480	0.4050	0.1296	0.4000	Pass

### CH00-DH1



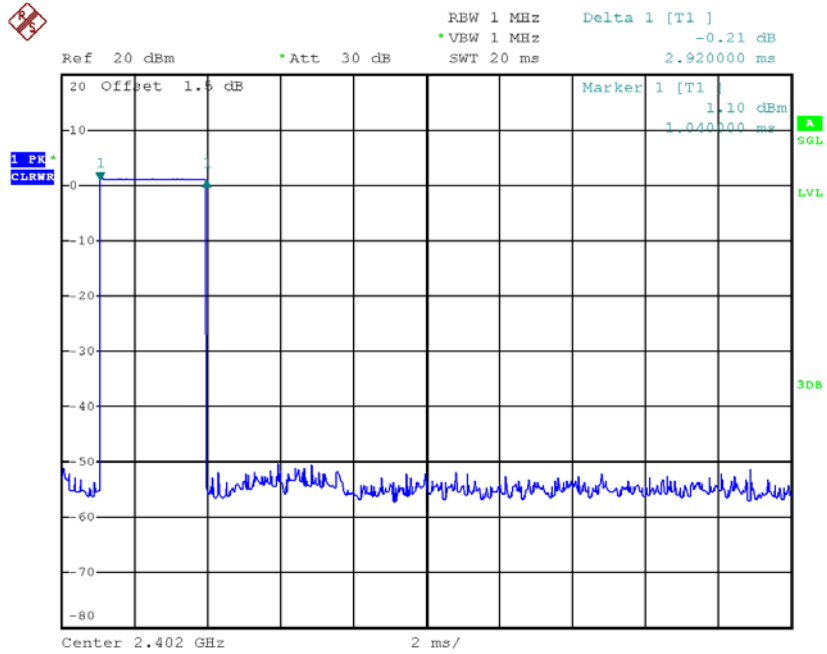
Date: 18.JUL.2018 18:48:22

### CH00-DH3



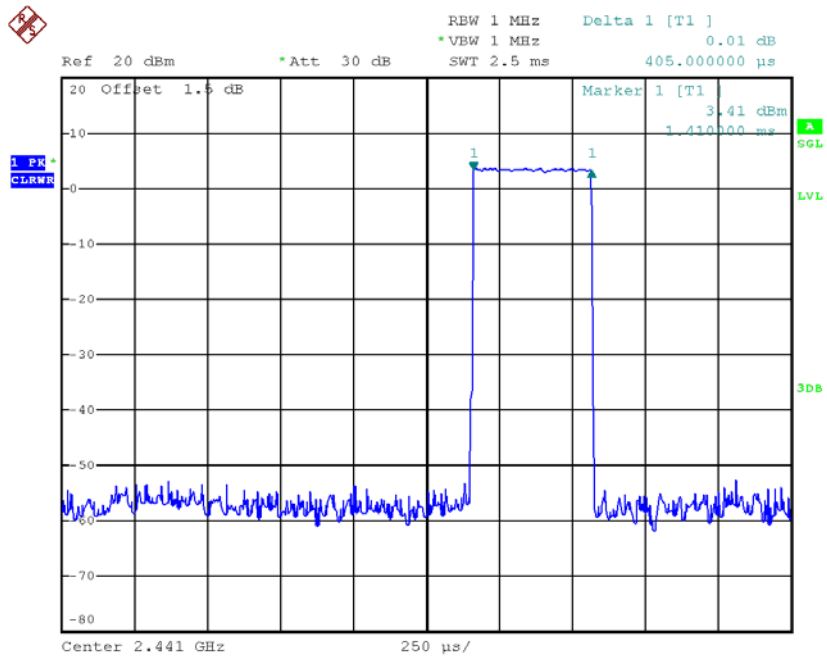
Date: 18.JUL.2018 18:43:50

### CH00-DH5



Date: 18.JUL.2018 18:36:24

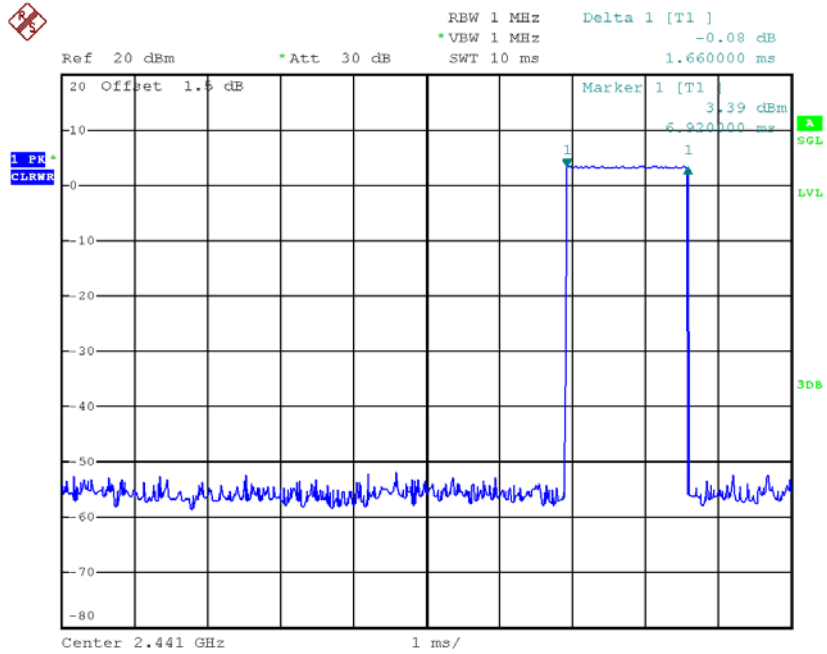
### CH39-DH1



Date: 18.JUL.2018 18:00:04

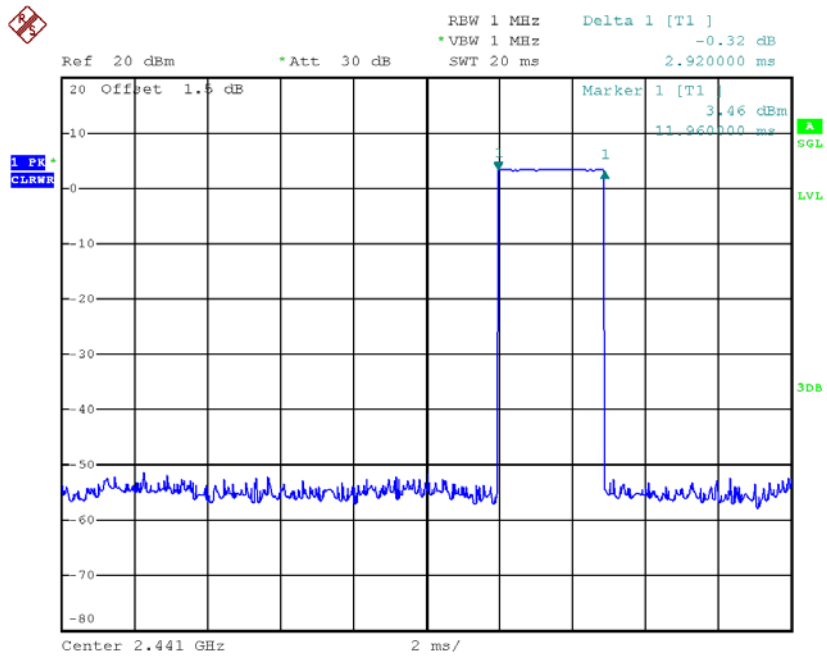


### CH39-DH3



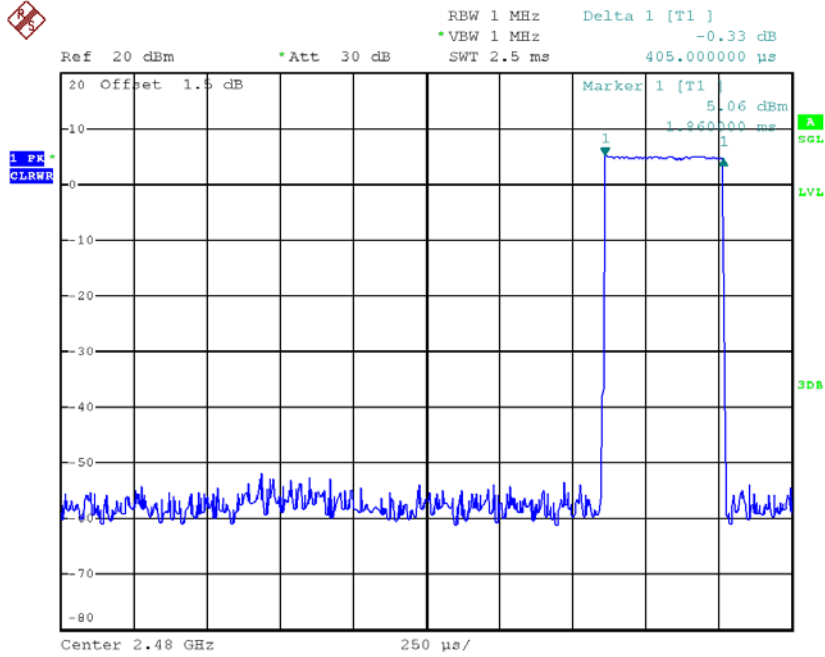
Date: 18.JUL.2018 18:45:14

### CH39-DH5



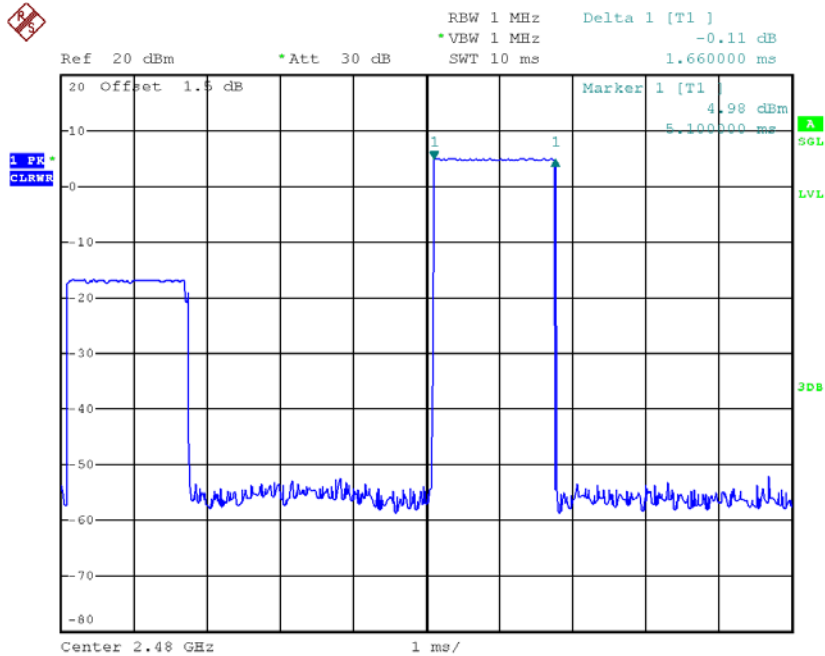
Date: 18.JUL.2018 18:40:29

### CH78-DH1



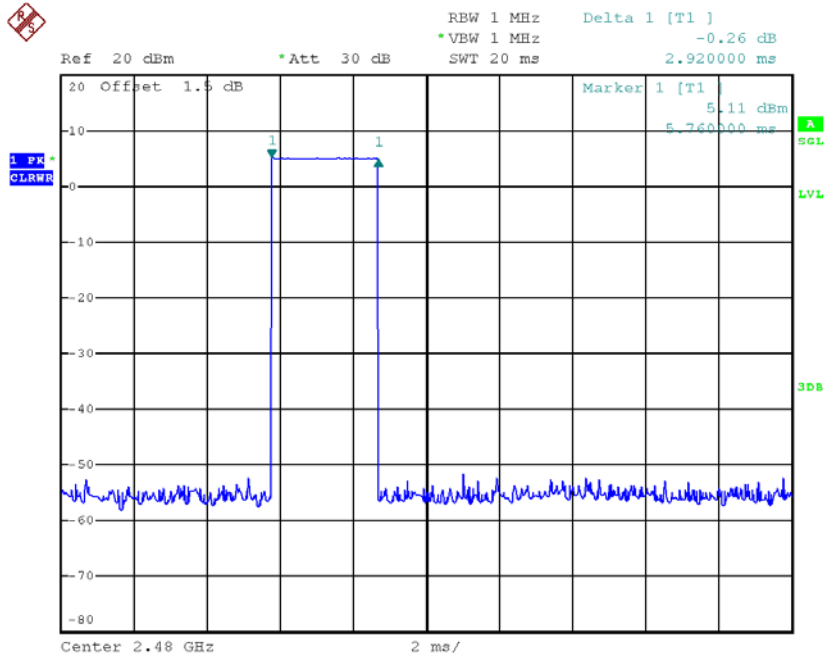
Date: 18.JUL.2018 18:00:08

### CH78-DH3



Date: 18.JUL.2018 18:46:43

### CH78-DH5

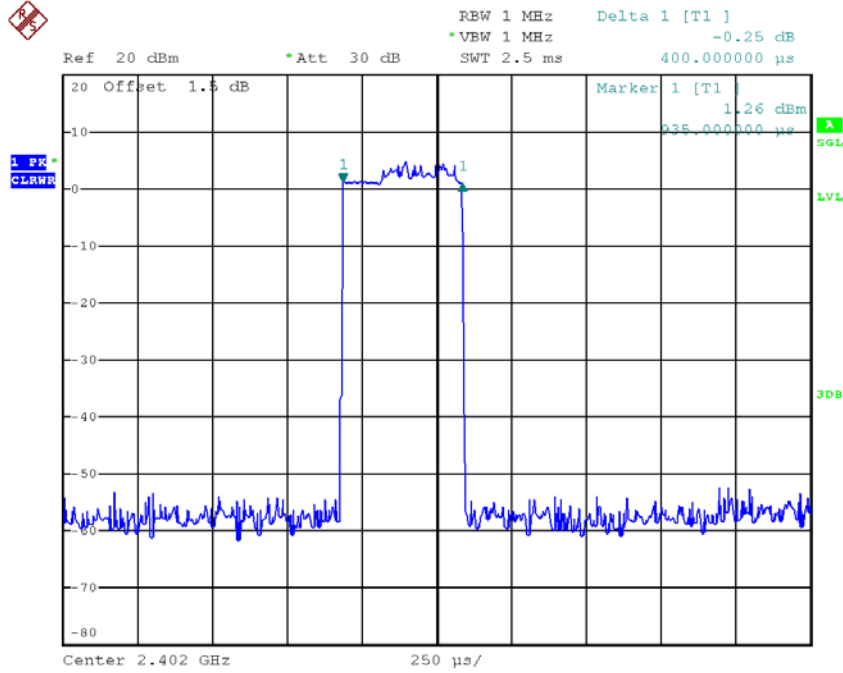


Date: 18.JUL.2018 18:36:33

Test Mode :	TX Mode_3Mbps
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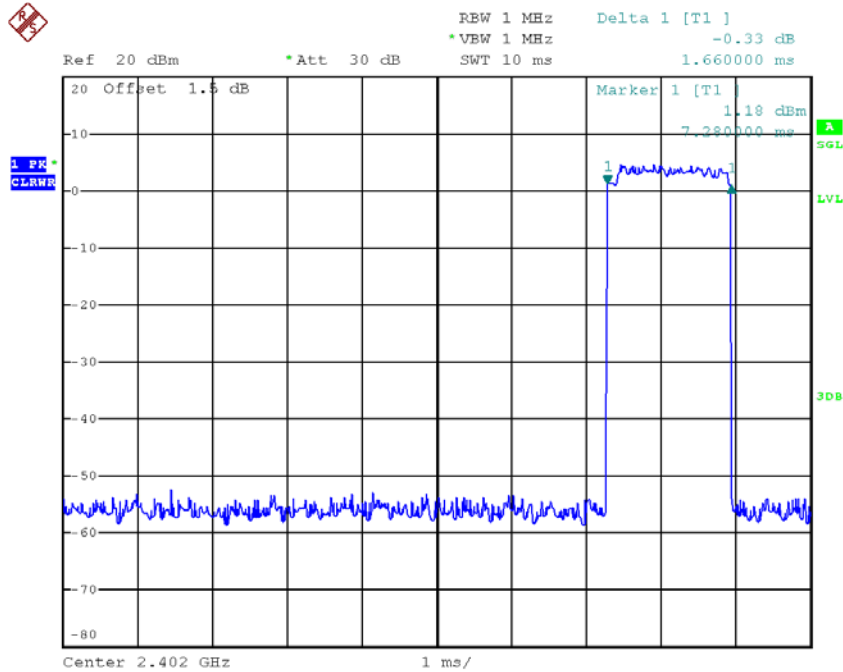
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.8800	0.3072	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH1	2402	0.4000	0.1280	0.4000	Pass
DH5	2441	2.8800	0.3072	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH1	2441	0.4050	0.1296	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass
DH3	2480	1.6600	0.2656	0.4000	Pass
DH1	2480	0.4050	0.1296	0.4000	Pass

### CH00-DH1



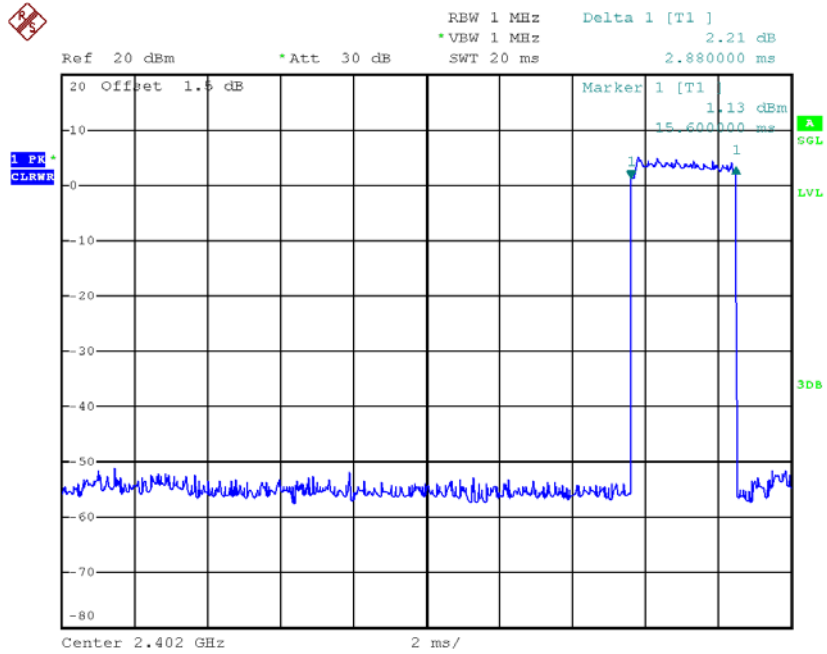
Date: 18.JUL.2018 19:11:00

### CH00-DH3



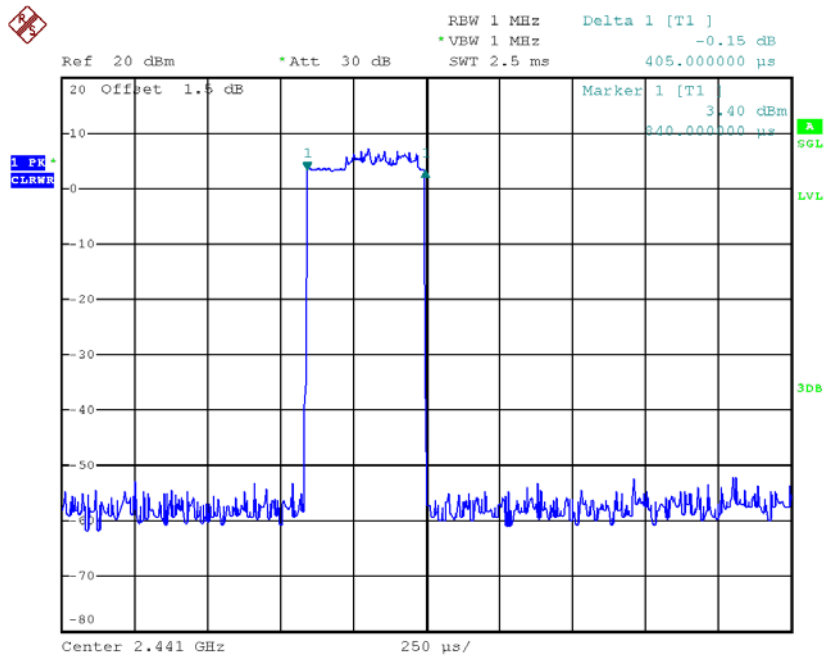
Date: 18.JUL.2018 19:02:16

### CH00-DH5



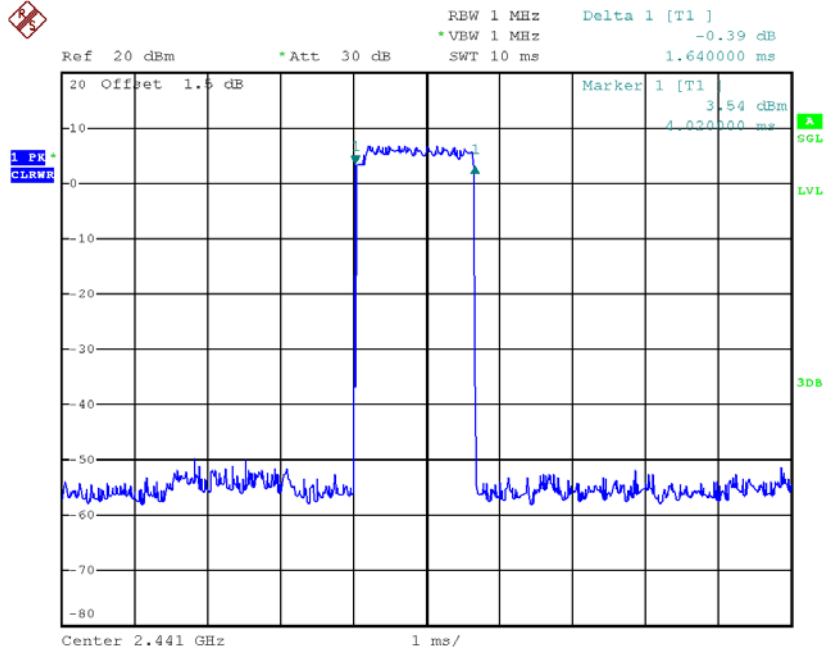
Date: 18.JUL.2018 19:04:43

### CH39-DH1



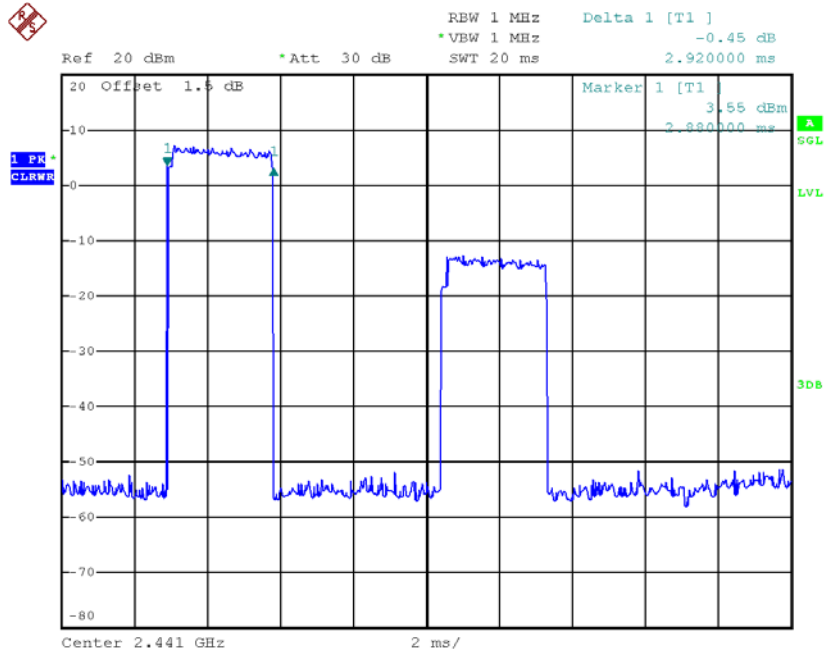
Date: 18.JUL.2018 19:11:33

### CH39-DH3



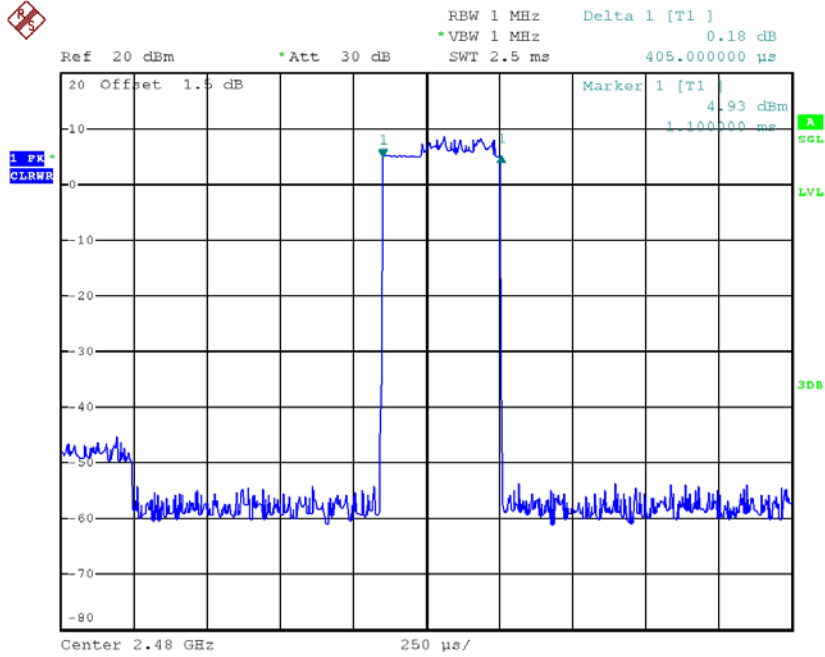
Date: 18.JUL.2018 19:09:15

### CH39-DH5



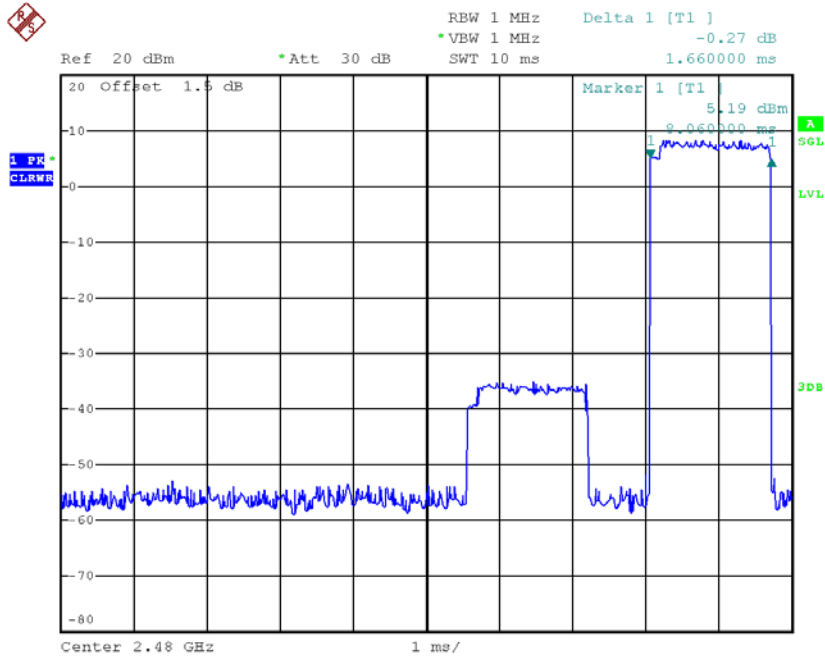
Date: 18.JUL.2018 19:06:36

### CH78-DH1



Date: 18.JUL.2018 19:11:41

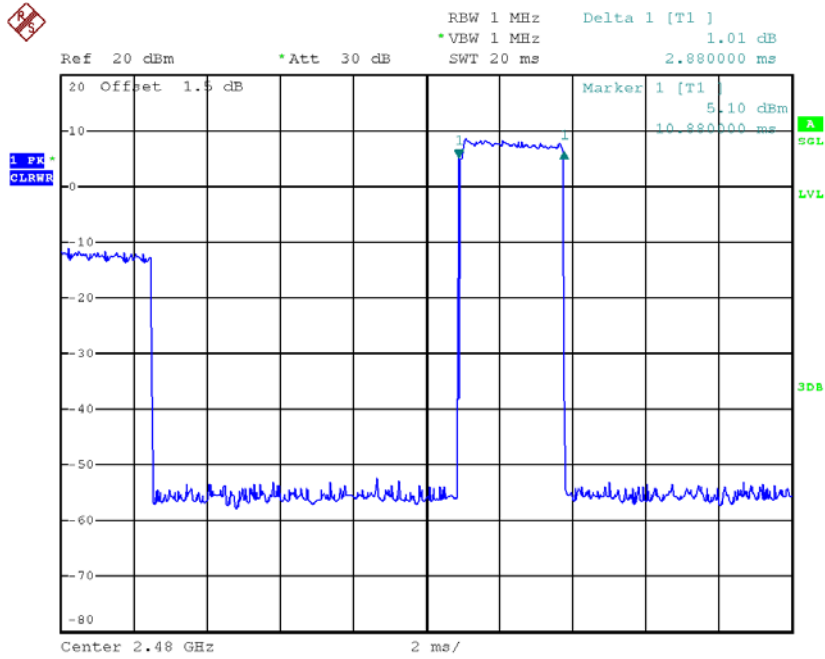
### CH78-DH3



Date: 18.JUL.2018 19:02:44



### CH78-DH5

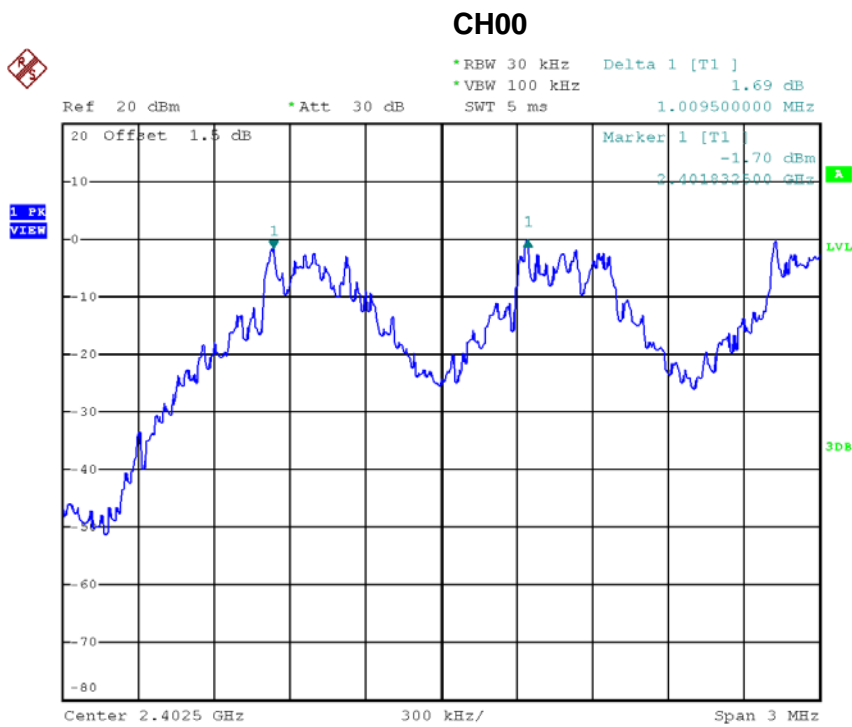


Date: 18.JUL.2018 19:08:02

## APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT

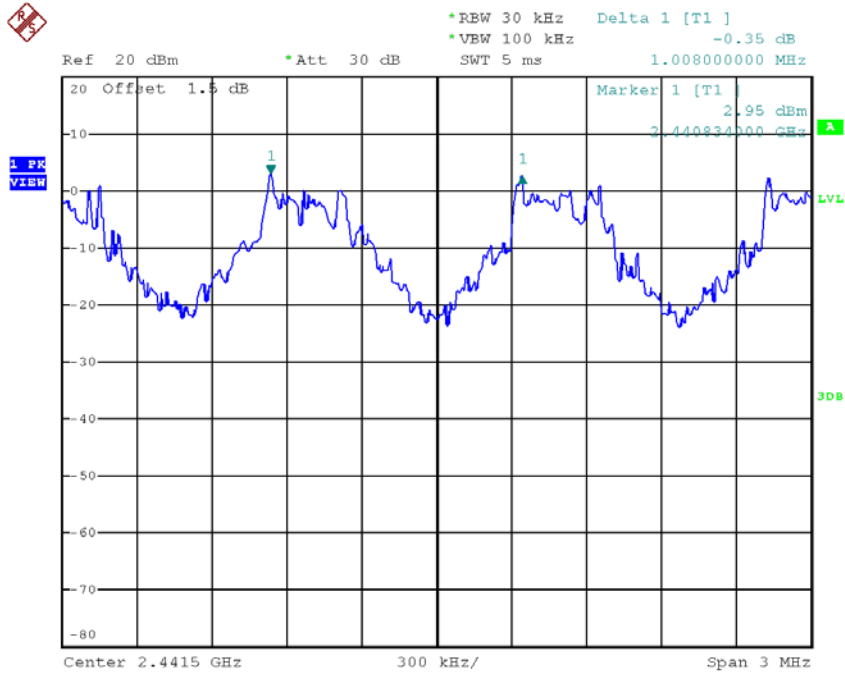
Test Mode : Hopping on \_1Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	1.010	0.615	Pass
2441	1.008	0.616	Pass
2480	0.990	0.612	Pass



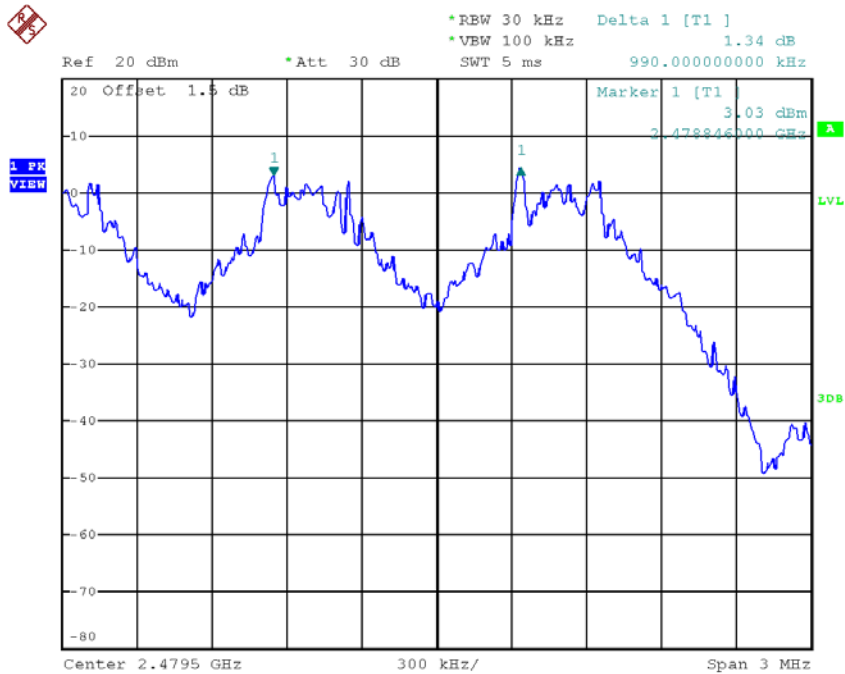
Date: 18.JUL.2018 18:01:18

### CH39



Date: 18.JUL.2018 18:02:22

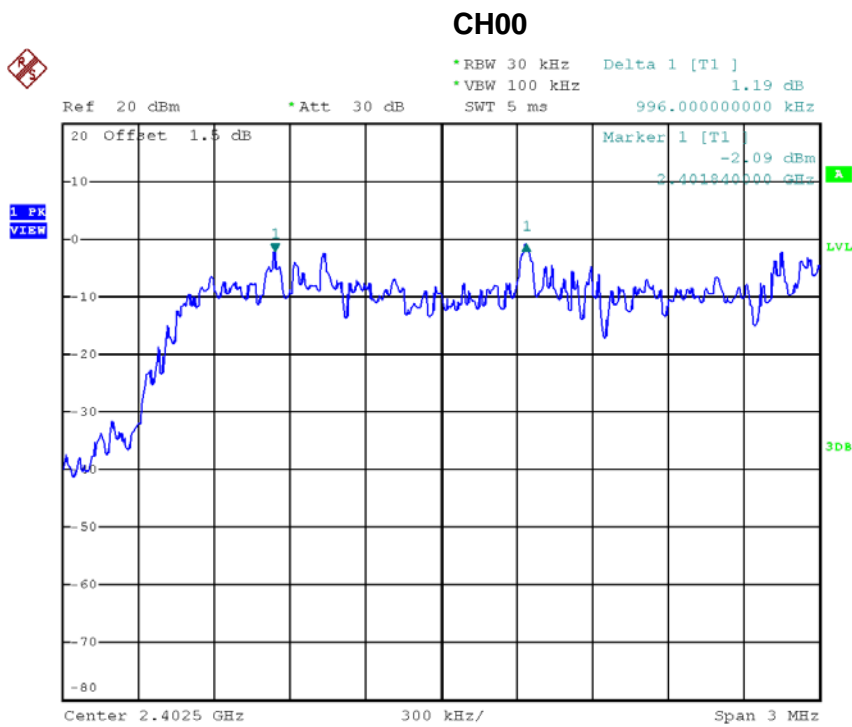
### CH78



Date: 18.JUL.2018 18:03:25

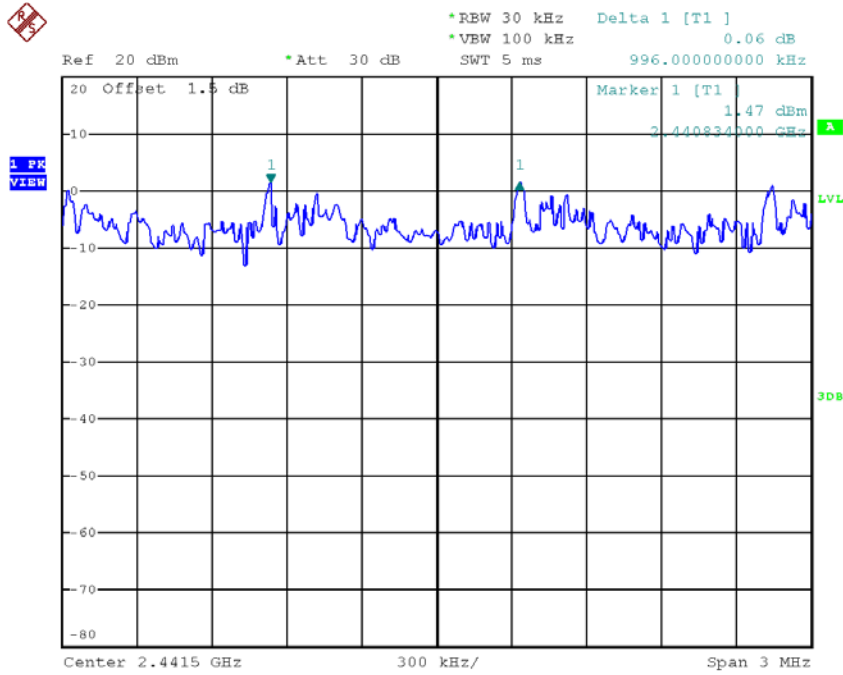
Test Mode : Hopping on \_3Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	0.996	0.892	Pass
2441	0.996	0.899	Pass
2480	0.996	0.874	Pass



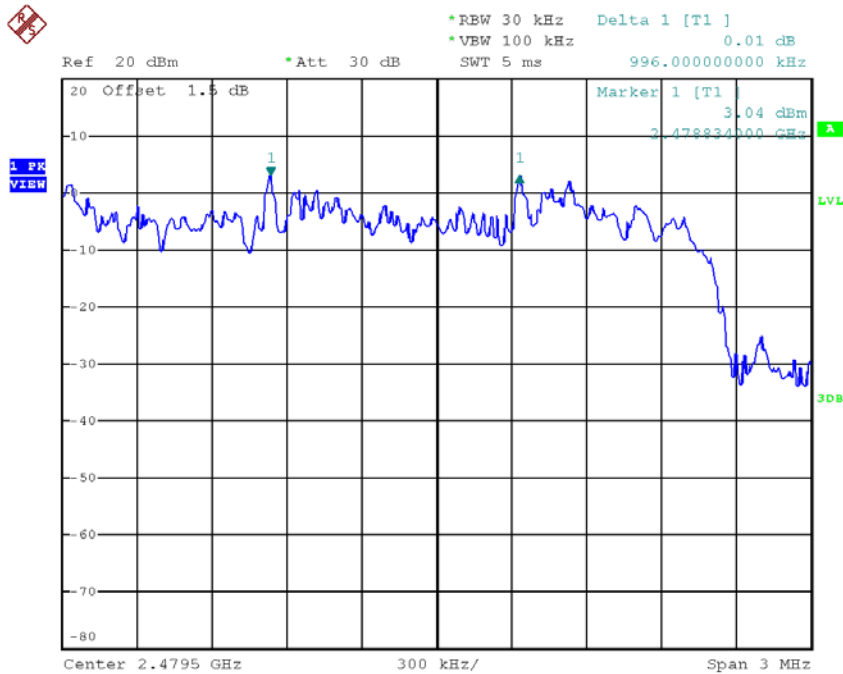
Date: 18.JUL.2018 18:56:01

### CH39



Date: 18.JUL.2018 18:57:06

### CH78

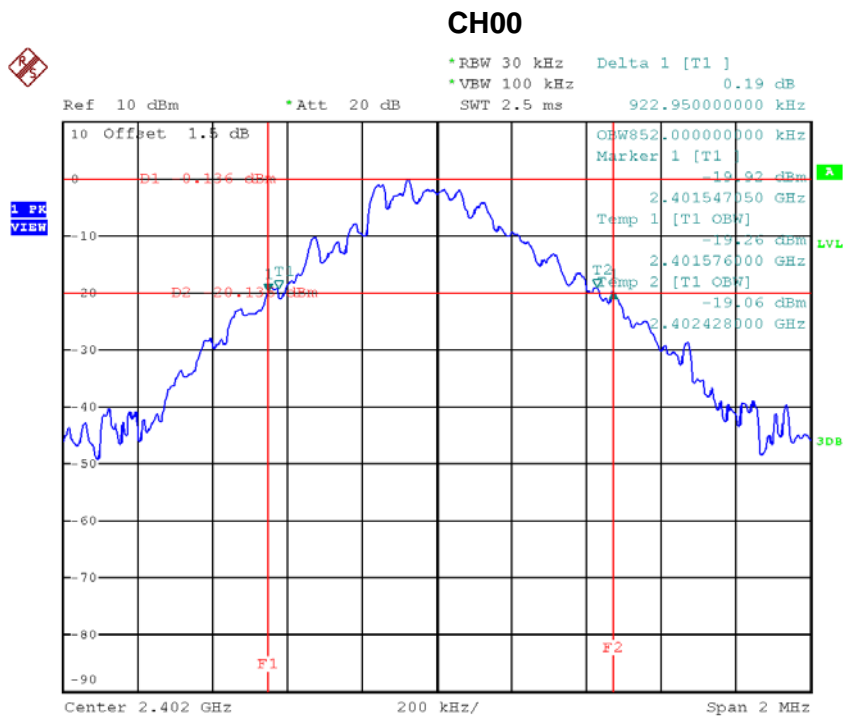


Date: 18.JUL.2018 18:58:10

## APPENDIX H - BANDWIDTH

Test Mode : TX Mode \_1Mbps

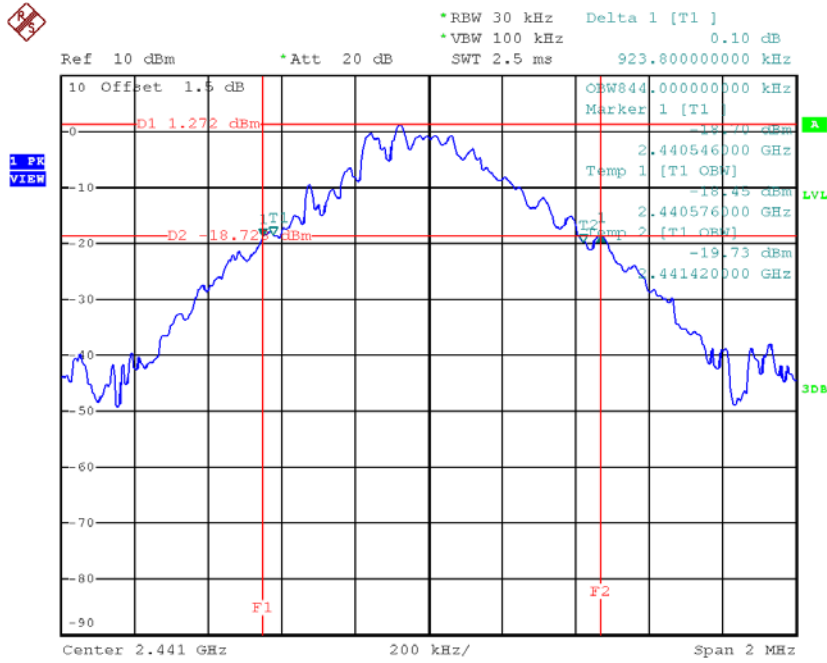
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	0.923	0.852	Pass
2441	0.924	0.844	Pass
2480	0.918	0.856	Pass



Date: 13.JUL.2018 13:51:22

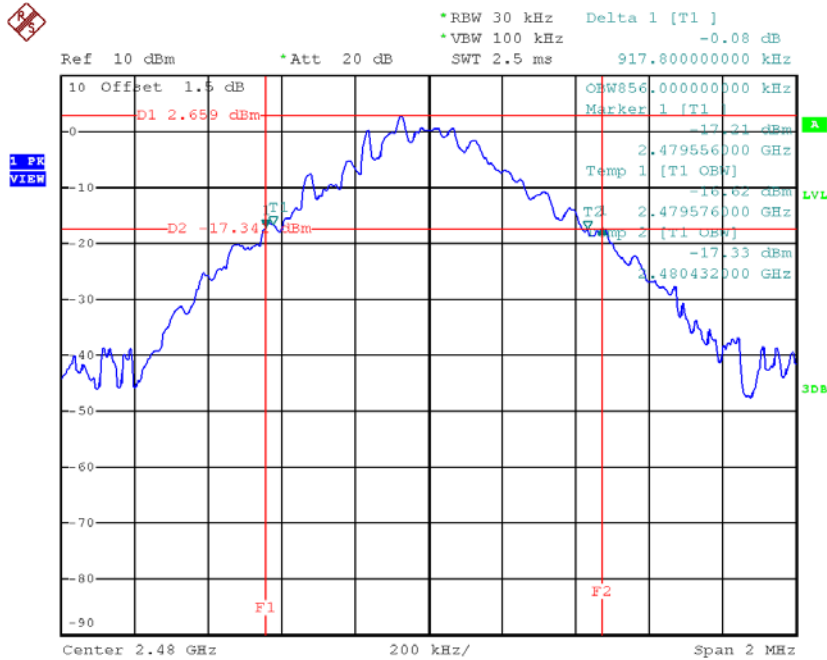


**CH39**



Date: 13.JUL.2018 13:53:22

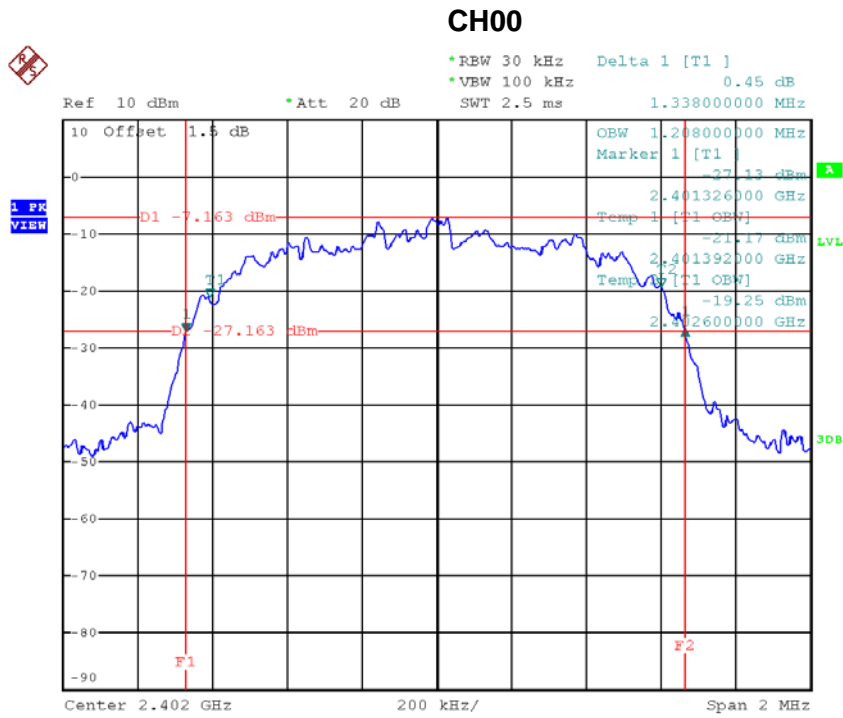
**CH78**



Date: 13.JUL.2018 13:54:39

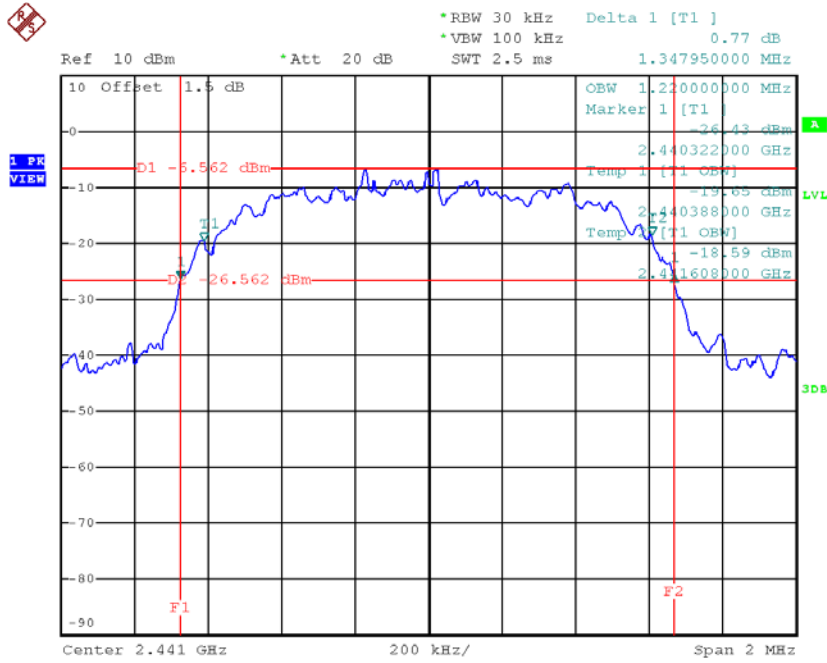
Test Mode : TX Mode\_3Mbps

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.338	1.208	Pass
2441	1.348	1.220	Pass
2480	1.311	1.220	Pass



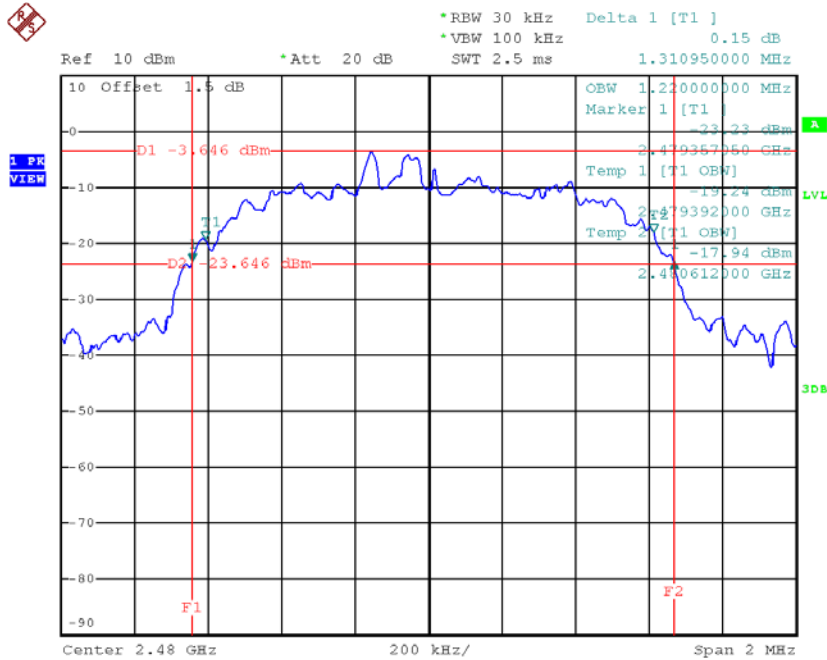
Date: 13.JUL.2018 14:50:40

**CH39**



Date: 13.JUL.2018 14:53:43

**CH78**

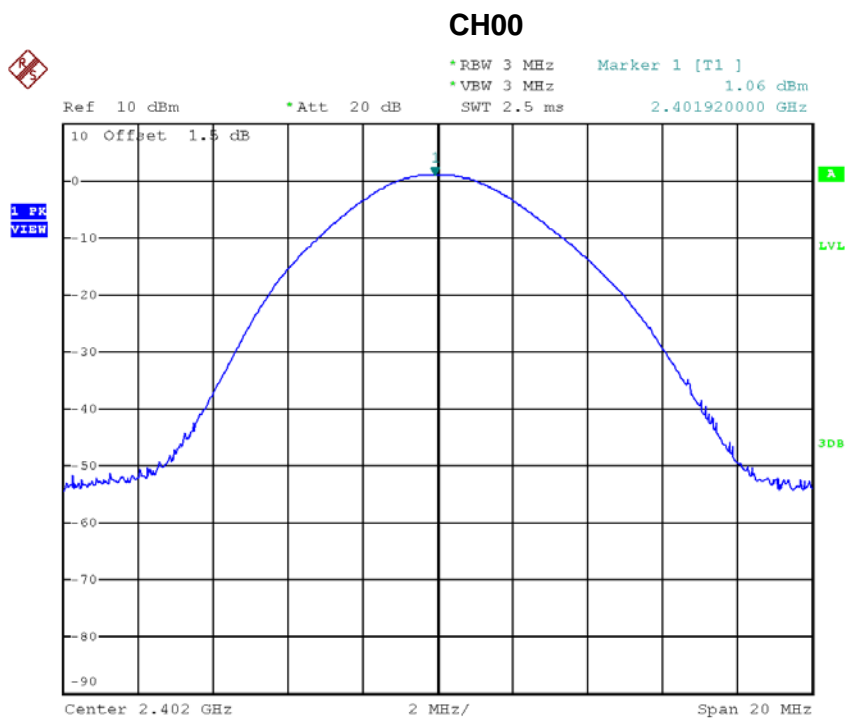


Date: 13.JUL.2018 14:55:42

## APPENDIX I - MAXIMUM OUTPUT POWER TEST

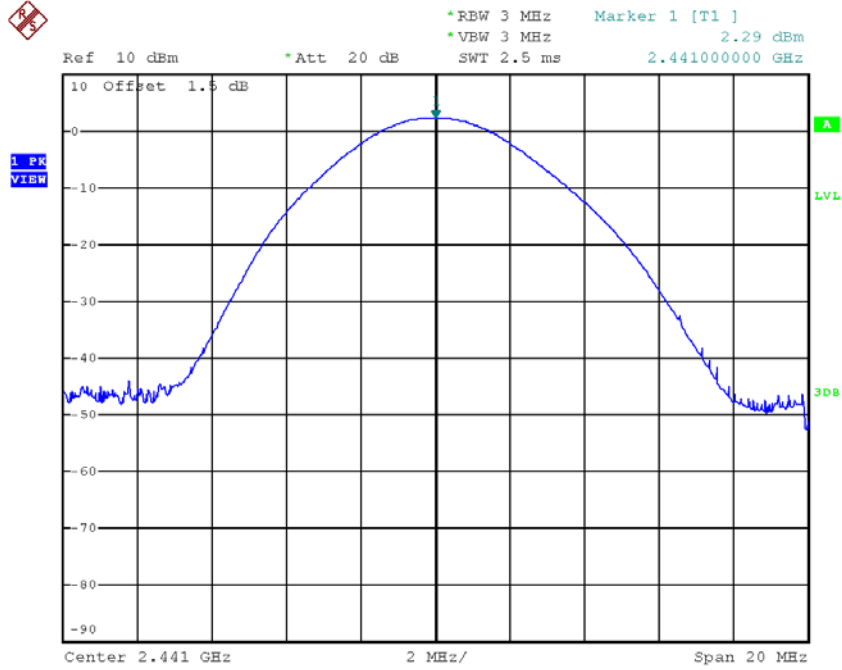
Test Mode : TX Mode \_1Mbps

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	1.06	0.0013	21.00	0.125	Pass
2441	2.29	0.0017	21.00	0.125	Pass
2480	3.67	0.0023	21.00	0.125	Pass



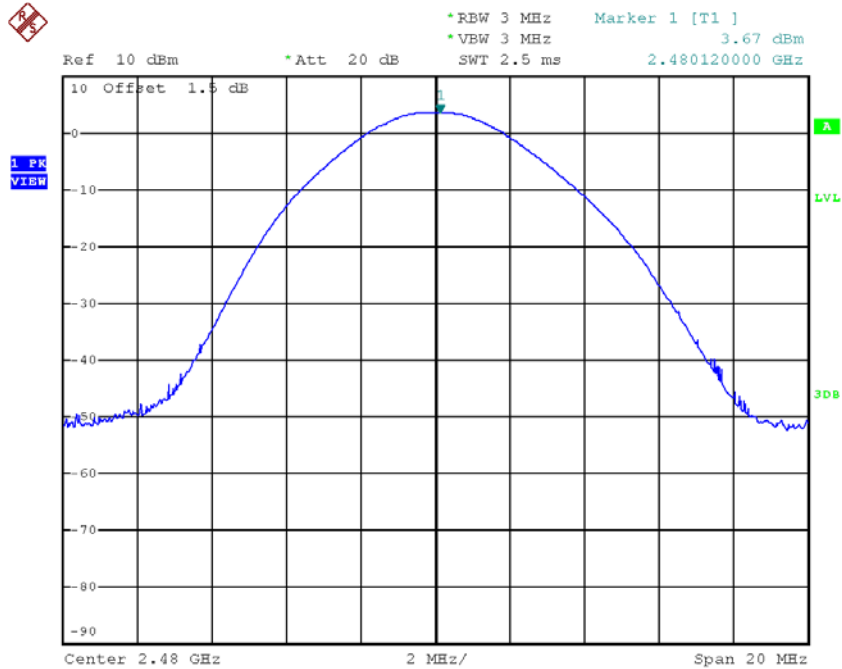
Date: 13.JUL.2018 13:47:32

### CH39



Date: 13.JUL.2018 13:49:23

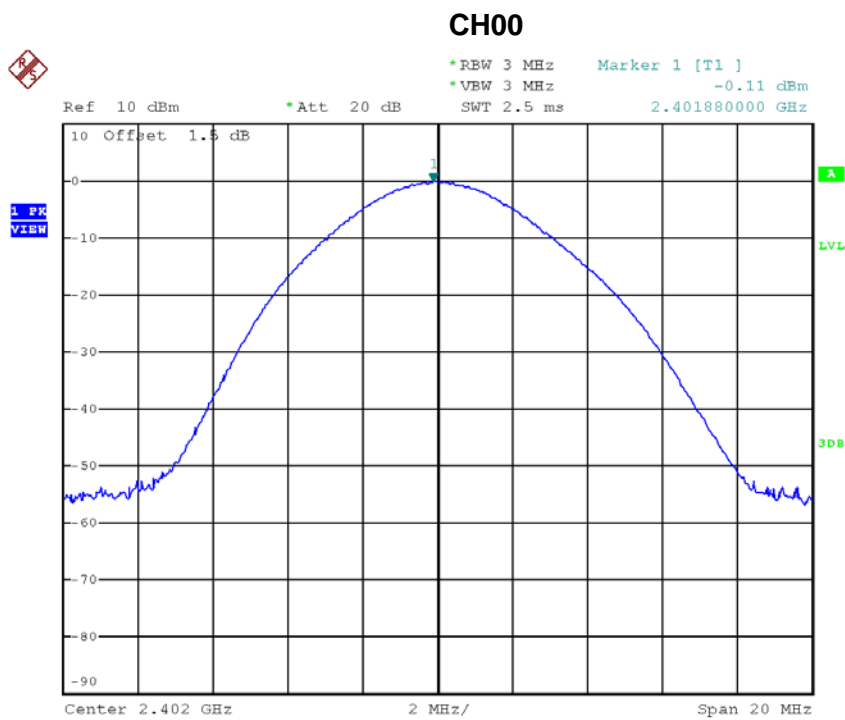
### CH78



Date: 13.JUL.2018 13:49:38

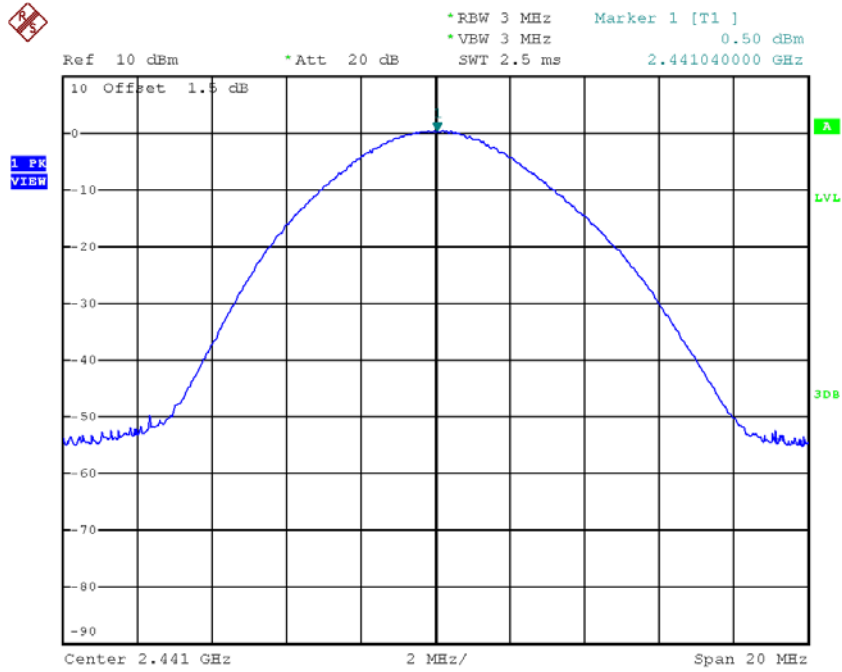
Test Mode : TX Mode \_3Mbps

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	-0.11	0.0010	21.00	0.125	Pass
2441	0.50	0.0011	21.00	0.125	Pass
2480	1.13	0.0013	21.00	0.125	Pass



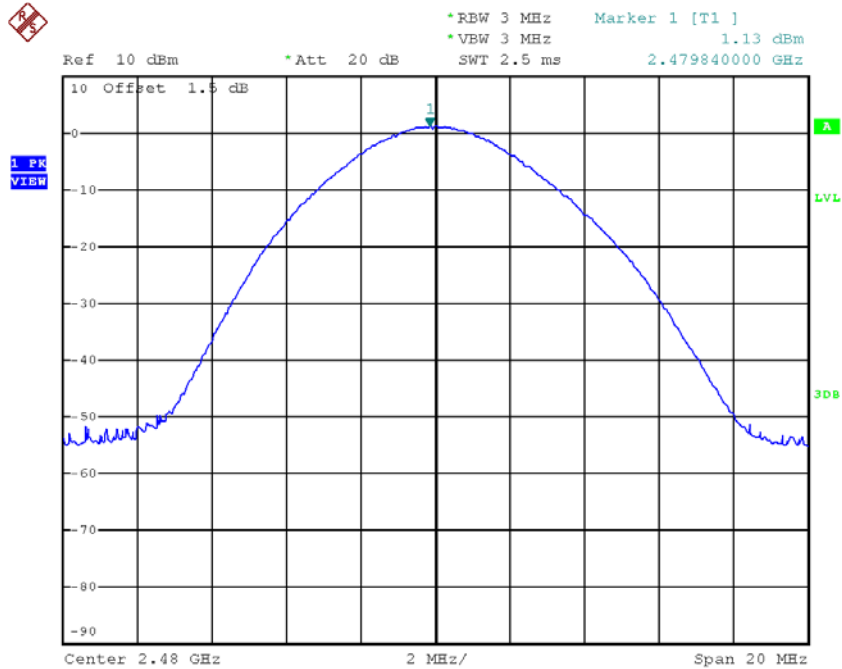
Date: 13.JUL.2018 14:49:49

### CH39



Date: 13.JUL.2018 14:52:43

### CH78

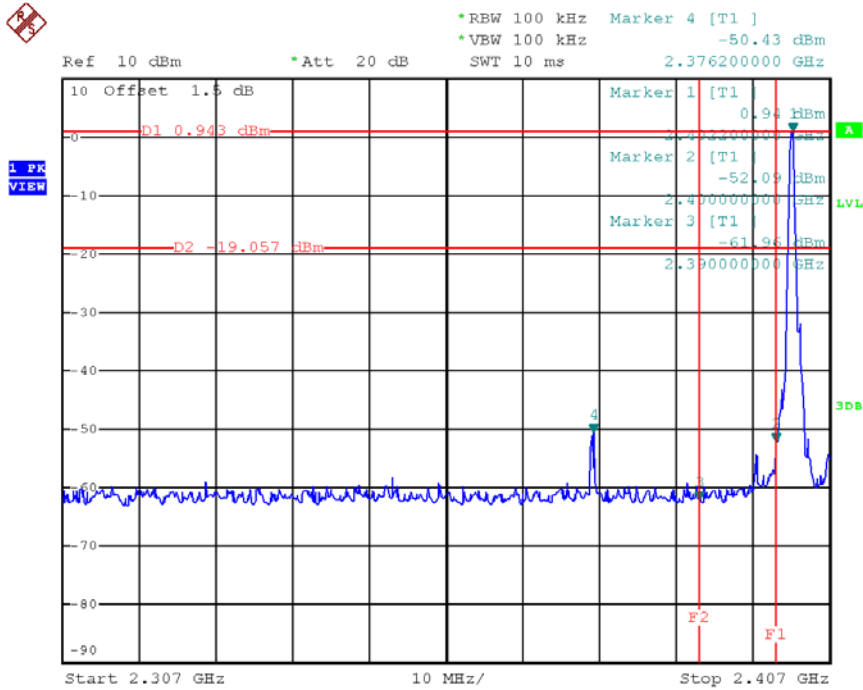


Date: 13.JUL.2018 14:55:01



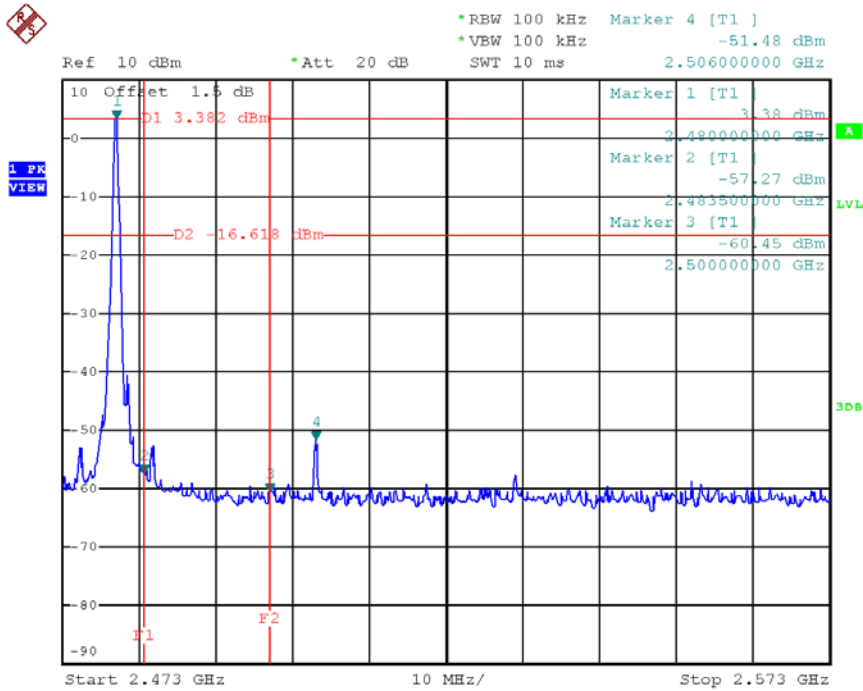
## APPENDIX J - ANTENNA CONDUCTED SPURIOUS EMISSION

### CH00 (Lower)\_1Mbps



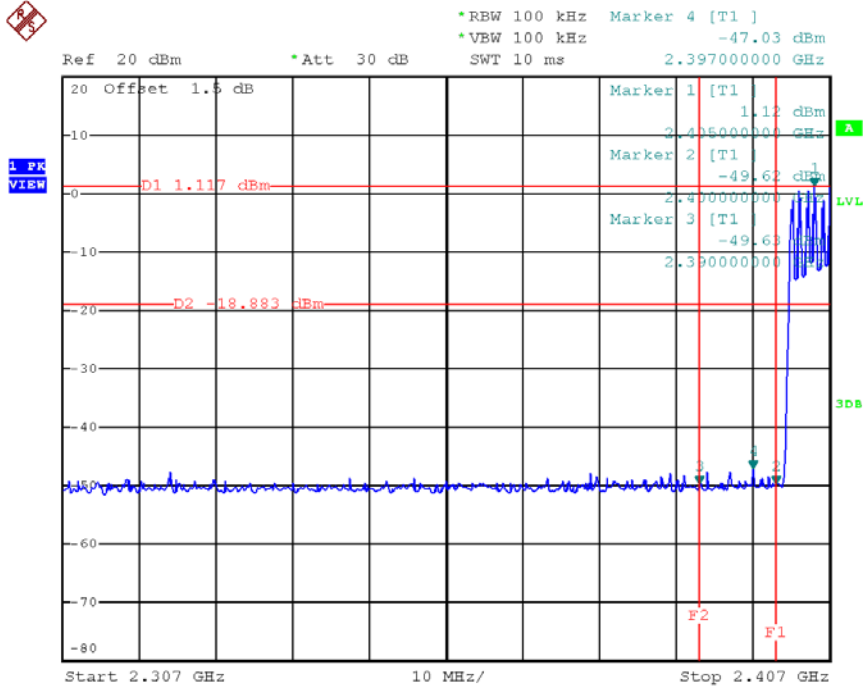
Date: 13.JUL.2018 13:50:43

### CH78 (Upper)\_1Mbps



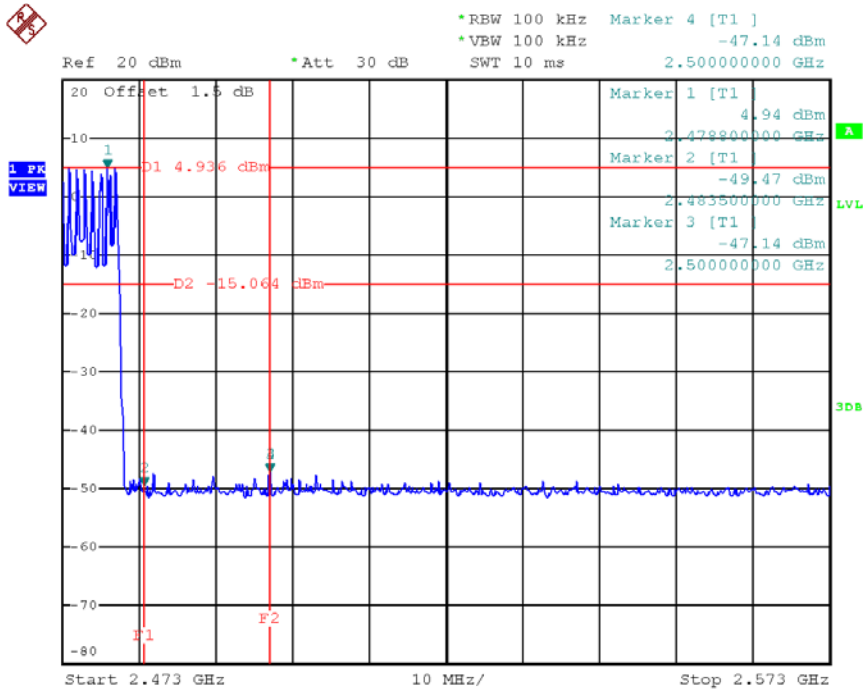
Date: 13.JUL.2018 13:54:00

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



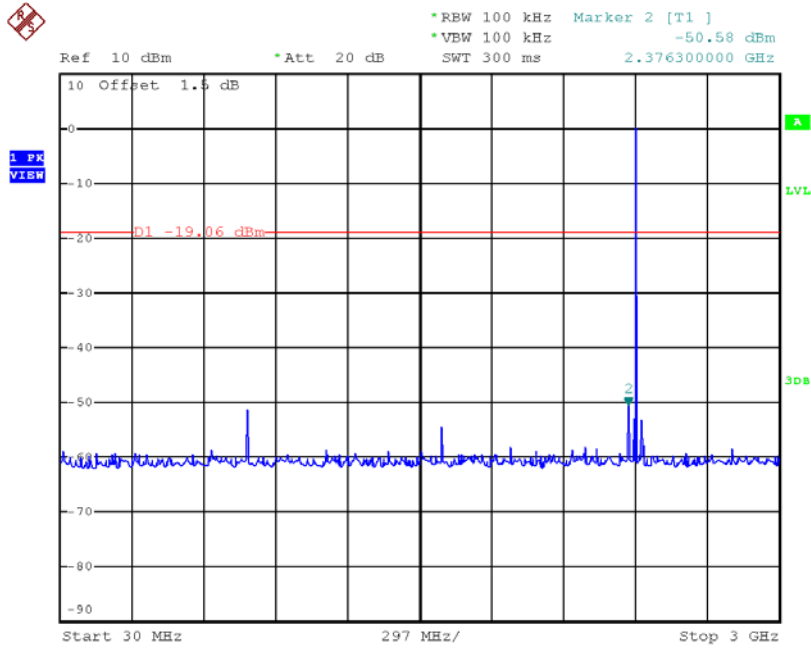
Date: 18.JUL.2018 18:52:59

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

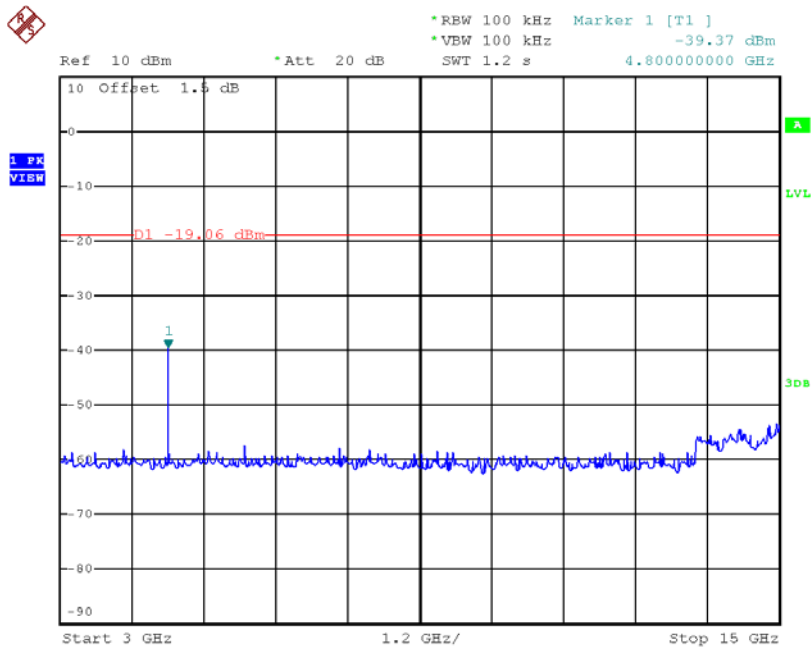


Date: 18.JUL.2018 18:06:40

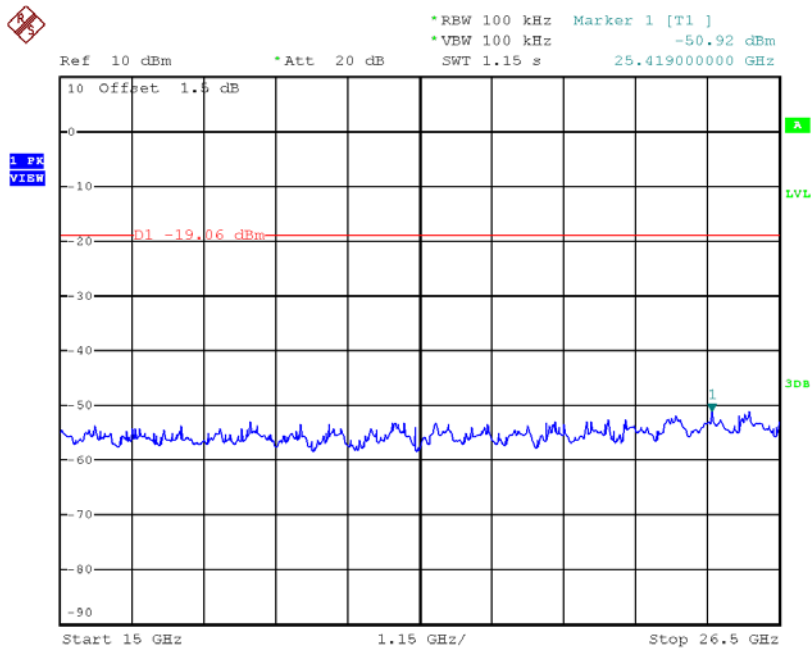
**CH00 (10 Harmonic of the frequency) \_1Mbps**



Date: 13.JUL.2018 13:51:35

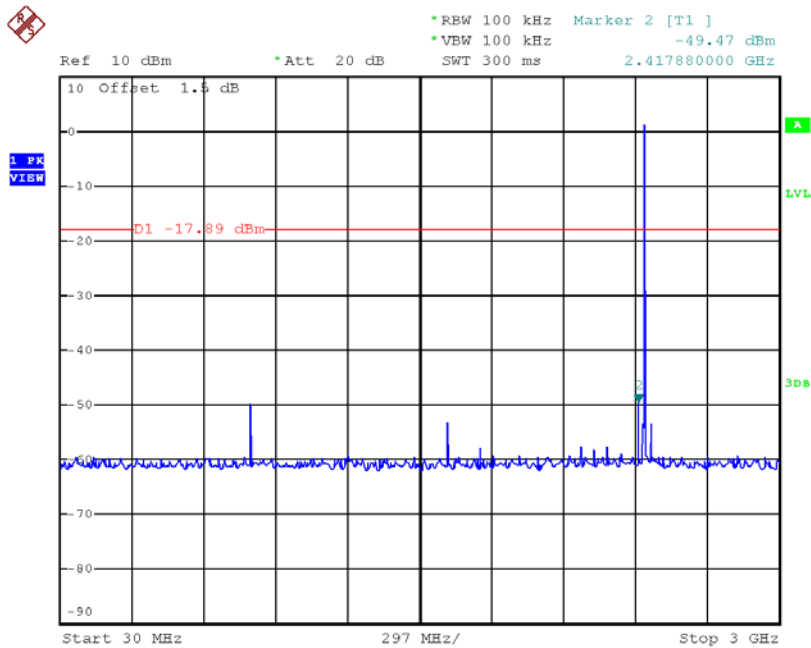


Date: 13.JUL.2018 13:51:42

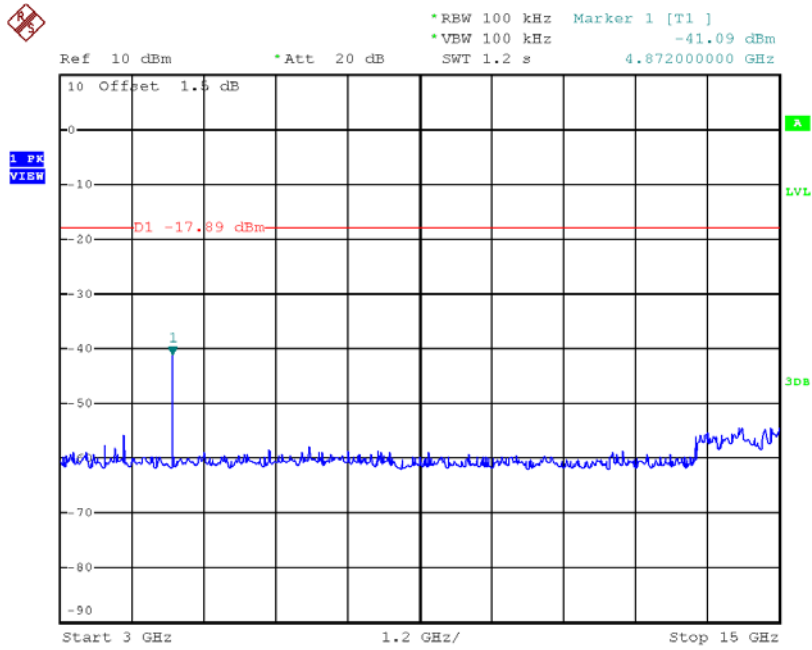


Date: 13.JUL.2018 13:51:49

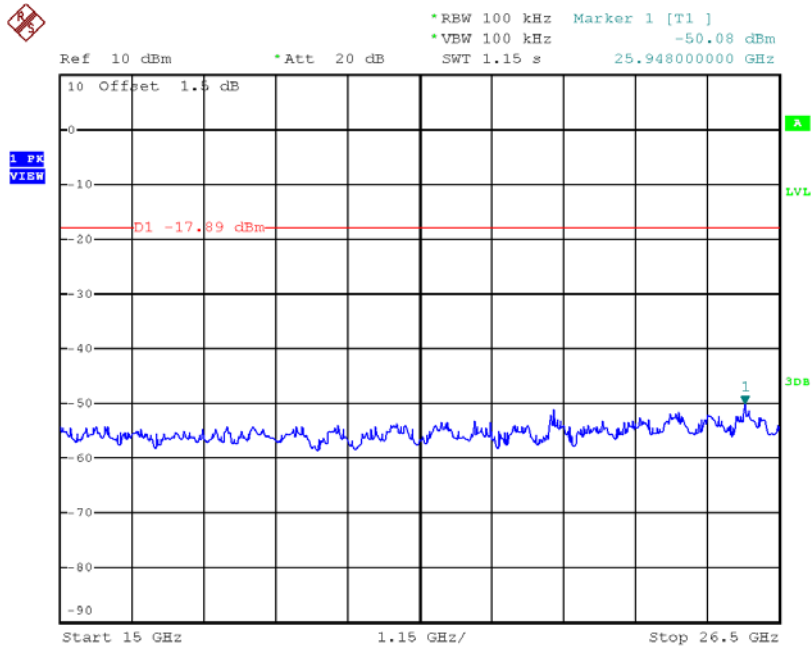
### CH39 (10 Harmonic of the frequency) \_1Mbps



Date: 13.JUL.2018 13:52:29

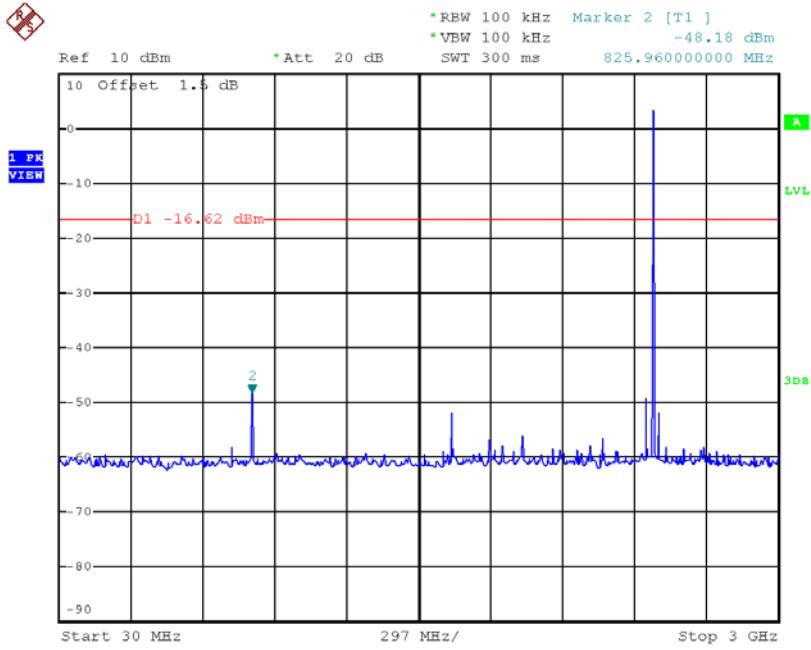


Date: 13.JUL.2018 13:52:36

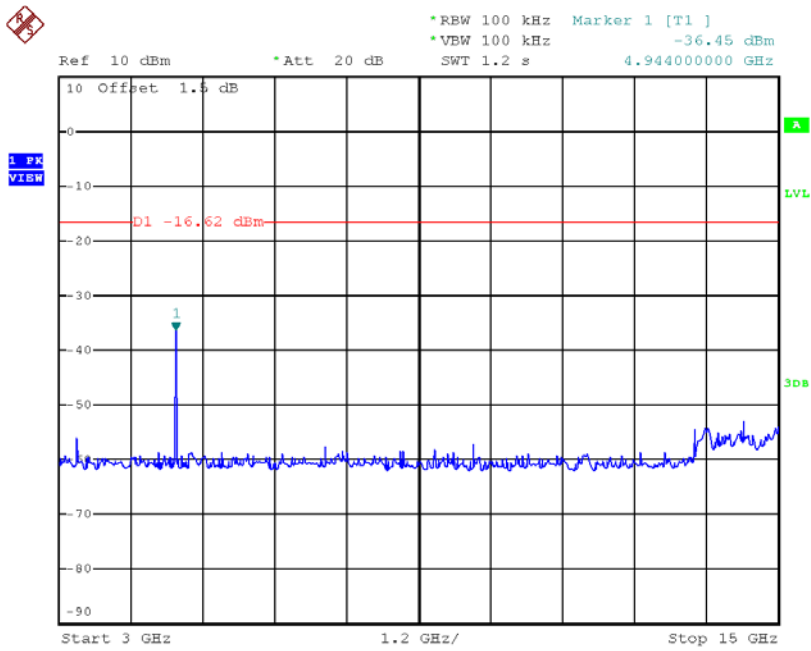


Date: 13.JUL.2018 13:52:43

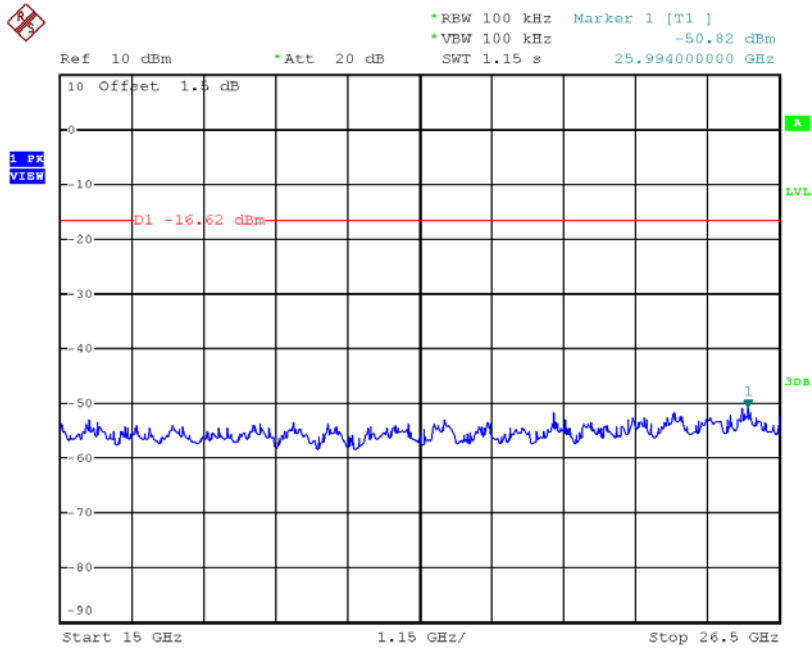
### CH78 (10 Harmonic of the frequency) \_1Mbps



Date: 13.JUL.2018 13:54:52



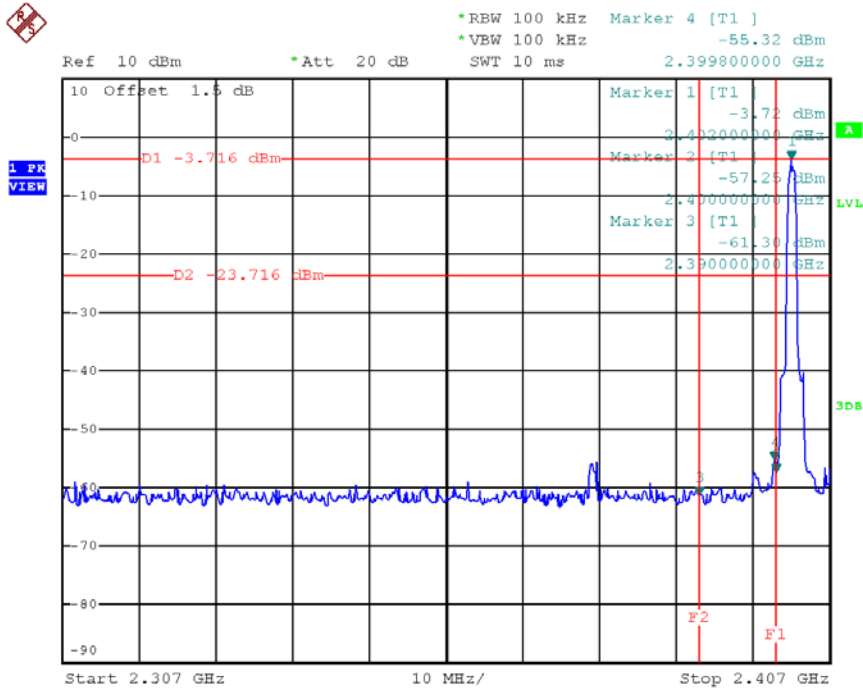
Date: 13.JUL.2018 13:54:59



Date: 13.JUL.2018 13:55:06

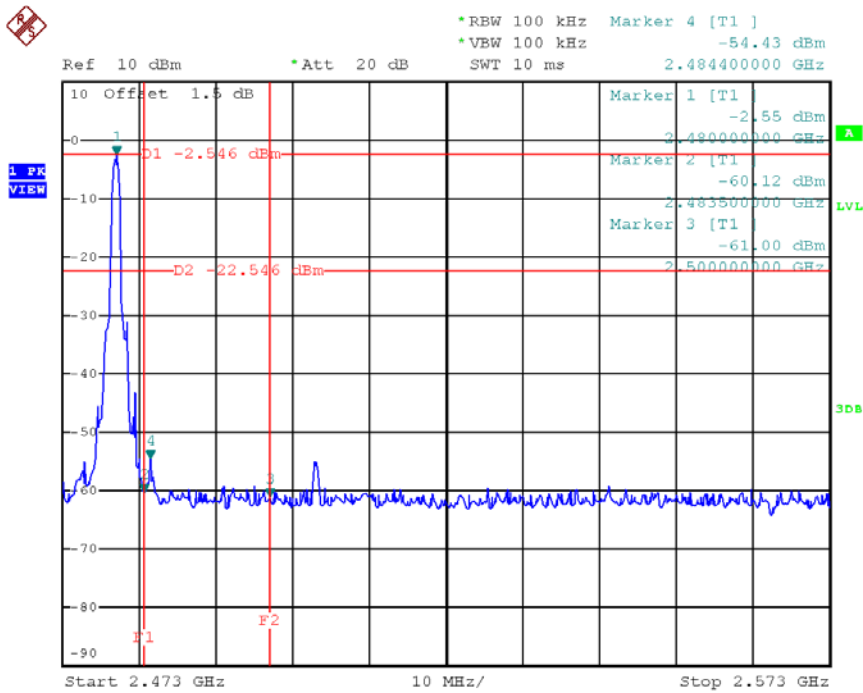


### CH00 (Lower) \_3Mbps



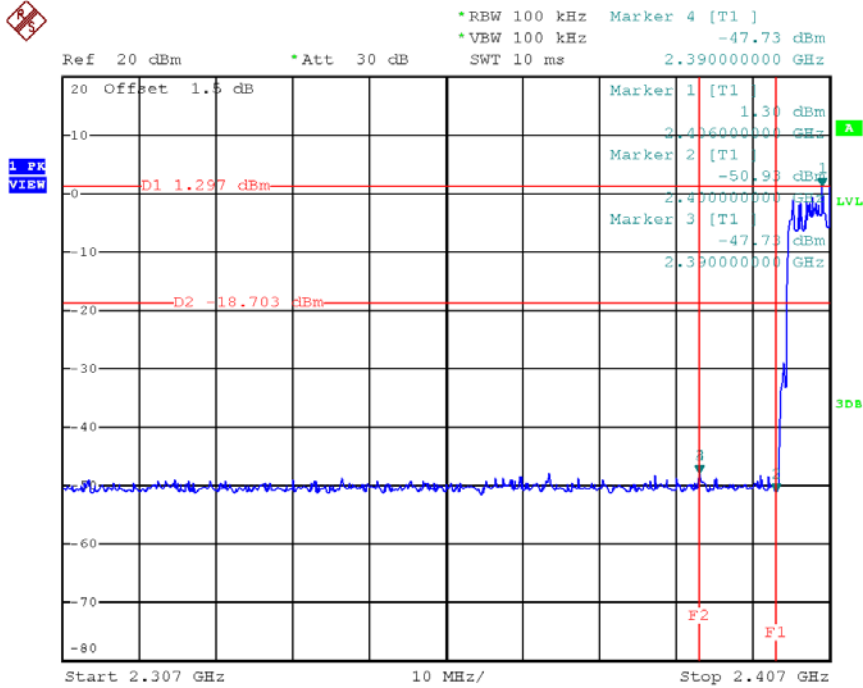
Date: 13.JUL.2018 14:50:13

### CH78 (Upper) \_3Mbps



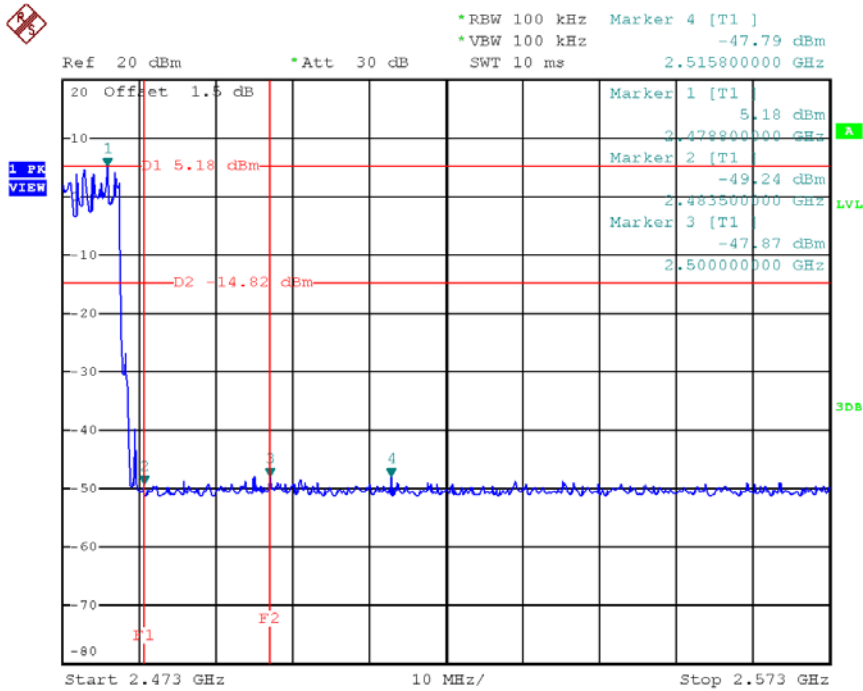
Date: 13.JUL.2018 14:55:08

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



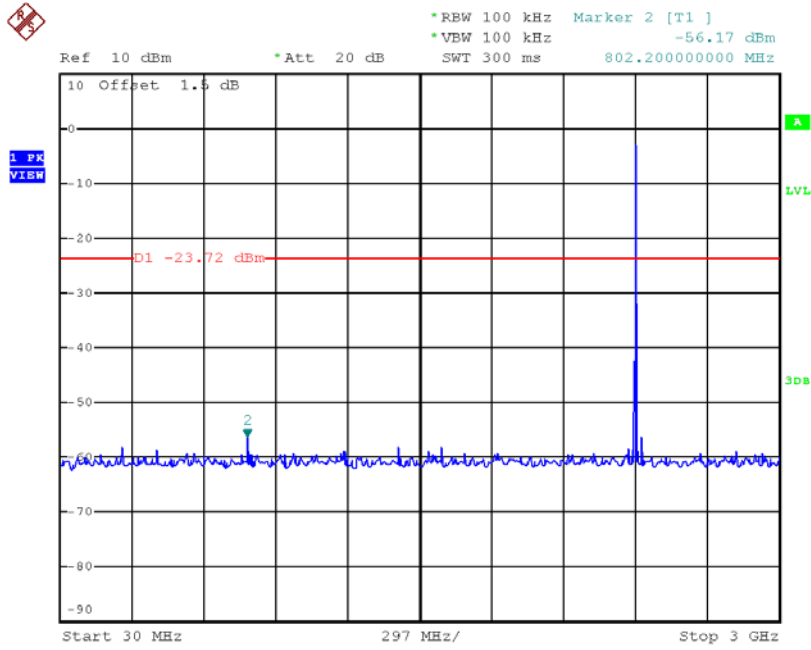
Date: 18.JUL.2018 19:00:36

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

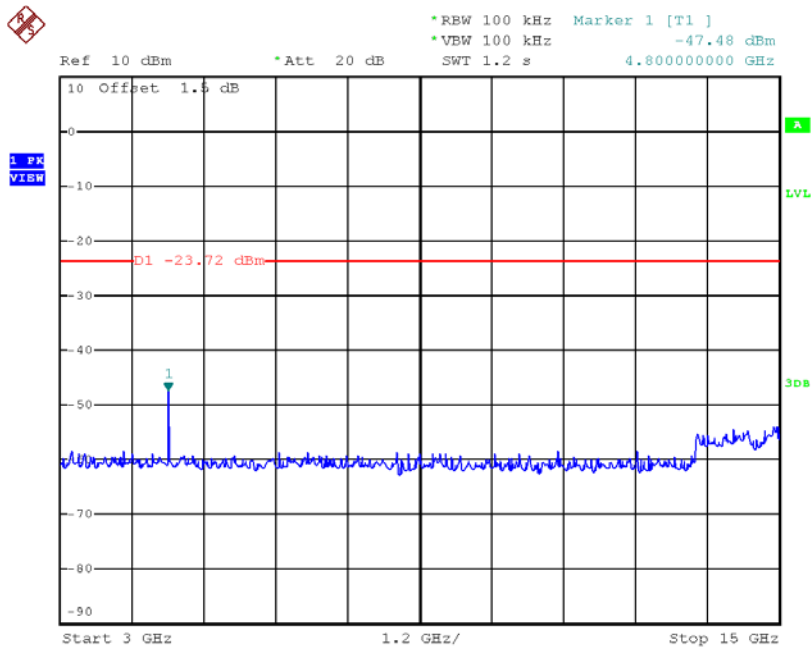


Date: 18.JUL.2018 19:01:11

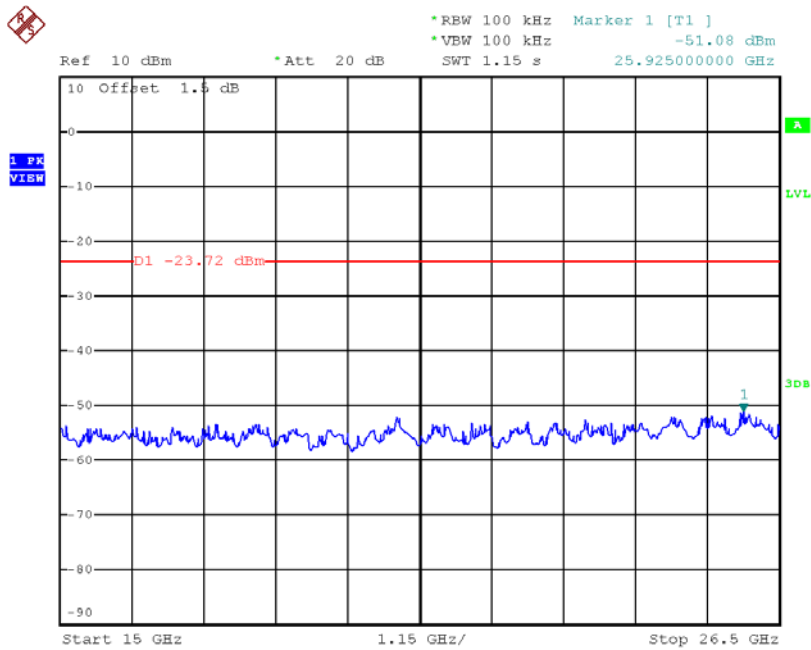
**CH00 (10 Harmonic of the frequency) \_3Mbps**



Date: 13.JUL.2018 14:50:53

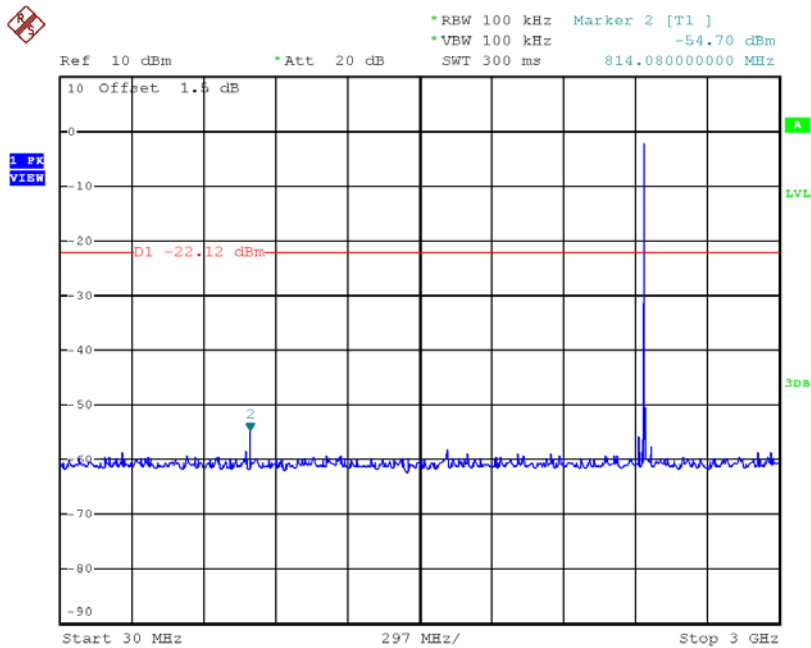


Date: 13.JUL.2018 14:51:00

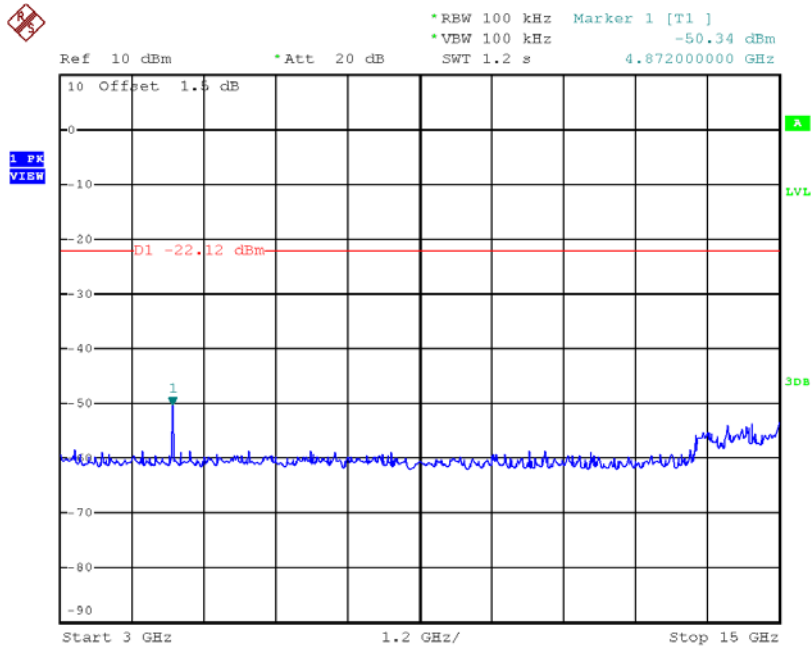


Date: 13.JUL.2018 14:51:07

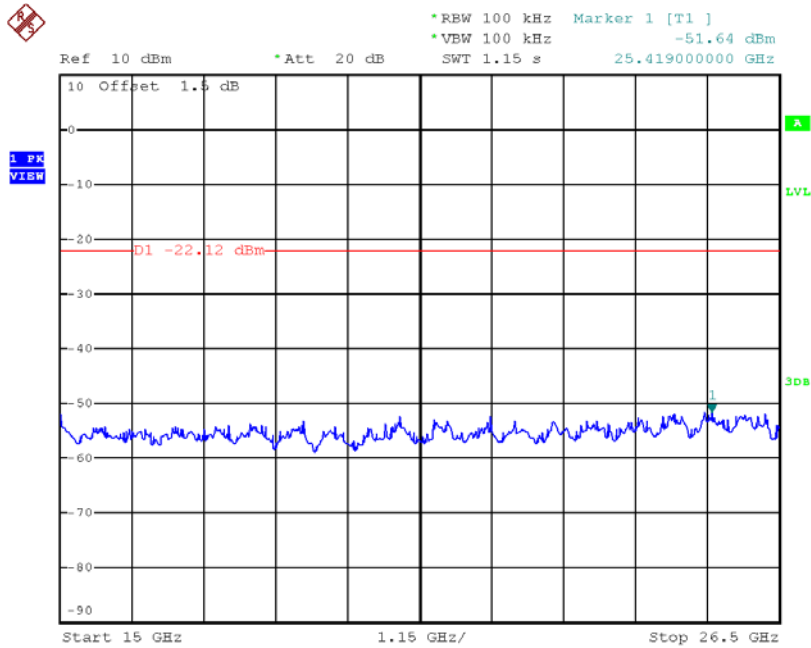
**CH39 (10 Harmonic of the frequency) \_3Mbps**



Date: 13.JUL.2018 14:53:03

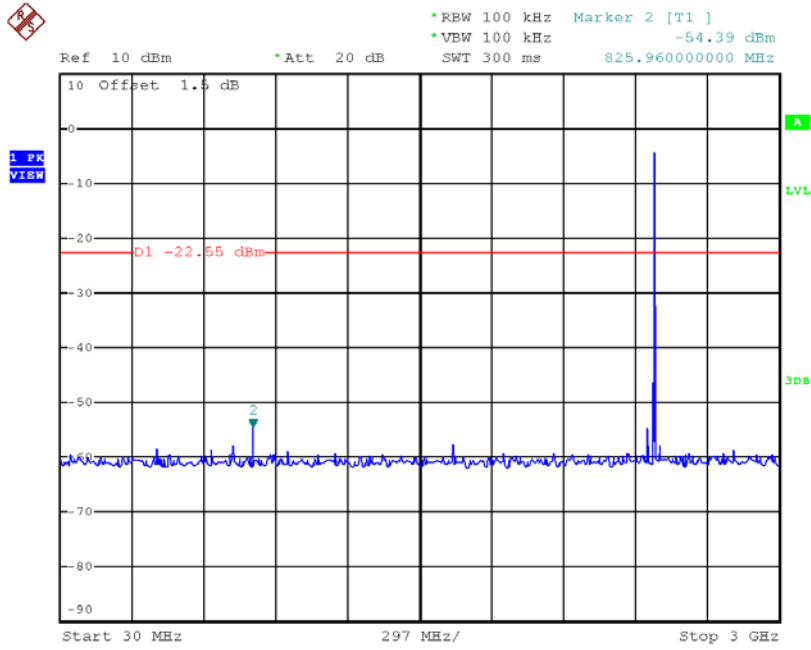


Date: 13.JUL.2018 14:53:10

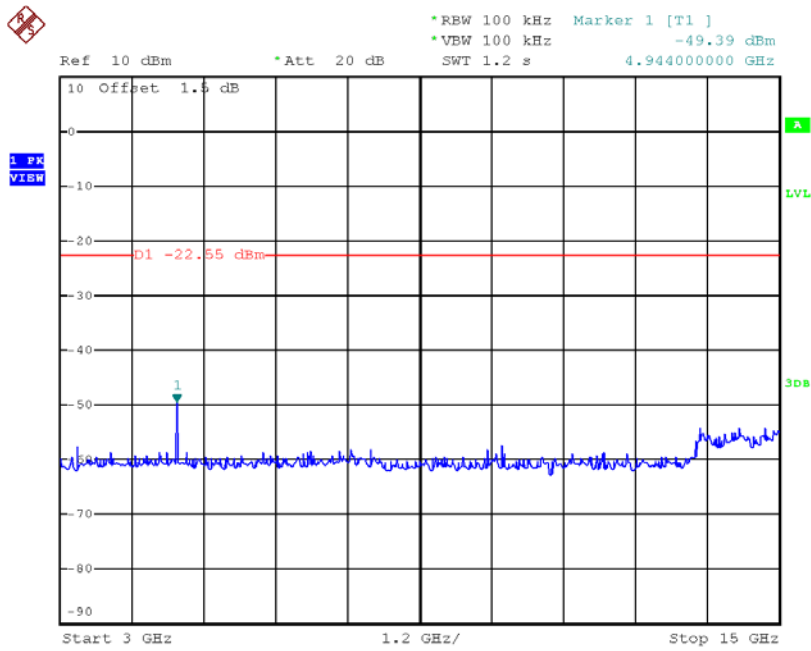


Date: 13.JUL.2018 14:53:17

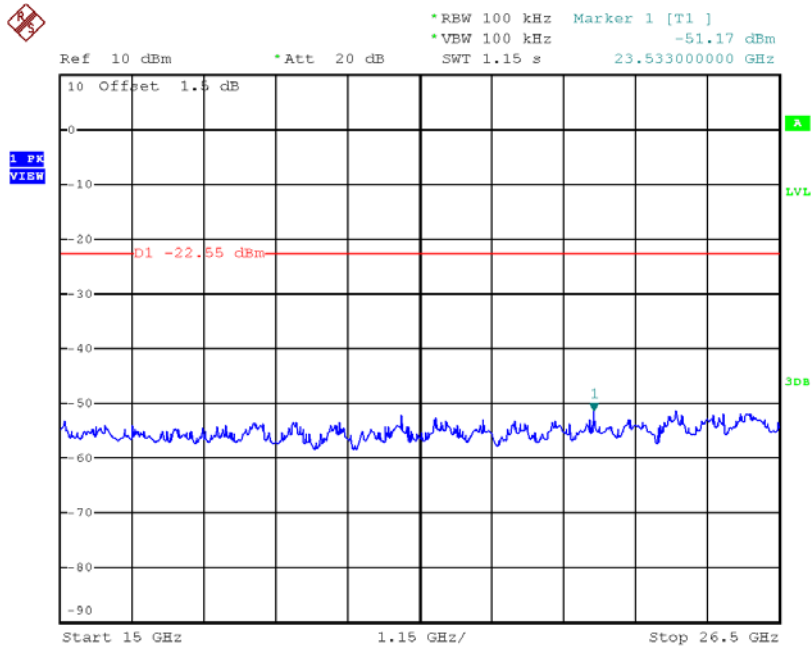
### CH78 (10 Harmonic of the frequency) \_3Mbps



Date: 13.JUL.2018 14:55:55



Date: 13.JUL.2018 14:56:03



Date: 13.JUL.2018 14:56:10