

# FCC Radio Test Report

## FCC ID: UFOOPH5000I

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

Project No. : 1611084  
Equipment : Handy Terminal with Bluetooth  
Test Model : OPH-5000i  
Series Mode : N/A  
Applicant : OPTOELECTRONICS CO.,LTD.  
Address : 12-17, Tsukagoshi 4-chome, Warabi, Saitama Pref.  
335-0002 Japan

Date of Receipt : Nov. 22, 2016  
Date of Test : Nov. 22, 2016 ~ Dec. 08, 2016  
Issued Date : Dec. 20, 2016  
Tested by : BTL Inc.

Testing Engineer

: Rush Kao  
(Rush Kao)

Technical Manager

: Jeff Yang  
(Jeff Yang)

Authorized Signatory

: Andy Chiu  
(Andy Chiu)

# B T L I N C .

B1, No. 37, Lane 365, Yang-Guang St.,  
Nei-Hu District, Taipei City 114, Taiwan.

TEL: +886-2-2657-3299 FAX: +886-2-2657-3331

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### **Limitation**

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

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1611084	Original Issue.	Dec. 20, 2016

## 1. CERTIFICATION

Equipment : Handy Terminal with Bluetooth  
Brand Name : OPTICON  
Test Model : OPH-5000i  
Series Model : N/A  
Applicant : OPTOELECTRONICS CO.,LTD.  
Manufacturer : OPTOELECTRONICS CO.,LTD.  
Address : 12-17, Tsukagoshi 4-chome, Warabi, Saitama Pref. 335-0002 Japan  
Factory : Hokkaido Electronic Industry Co.,Ltd.  
Address : 118-122 Kamiashibetsu-cho, Ashibetsu-shi, Hokkaido 079-1371 Japan.  
Date of Test : Nov. 22, 2016 ~ Dec. 08, 2016  
Test Sample : Engineering Sample  
Standard(s) : FCC Part15, Subpart C (15.247)/ ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1611084) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

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

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15, Subpart C (15.247)			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)	Hopping Channel Separation	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.247 (b)(1)	Peak Output Power	PASS	
15.247(d) 15.209	Radiated Spurious Emission	PASS	
15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS	
15.247 (a)(1)(iii)	Dwell Time	PASS	
15.205	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:

#### Conducted emission Test:

**C05:** (VCCI RN: C-4742; FCC RN:674415; FCC DN:TW0659)  
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

#### Radiated emission Test (Below 1GHz):

**CB15:** (FCC RN:674415; FCC DN:TW0659)  
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

#### Radiated emission Test (Above 1GHz):

**CB15:** (FCC RN:674415; FCC DN:TW0659)  
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan



## 2.2 MEASUREMENT UNCERTAINTY

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

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

### A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)
C05	CISPR	150 kHz ~ 30MHz	3.06

### B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)
CB11 (3m)	CISPR	9kHz ~ 150kHz	2.66
		150kHz ~ 30MHz	2.42

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB15 (3m)	CISPR	30MHz ~ 200MHz	V	4.76
		30MHz ~ 200MHz	H	4.28
		200MHz ~ 1,000MHz	V	5.08
		200MHz ~ 1,000MHz	H	4.50

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB15 (3m)	CISPR	1GHz ~ 6GHz	V	4.48
		1GHz ~ 6GHz	H	4.50

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB15 (1m)	CISPR	6GHz ~ 18GHz	V	4.30
		6GHz ~ 18GHz	H	4.14

Test Site	Method	Measurement Frequency Range	U, (dB)
CB15 (1m)	CISPR	18 ~ 26.5GHz	5.28

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our  $U_{lab}$  values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called  $U_{CISPR}$ , as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz : 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz : 5.2 dB

It can be seen that our  $U_{lab}$  values are smaller than  $U_{CISPR}$ .

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	Handy Terminal with Bluetooth	
Brand Name	OPTICON	
Test Model	OPH-5000i	
Series Model	N/A	
Model Difference	N/A	
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.	4.65 dBm(1Mbps) 2.22 dBm(3Mbps)
Power Source	#1 Supplied from USB port. #2 Supplied from battery.	
Power Rating	#1 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	OPTICON	N/A	PCB	N/A	-5.47	

### 3.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX Mode <b>Note (1)</b>
Mode 2	Bluetooth

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 2	Bluetooth

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

**Note:**

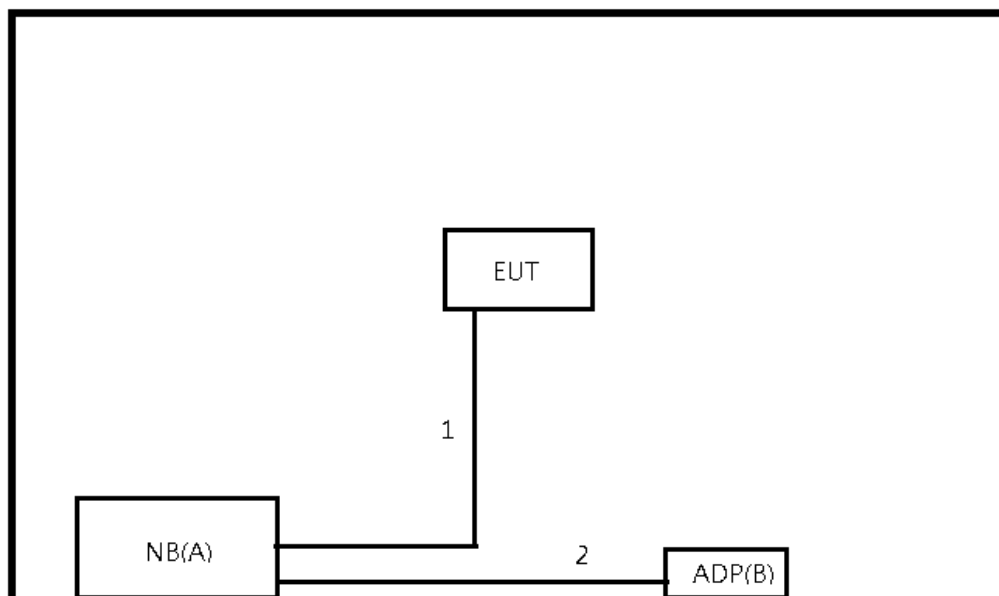
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

### 3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

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

Test Software Version	Barcode		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	max	max	max
Parameters(3Mbps)	max	max	max

### 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.	Note
A	Notebook PC	Acer	M52351	DOC	NXV7JTA005334043D42000	
B	Adapter	N/A	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.5m	USB Cable
2	NO	NO	1.5m	Power 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 (dBμV)	
	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

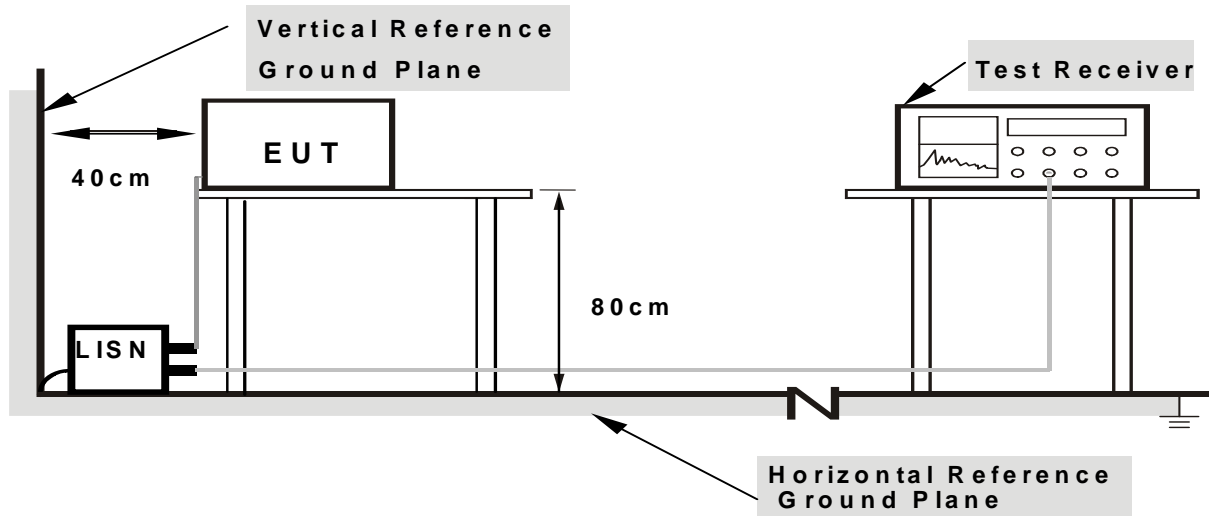
#### 4.1.2 TEST PROCEDURE

- 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 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: 25°C  
Relative Humidity: 55%  
Test Voltage: DC 5V

#### 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), then the 15.209(a) 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:

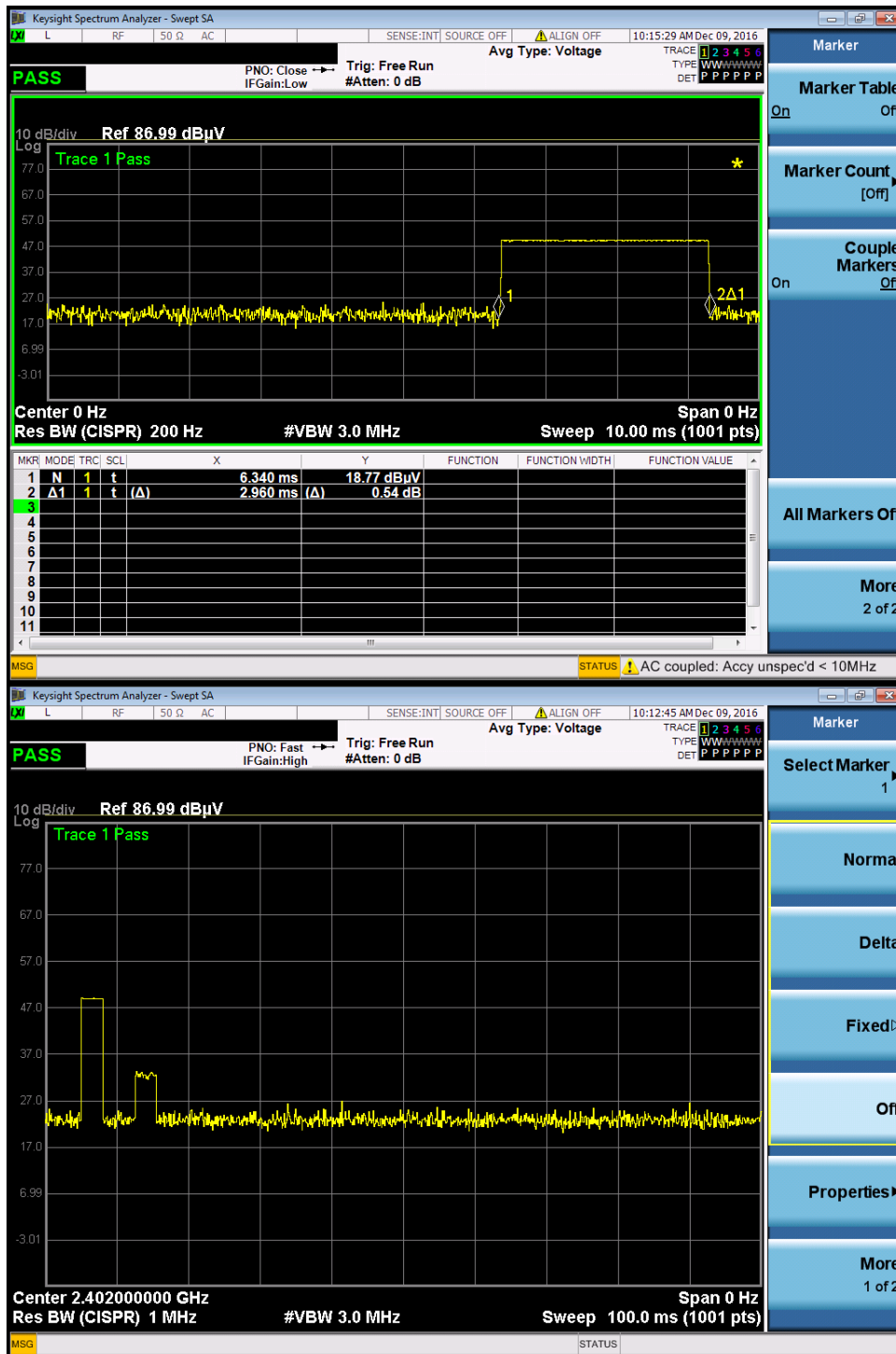
- (1) The limit for radiated test was performed according to FCC PART 15C/RSS-247.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correct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

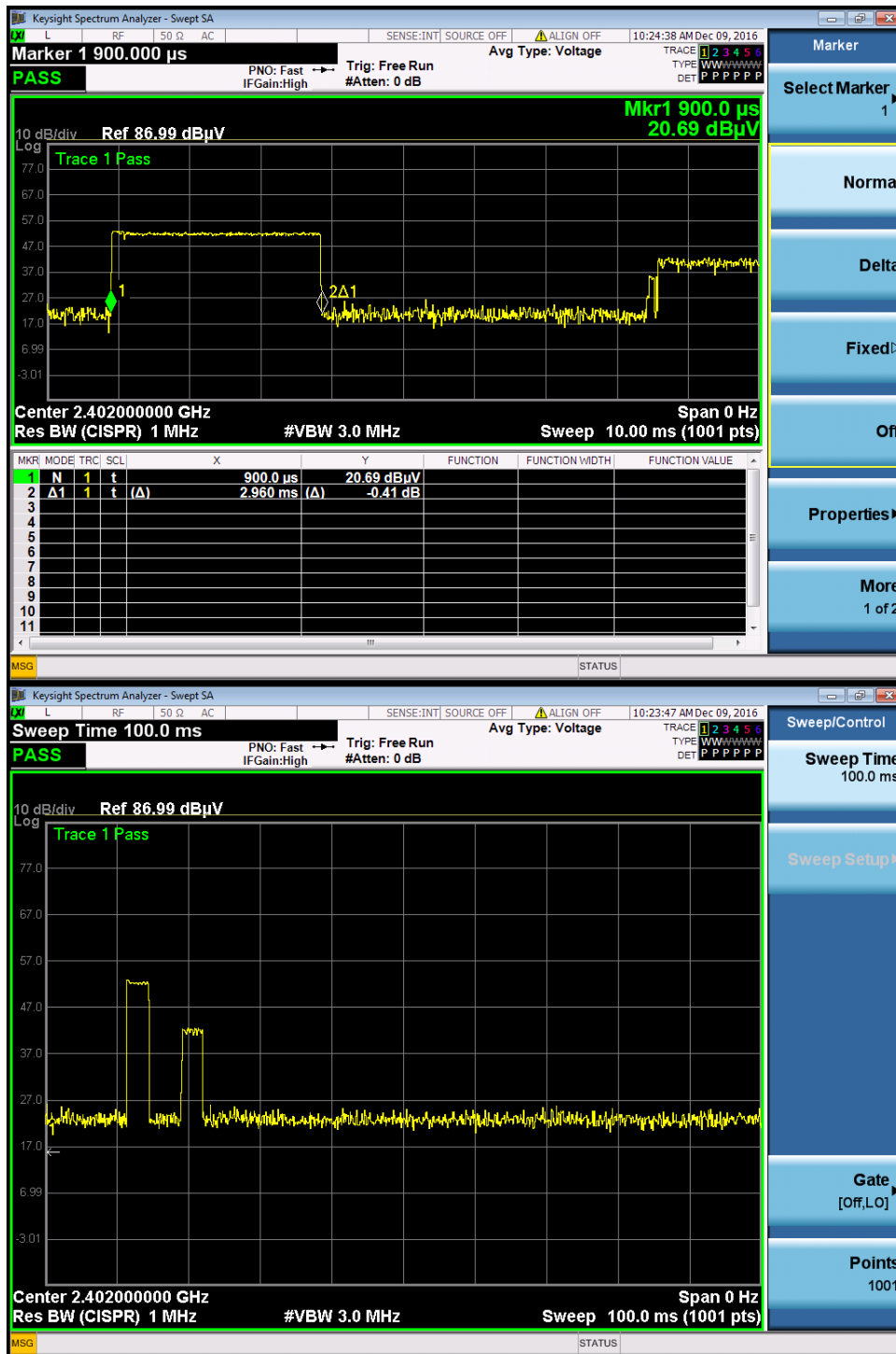
# 1Mbps



$$20\log(\text{Dwell Time}/100\text{ms})=20\log(\text{Time On}*\text{Number of hopping}/100\text{ms})$$

Time On(ms)	Number of hopping	Dwell Time	20log(Dwell Time/100ms)
2.96	2	5.92	-24.55

### 3Mbps



20log(Dwell Time/100ms)=20log(Time On*Number of hopping/100ms)			
Time On(ms)	Number of hopping	Dwell Time	20log(Dwell Time/100ms)
2.96	2	5.92	-24.55

#### **4.2.2 TEST PROCEDURE**

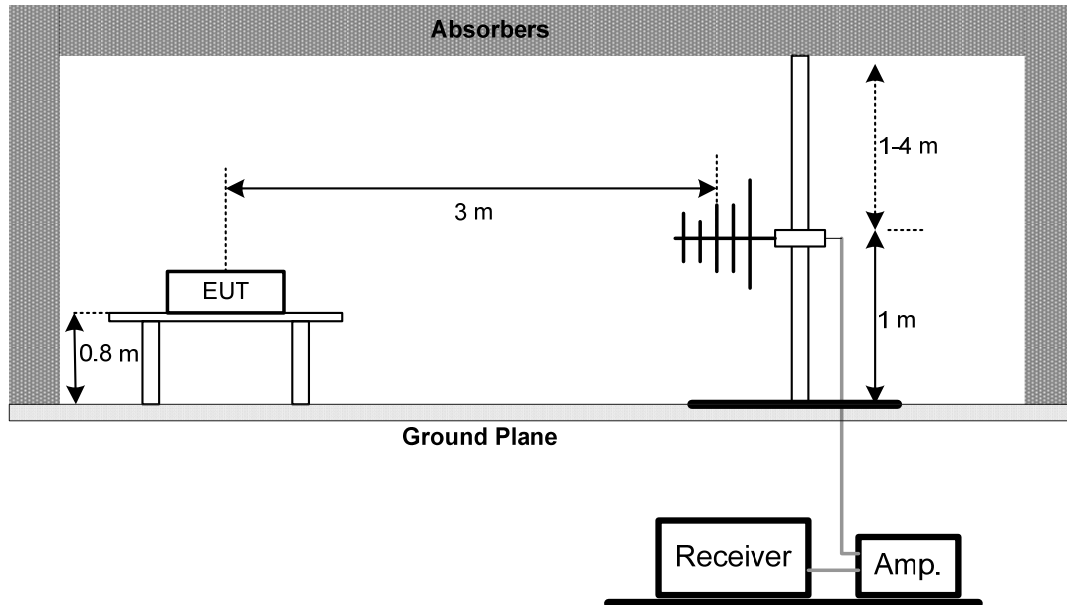
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance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

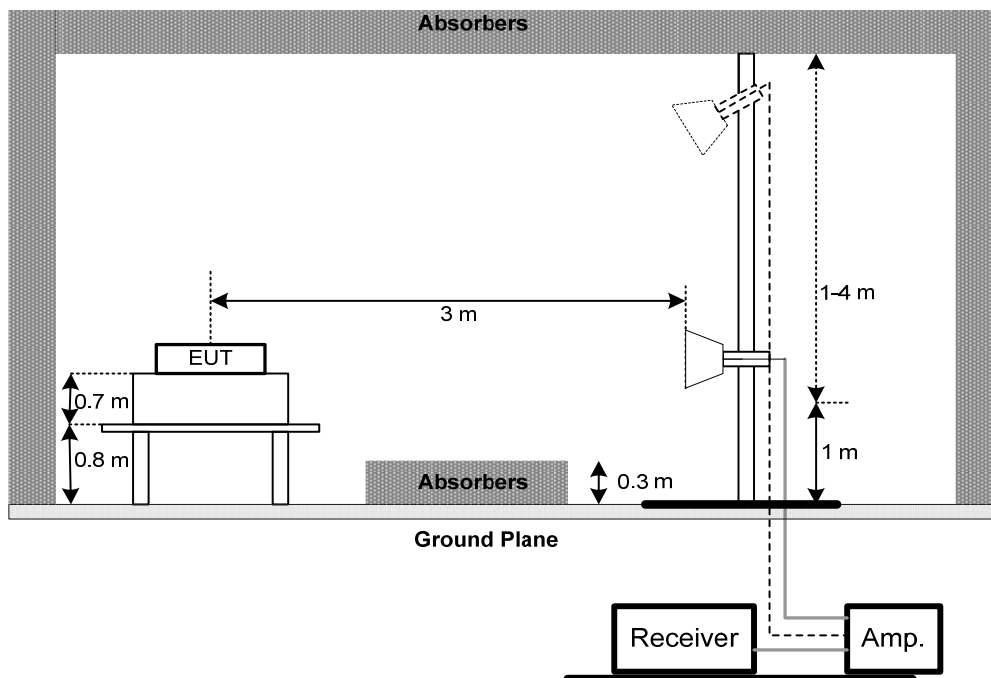
No deviation

#### 4.2.4 TEST SETUP

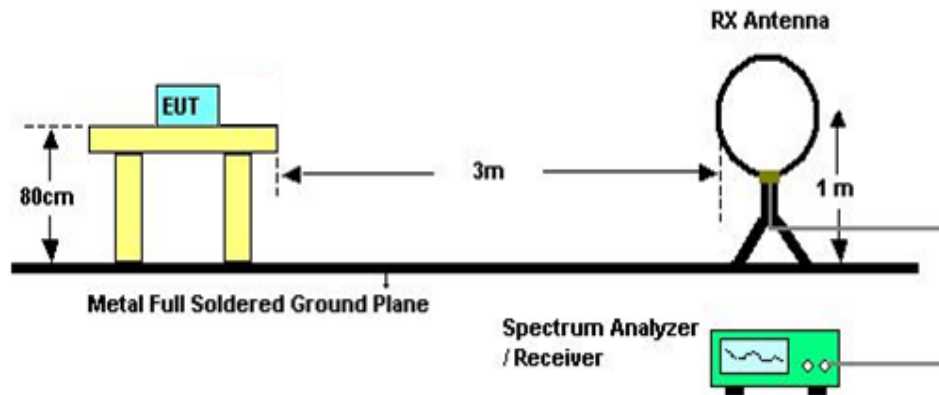
##### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



##### (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: DC 5V

#### 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.

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

Please refer to the Attachment 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			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS

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

#### 5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW=100KHz, VBW=100KHz, Sweep time = Auto.

#### 5.1.2 DEVIATION FROM STANDARD

No deviation.

#### 5.1.3 TEST SETUP



#### 5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 5.1.5 EUT TEST CONDITIONS

Temperature: 25°C  
 Relative Humidity: 55%  
 Test Voltage: DC 5V

#### 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				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

#### 6.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
- 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.
- 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.
- 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: DC 5V

#### **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

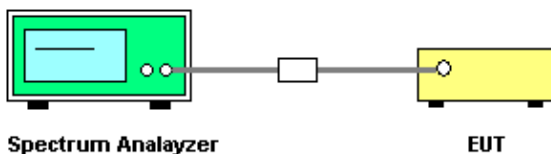
#### 7.1.1 TEST PROCEDURE

- The EUT must have its hopping function enabled
- 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: DC 5V

#### 7.1.5 TEST RESULTS

Please refer to the Attachment G

## 8. BANDWIDTH TEST

### 8.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Frequency Range (MHz)
15.247(a)(2)	Bandwidth	2400-2483.5

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

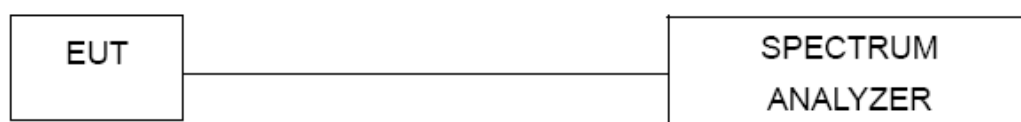
#### 8.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep Time = Auto.

#### 8.1.2 DEVIATION FROM STANDARD

No deviation.

#### 8.1.3 TEST SETUP



#### 8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 8.1.5 EUT TEST CONDITIONS

Temperature: 25°C  
 Relative Humidity: 55%  
 Test Voltage: DC 5V

#### 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				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1)	Peak Output Power	1 Watt or 30dBm ( hopping channel >75) 0.125Watt or 21dBm (hopping channel <75)	2400-2483.5	PASS

#### 9.1.1 TEST PROCEDURE

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

#### 9.1.2 DEVIATION FROM STANDARD

No deviation.

#### 9.1.3 TEST SETUP



#### 9.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 9.1.5 EUT TEST CONDITIONS

Temperature: 25°C  
Relative Humidity: 55%  
Test Voltage: DC 5V

#### 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.

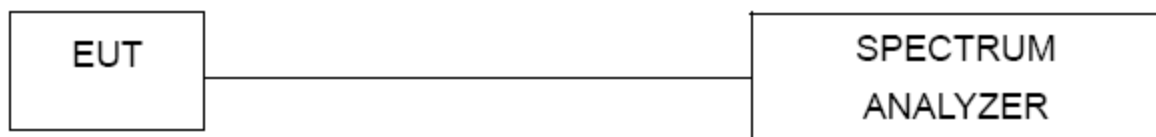
#### 10.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.
- 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: DC 5V

#### 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	TWO-LINE V-NETWORK	R&S	ENV216	101051	Feb. 23, 2017
2	Test Cable	TIMES	CFD300-NL	C03	Jun. 14, 2017
3	EMI Test Receiver	R&S	ESR3	101854	Dec. 17, 2016
4	Measurement Software	Farad	EZ EMC (Version NB-03A)	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Receiver	Keysight	N9038A	MY55420127	Jan. 07, 2017
2	EXA Spectrum Analyzer	Keysight	N9010A	MY52220990	Feb. 23, 2017
3	Horn Antenna(1G~18G)	SCHWARZBECK	BBHA 9120 D	9120D-1342	Mar. 01, 2017
4	Trilog-Broadband Antenna(30M~1G)	Schwarzbeck	VULB9168	9168-548	Jan. 17, 2017
5	Pre-Amplifier(30M~1G)	EMC	EMC02325	980217	Dec. 29, 2016
6	Pre-Amplifier(1G~26G)	EMC	012645B	980267	Mar. 01, 2017
7	Test Cable	EMCI	EMC104-SM-S M-800	150207	Jan. 05, 2017
8	Test Cable	EMCI	EEMC104-SM-S M-3000	151205	Jan. 05, 2017
9	Test Cable	EMCI	S104-SMAP-2	M001220	Jan. 05, 2017
10	EXA Spectrum Analyzer	Agilent	N9010A	MY52220990	Feb. 24, 2017
11	EMI Test Receiver	Agilent	N9038A	MY51210215	Jan. 08, 2017
12	Loop Antenna	EMCO	6502	00042960	Nov. 24, 2017

Number of Hopping Channel					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

Average Time of Occupancy					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

Hopping Channel Separation Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

Peak Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2495A	1128008	Aug. 17, 2017

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

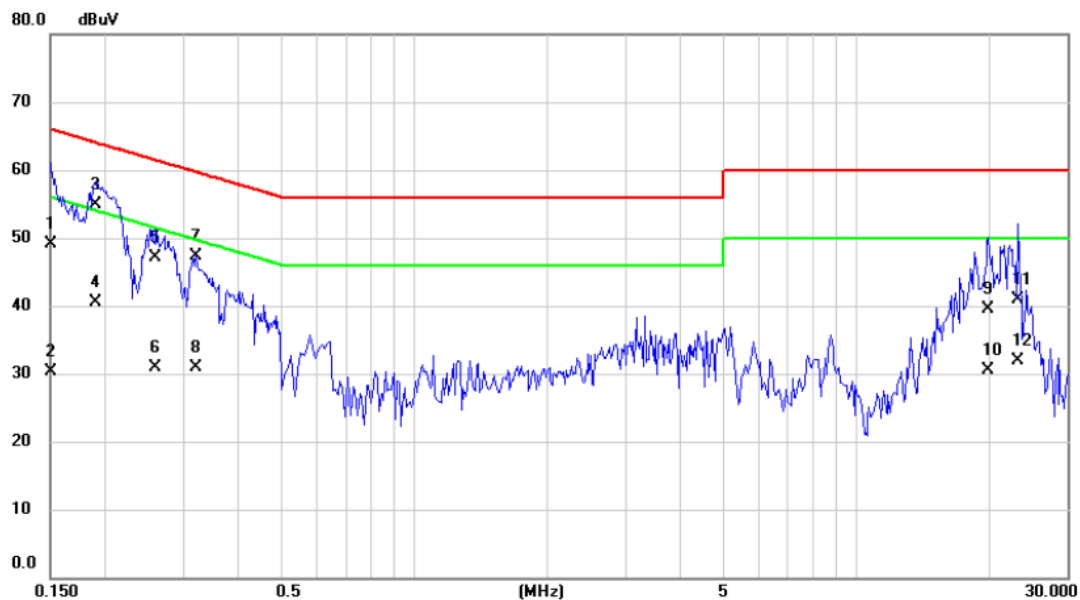
Remark: "N/A" denotes no model name, serial no. or calibration specified.  
All calibration period of equipment list is one year.

## ATTACHMENT A - CONDUCTED EMISSION



Test Mode: Bluetooth

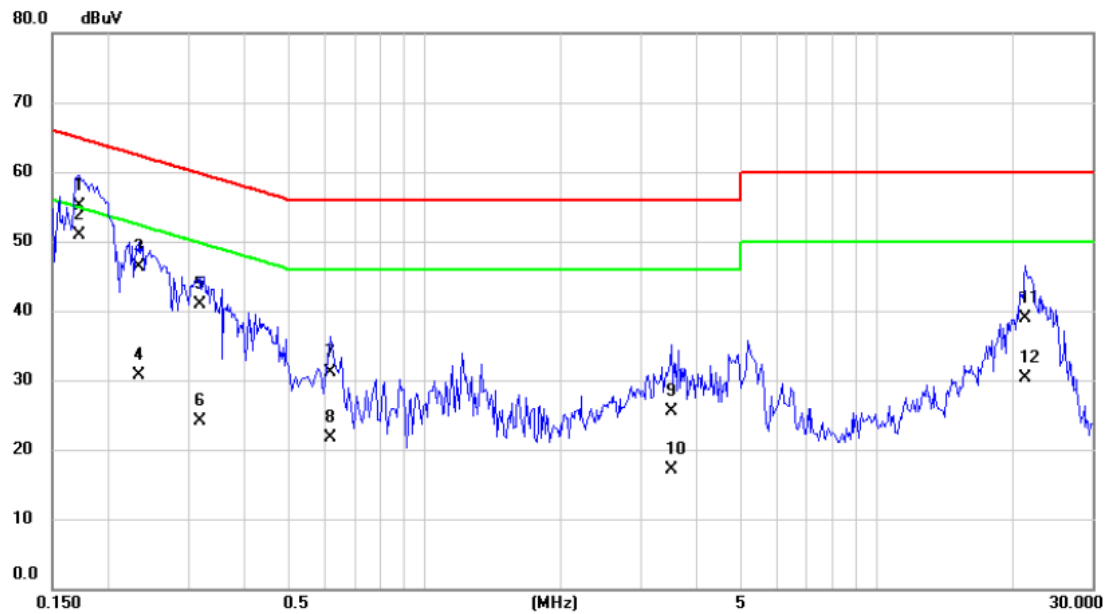
### Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	39.50	9.64	49.14	66.00	-16.86	QP	
2		0.1500	20.60	9.64	30.24	56.00	-25.76	AVG	
3	*	0.1906	45.30	9.64	54.94	64.01	-9.07	QP	
4		0.1906	30.90	9.64	40.54	54.01	-13.47	AVG	
5		0.2600	37.50	9.64	47.14	61.43	-14.29	QP	
6		0.2600	21.30	9.64	30.94	51.43	-20.49	AVG	
7		0.3215	37.60	9.63	47.23	59.67	-12.44	QP	
8		0.3215	21.30	9.63	30.93	49.67	-18.74	AVG	
9		19.8500	29.70	9.76	39.46	60.00	-20.54	QP	
10		19.8500	20.80	9.76	30.56	50.00	-19.44	AVG	
11		23.1500	31.20	9.74	40.94	60.00	-19.06	QP	
12		23.1500	22.20	9.74	31.94	50.00	-18.06	AVG	

Test Mode: Bluetooth

### Neutral

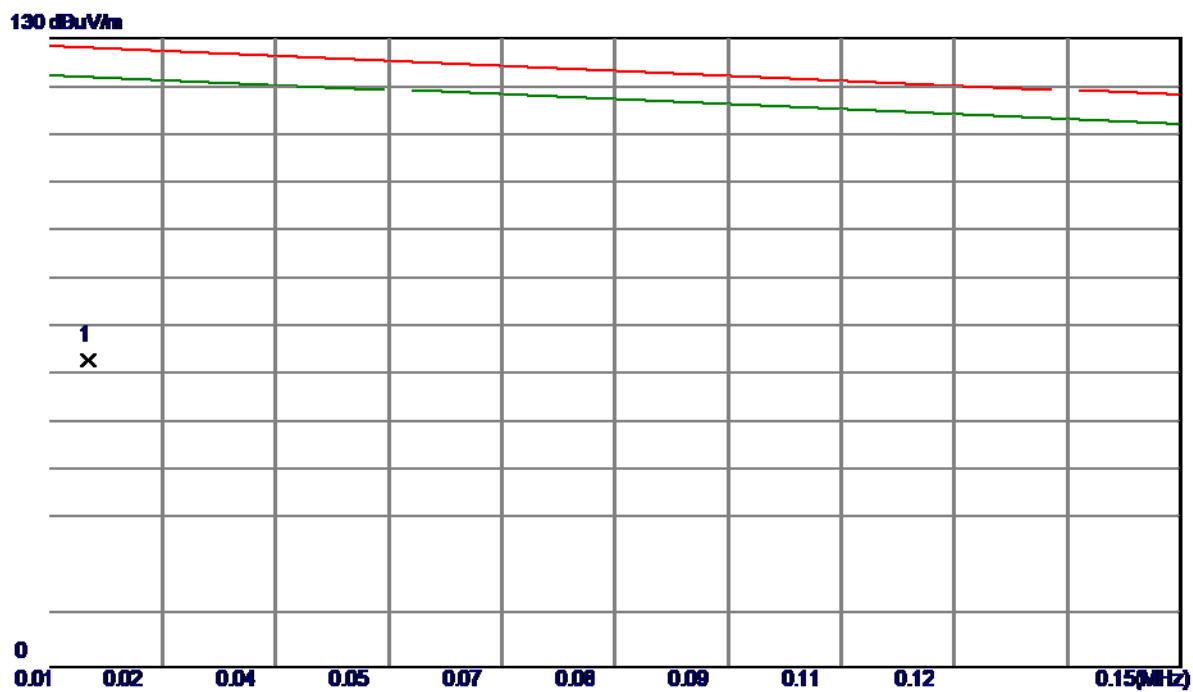


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1717	45.50	9.65	55.15	64.88	-9.73	QP	
2	*	0.1717	41.30	9.65	50.95	54.88	-3.93	AVG	
3		0.2340	36.60	9.64	46.24	62.31	-16.07	QP	
4		0.2340	21.00	9.64	30.64	52.31	-21.67	AVG	
5		0.3180	31.20	9.63	40.83	59.76	-18.93	QP	
6		0.3180	14.40	9.63	24.03	49.76	-25.73	AVG	
7		0.6170	21.50	9.63	31.13	56.00	-24.87	QP	
8		0.6170	12.10	9.63	21.73	46.00	-24.27	AVG	
9		3.5150	15.90	9.66	25.56	56.00	-30.44	QP	
10		3.5150	7.40	9.66	17.06	46.00	-28.94	AVG	
11		21.3500	29.20	9.75	38.95	60.00	-21.05	QP	
12		21.3500	20.60	9.75	30.35	50.00	-19.65	AVG	

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

Test Mode: TX Mode

Ant 0°

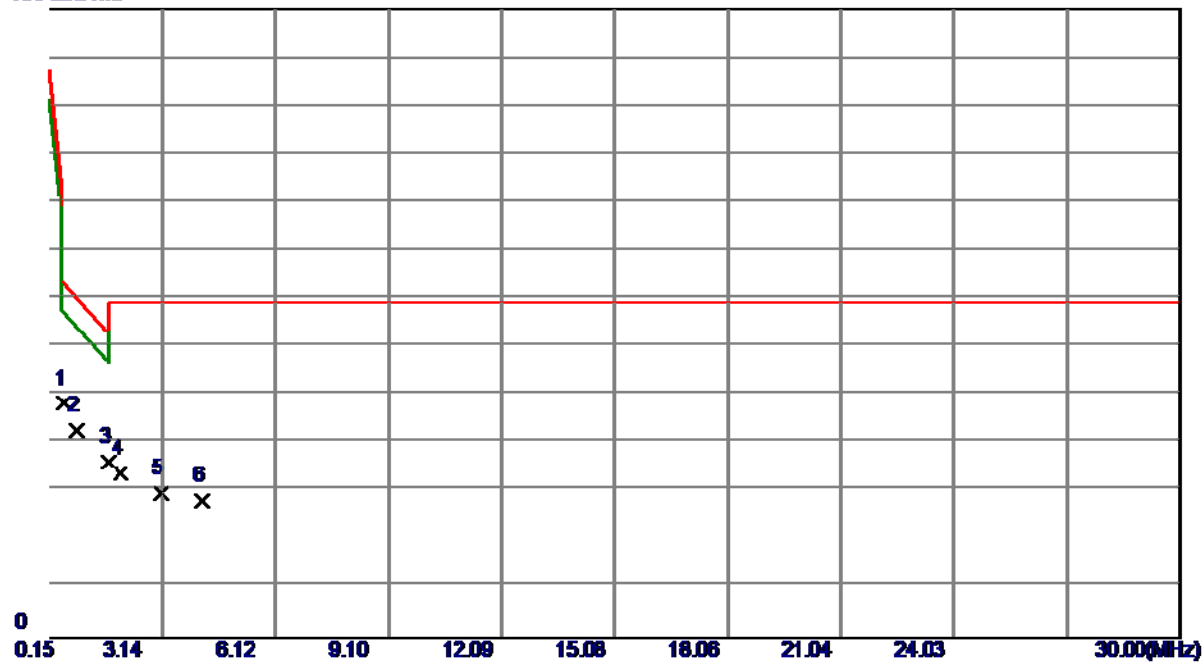


No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	0.0138	13.92	19.45	63.37	128.17	-64.80	Peak	

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

Ant 0°

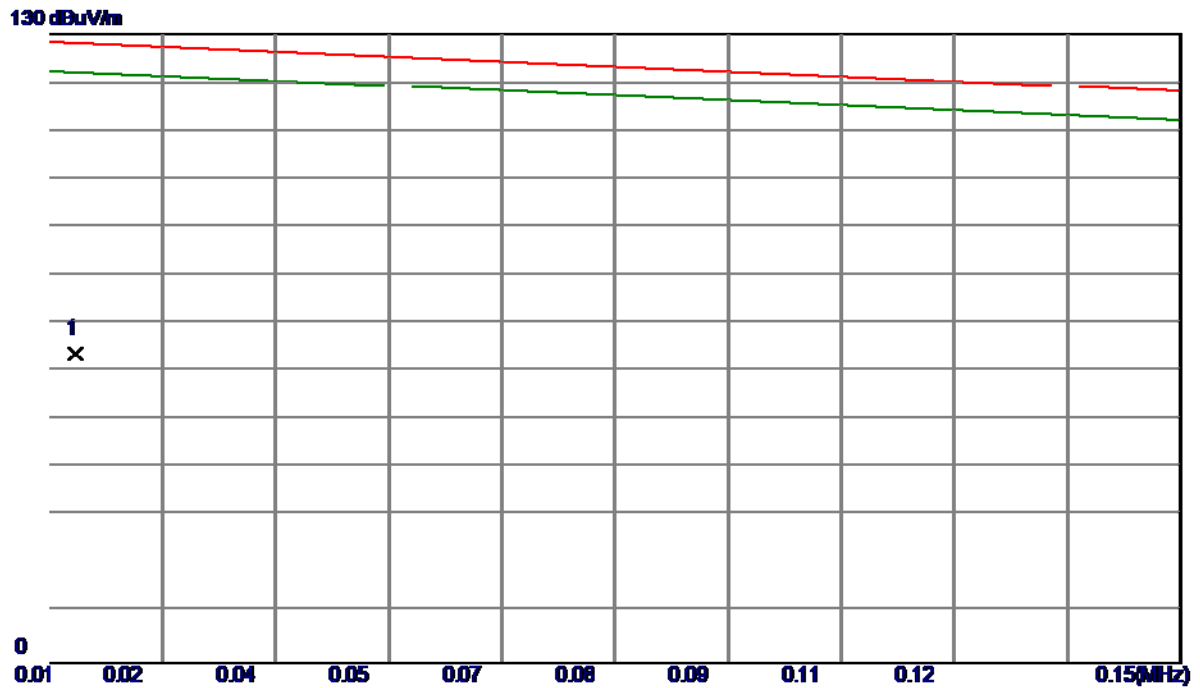
130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.5381	36.67	11.82	48.49	73.37	-24.88	Peak	
2	0.8962	30.82	11.96	42.78	70.18	-27.40	Peak	
3	1.7022	24.67	11.68	36.35	62.99	-26.64	Peak	
4	2.0305	22.53	11.54	34.07	69.54	-35.47	Peak	
5	3.1052	18.82	11.12	29.94	69.54	-39.60	Peak	
6	4.1798	17.14	11.28	28.42	69.54	-41.12	Peak	

Test Mode: TX Mode

Ant 90°

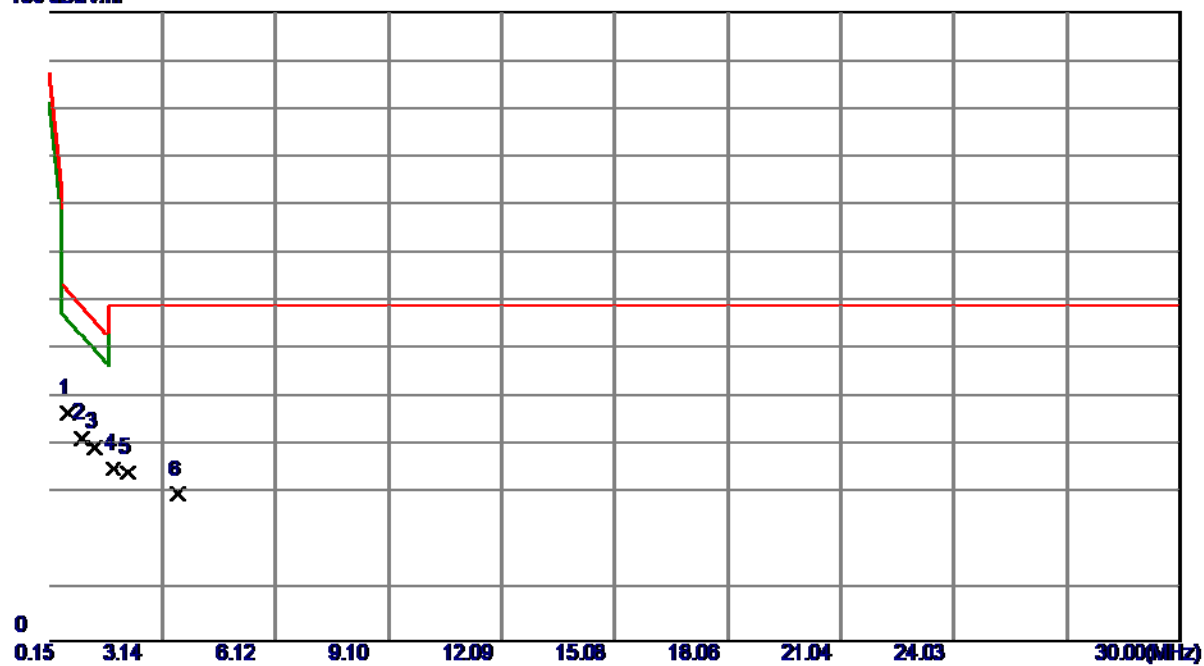


No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	0.0123	11.17	19.86	64.03	128.27	-64.24	Peak	

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

Ant 90°

130 dBuV/m



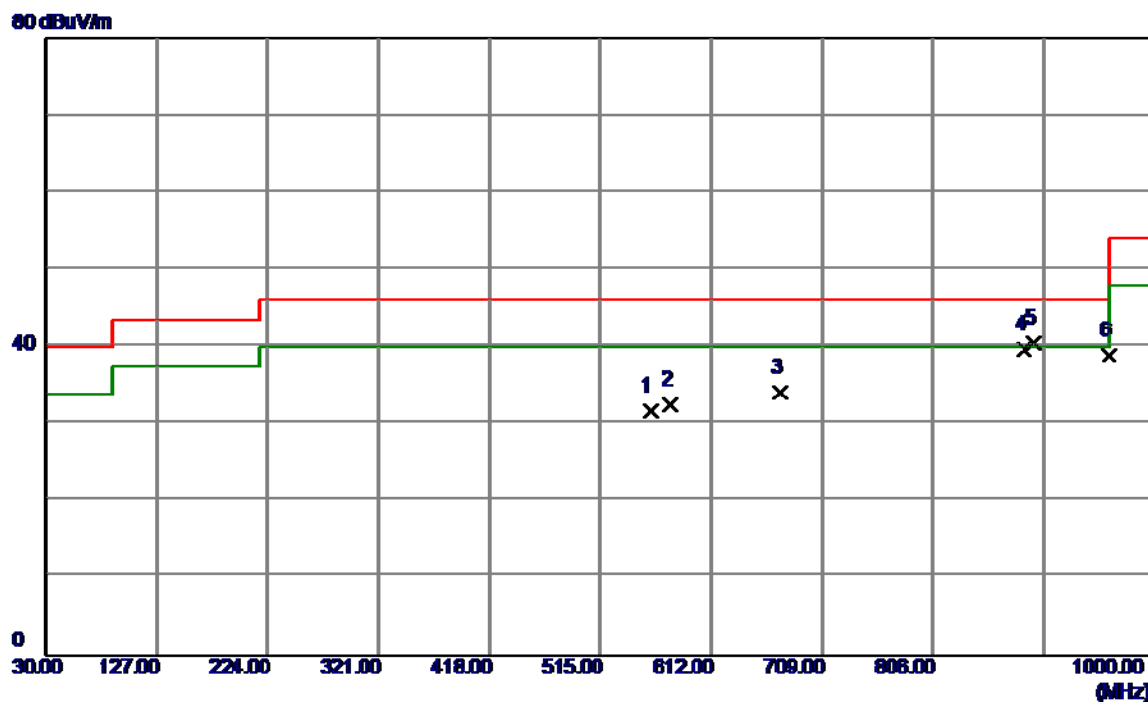
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.6574	35.09	11.86	46.95	72.31	-25.36	Peak	
2	1.0156	29.96	11.99	41.95	69.11	-27.16	Peak	
3	1.3440	28.07	11.85	39.92	66.19	-26.27	Peak	
4	1.8515	24.01	11.62	35.63	69.54	-33.91	Peak	
5	2.2395	23.52	11.44	34.96	69.54	-34.58	Peak	
6	3.5231	19.11	11.18	30.29	69.54	-39.25	Peak	

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



Test Mode: TX 2441MHz \_CH39\_1Mbps

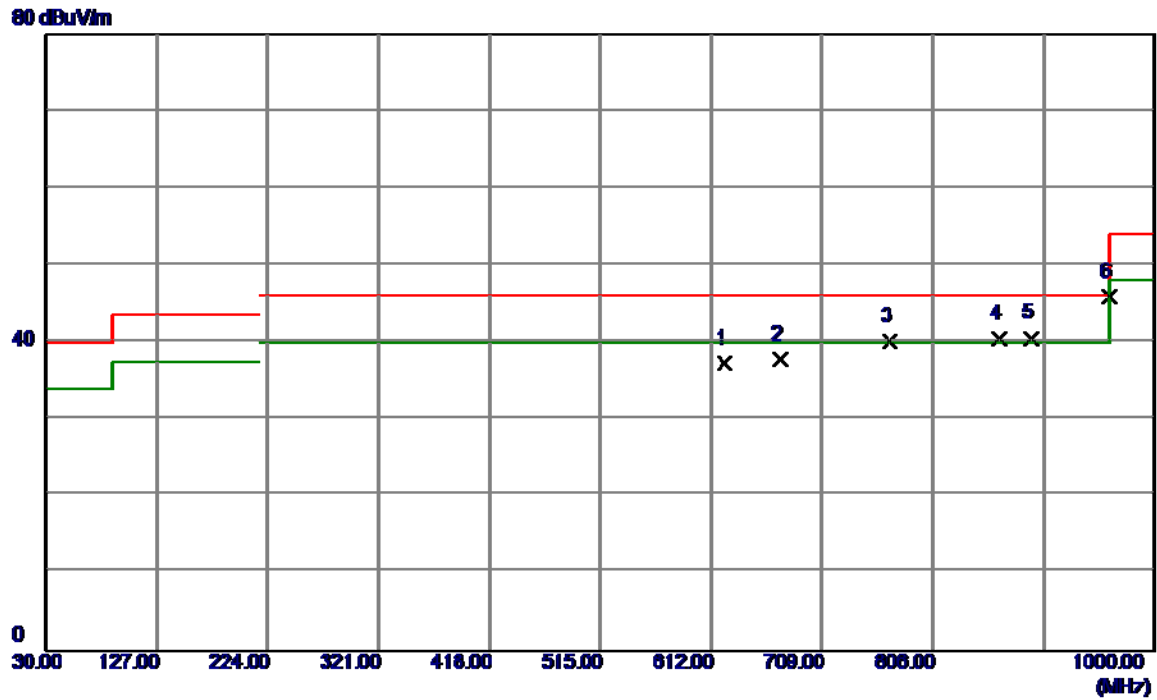
## Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	558.6500	33.34	-1.70	31.64	46.00	-14.36	Peak	
2	576.1100	33.71	1.24	32.47	46.00	13.53	Peak	
3	672.1400	33.82	0.25	34.07	46.00	-11.93	Peak	
4	885.5400	35.80	3.83	39.63	46.00	-6.37	Peak	
5 *	894.2700	36.46	4.01	40.47	46.00	-5.53	Peak	
6	960.2300	33.73	5.13	38.86	54.00	-15.14	Peak	

Test Mode: TX 2441MHz \_CH39\_1Mbps

## Horizontal

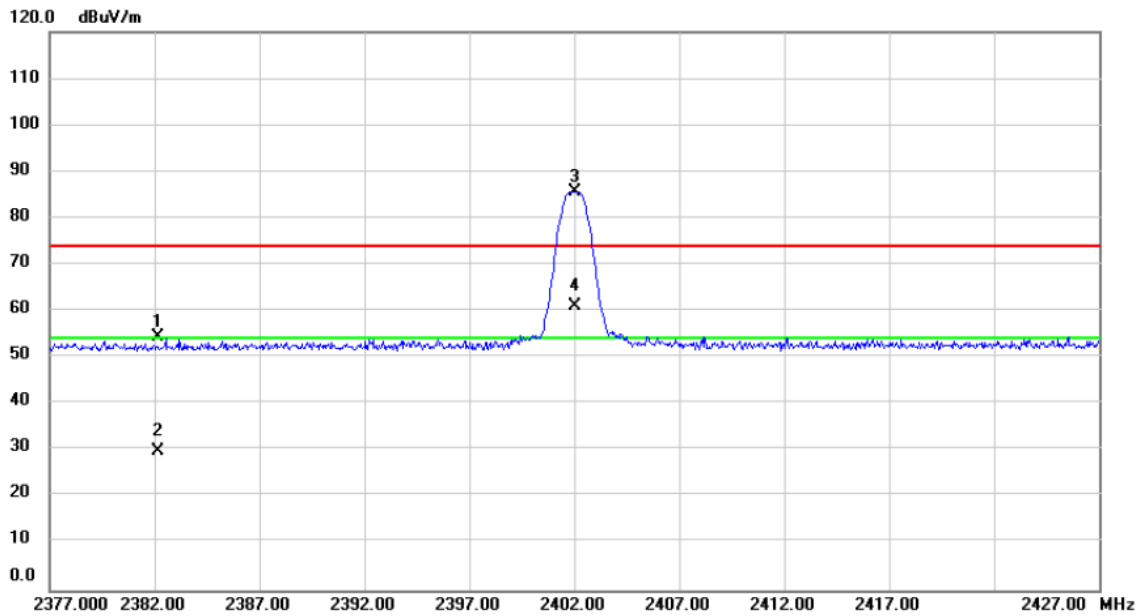


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	623.6400	37.69	-0.44	37.25	46.00	-8.75	Peak	
2	672.1400	37.58	0.25	37.83	46.00	-8.17	Peak	
3	768.1700	38.13	2.08	40.21	46.00	-5.79	Peak	
4	864.2000	37.14	3.40	40.54	46.00	-5.46	Peak	
5 *	892.3300	36.59	3.97	40.56	46.00	-5.44	Peak	
6	960.2300	40.71	5.13	45.84	54.00	-8.16	Peak	

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

Test Mode : TX 2402MHz \_CH00\_1Mbps

**Vertical**

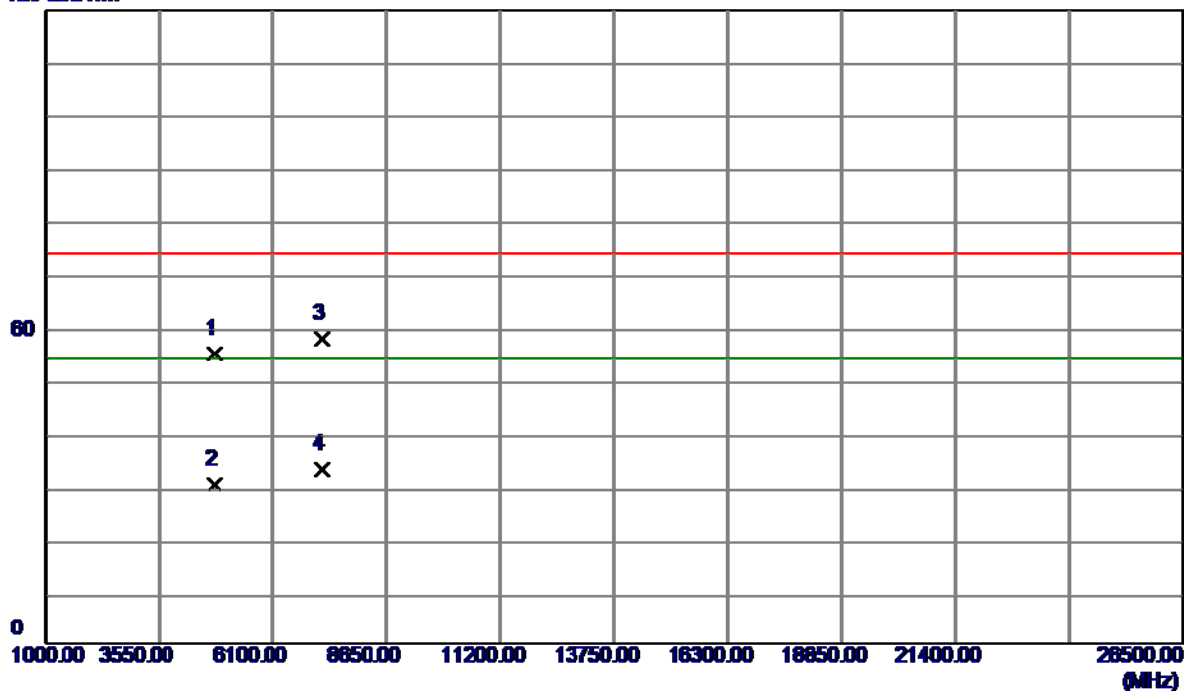


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2382.148	27.45	26.87	54.32	74.00	-19.68	peak	
2		2382.148	2.90	26.87	29.77	54.00	-24.23	AVG	
3	*	2402.000	58.73	26.93	85.66	74.00	11.66	peak	No Limit
4	X	2402.000	34.18	26.93	61.11	54.00	7.11	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps

Vertical

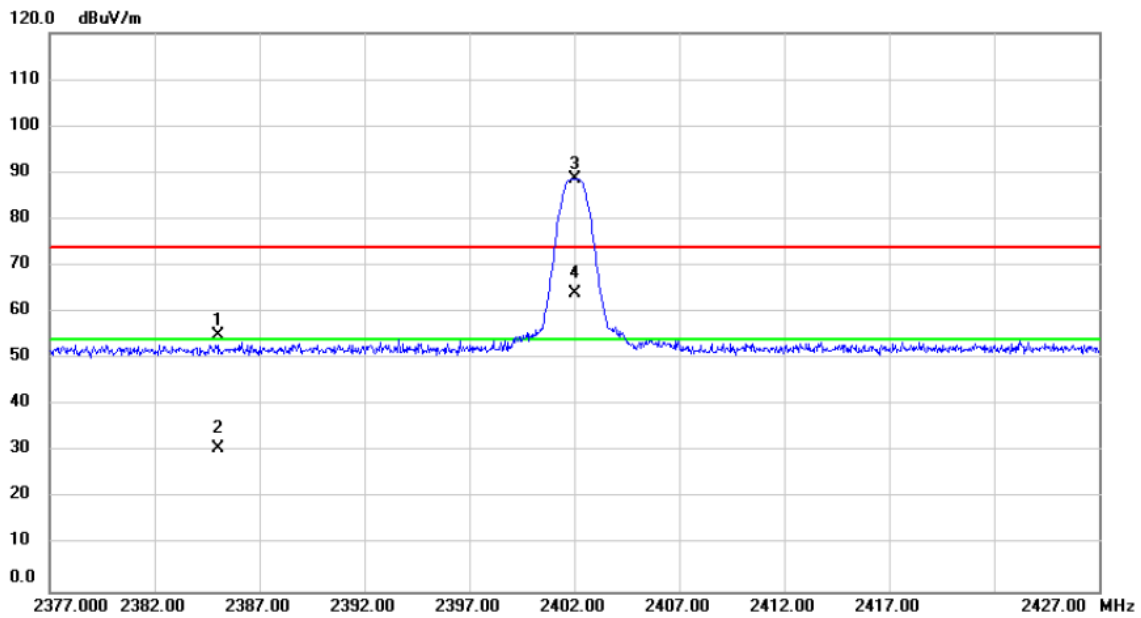
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4804.0000	66.34	-11.50	54.84	74.00	-19.16	Peak	
2	4804.0000	41.79	-11.50	30.29	54.00	-23.71	AVG	
3 *	7206.0000	63.21	-5.47	57.74	74.00	-16.26	Peak	
4	7206.0000	38.66	-5.47	33.19	54.00	-20.81	AVG	

Test Mode : TX 2402MHz \_CH00\_1Mbps

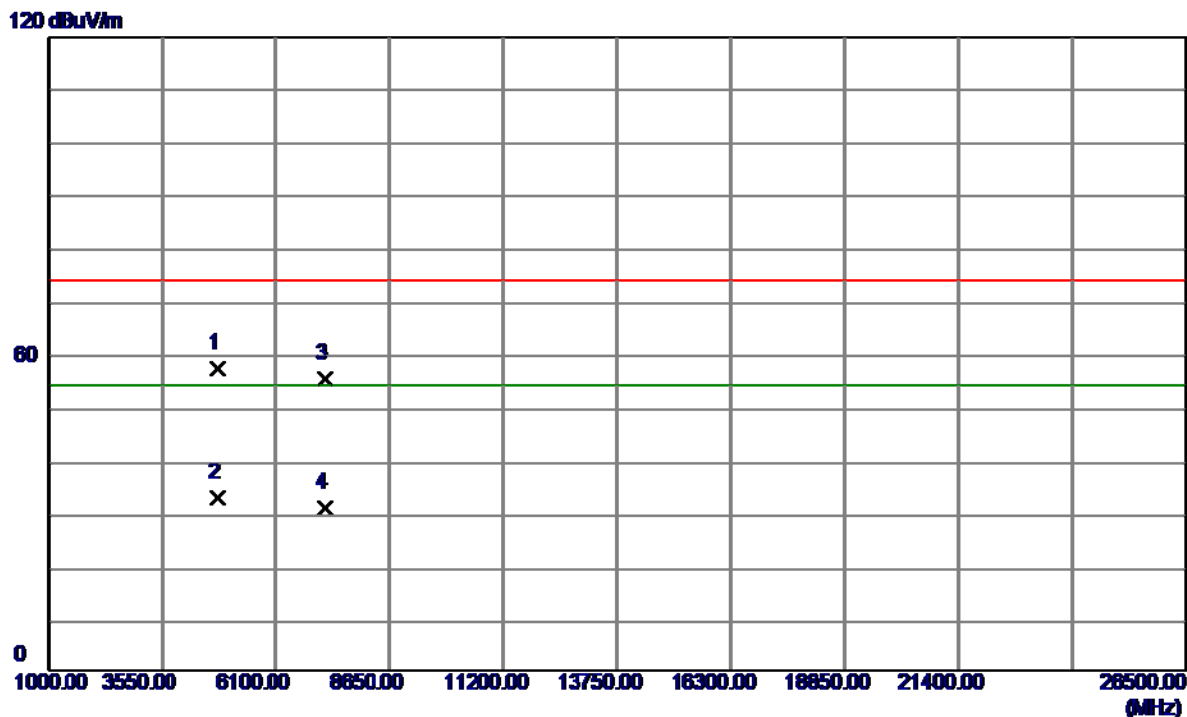
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2385.021	28.29	26.88	55.17	74.00	-18.83	peak	
2		2385.021	3.74	26.88	30.62	54.00	-23.38	AVG	
3	*	2402.000	61.72	26.93	88.65	74.00	14.65	peak	No Limit
4	X	2402.000	37.17	26.93	64.10	54.00	10.10	AVG	No Limit

Test Mode :	TX 2402MHz _CH00_1Mbps
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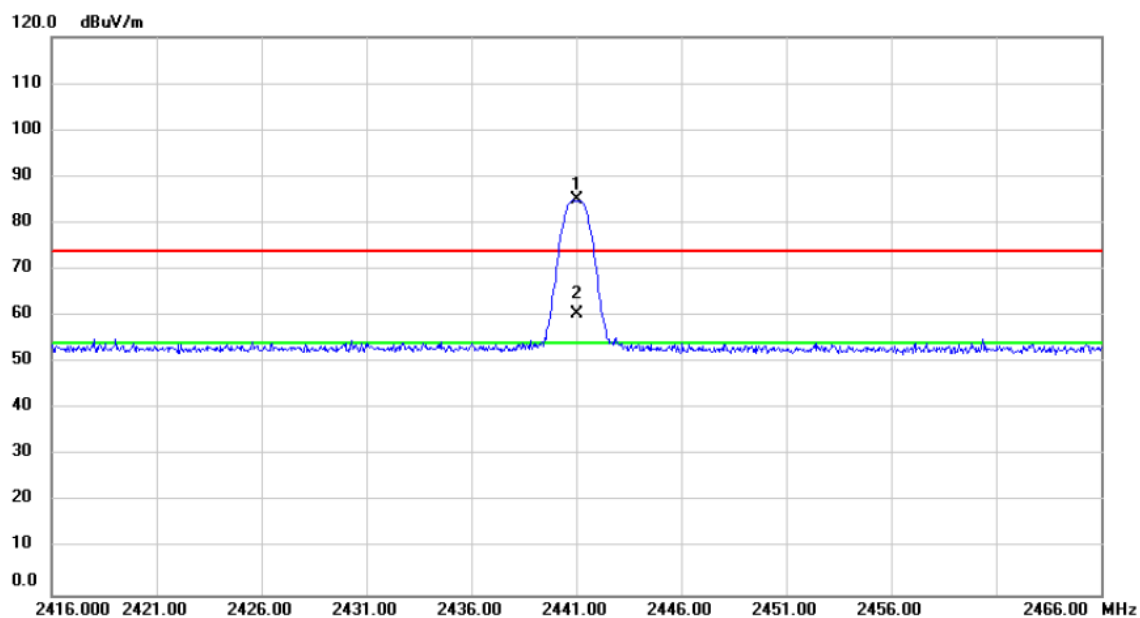
### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4804.0000	68.69	-11.50	57.19	74.00	-16.81	Peak	
2	4804.0000	44.14	-11.50	32.64	54.00	-21.36	AVG	
3	7206.0000	60.68	-5.47	55.21	74.00	-18.79	Peak	
4	7206.0000	36.13	-5.47	30.66	54.00	-23.34	AVG	

Test Mode :	TX 2441MHz _CH39_ 1Mbps
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### Vertical



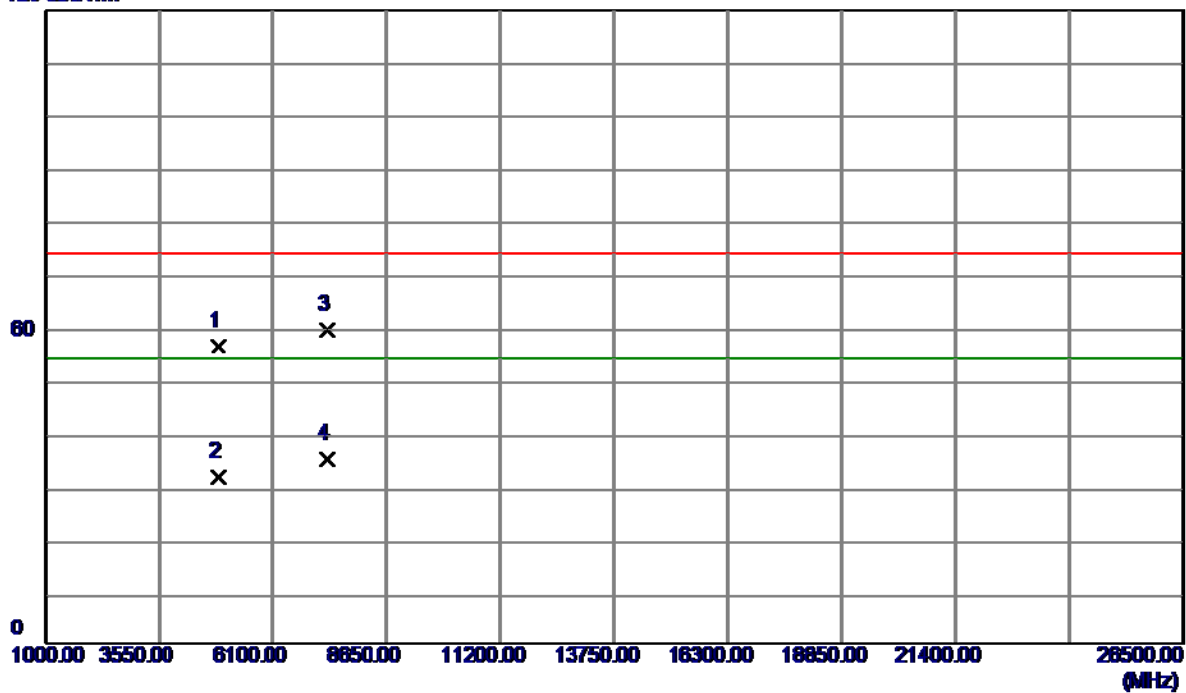
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2441.000	57.89	27.03	84.92	74.00	10.92	peak	No Limit
2	X	2441.000	33.34	27.03	60.37	54.00	6.37	AVG	No Limit



Test Mode : TX 2441MHz \_CH39\_1Mbps

### Vertical

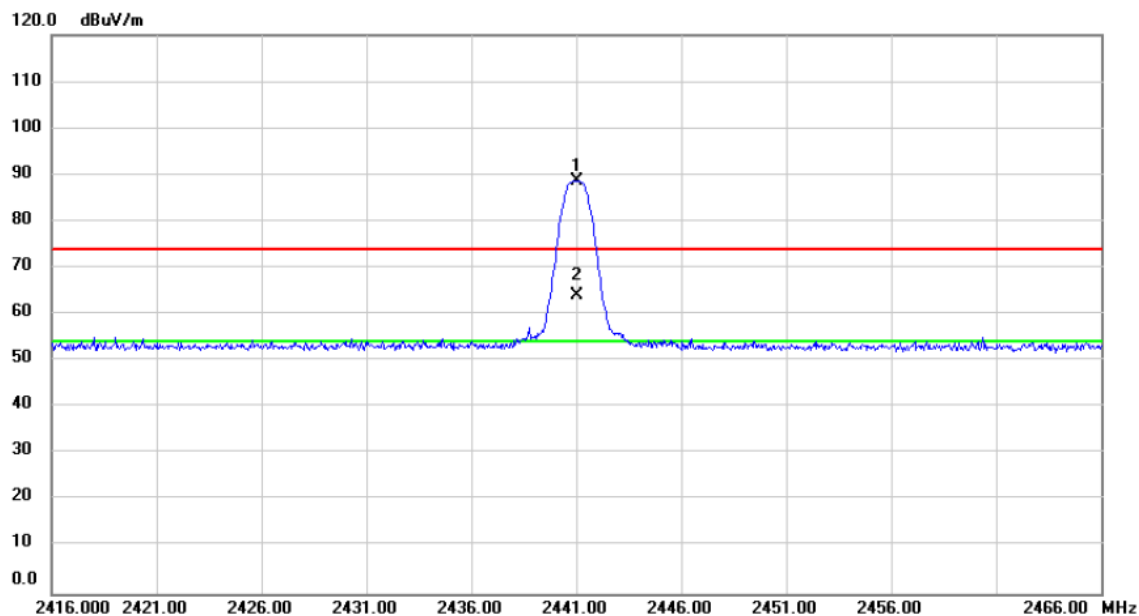
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4882.0000	67.67	-11.38	56.29	74.00	-17.71	Peak	
2	4882.0000	43.12	-11.38	31.74	54.00	-22.26	AVG	
3 *	7323.0000	64.54	-5.03	59.51	74.00	-14.49	Peak	
4	7323.0420	39.99	-5.03	34.96	54.00	-19.04	AVG	

Test Mode :	TX 2441MHz _CH39_1Mbps
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### Horizontal

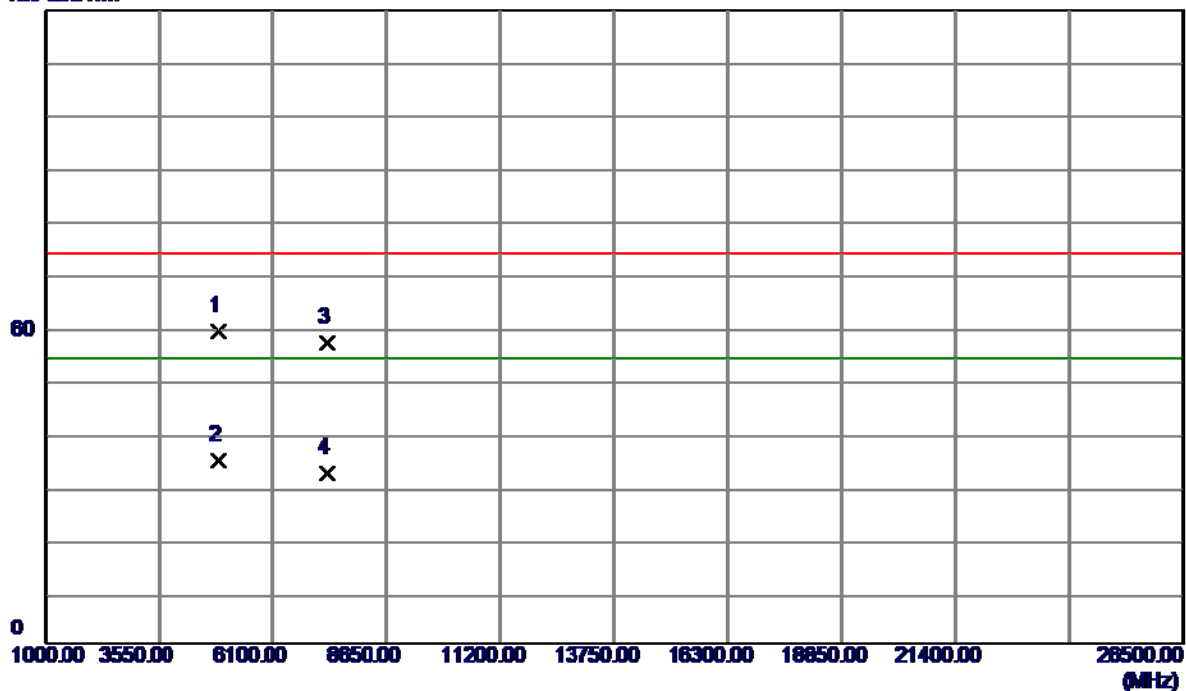


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2441.000	61.57	27.03	88.60	74.00	14.60	peak	No Limit
2	X	2441.000	37.02	27.03	64.05	54.00	10.05	AVG	No Limit

Test Mode :	TX 2441MHz _CH39_1Mbps
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### Horizontal

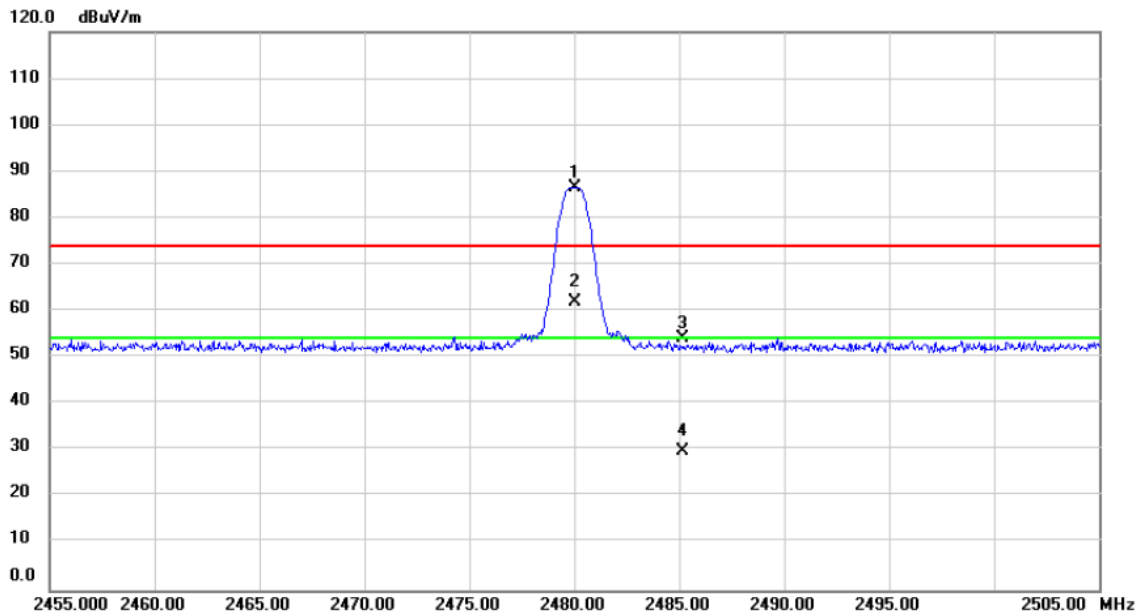
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4882.0000	70.62	-11.38	59.24	74.00	-14.76	Peak	
2	4882.0000	46.07	-11.38	34.69	54.00	-19.31	AVG	
3	7323.0000	62.08	-5.03	57.05	74.00	-16.95	Peak	
4	7323.0000	37.53	-5.03	32.50	54.00	-21.50	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

Vertical

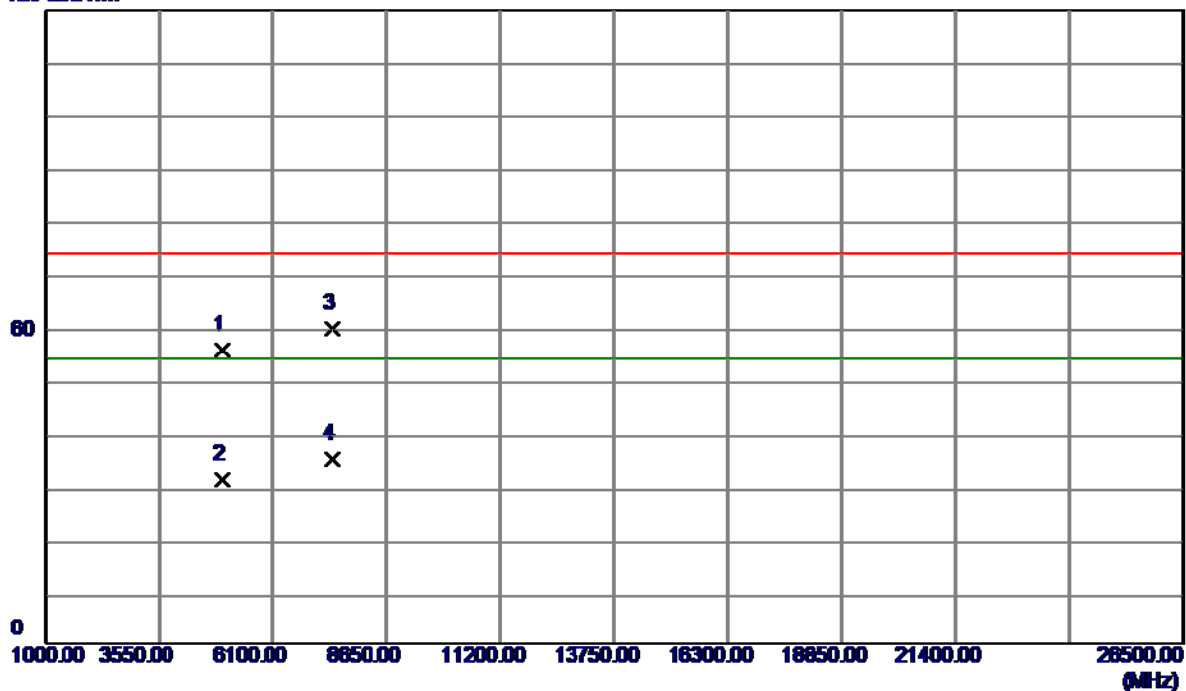


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2480.000	59.45	27.14	86.59	74.00	12.59	peak	No Limit
2	X	2480.000	34.90	27.14	62.04	54.00	8.04	AVG	No Limit
3		2485.198	27.14	27.16	54.30	74.00	-19.70	peak	
4		2485.198	2.59	27.16	29.75	54.00	-24.25	AVG	

Test Mode :	TX 2480MHz _CH78_1Mbps
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### Vertical

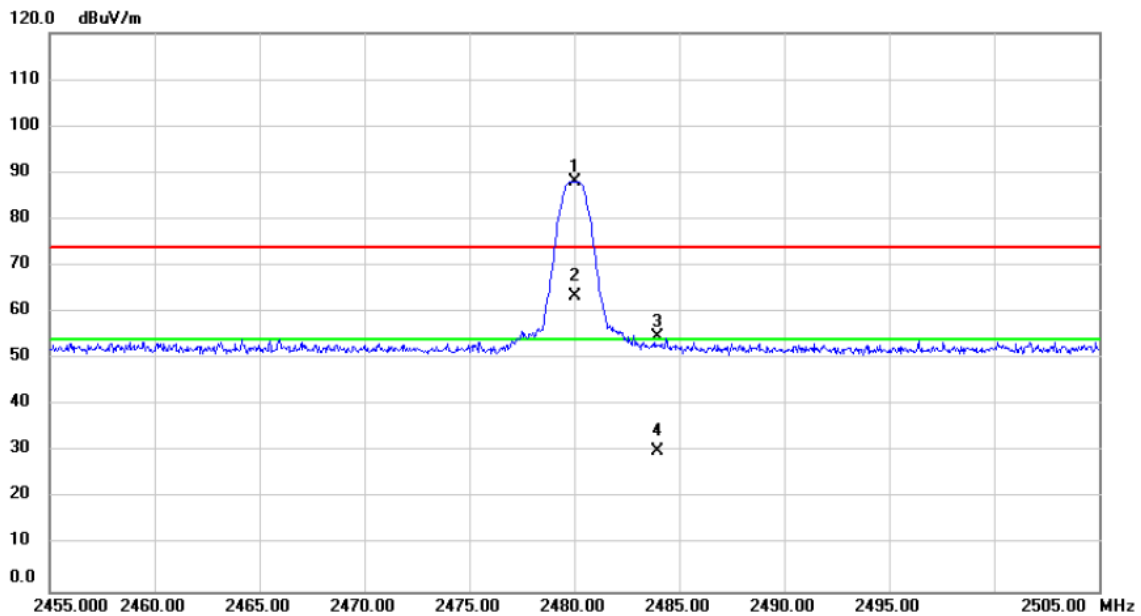
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4960.0000	66.98	-11.26	55.72	74.00	-18.28	Peak	
2	4960.0000	42.43	-11.26	31.17	54.00	-22.83	AVG	
3 *	7440.0000	64.28	-4.59	59.69	74.00	-14.31	Peak	
4	7440.0000	39.73	-4.59	35.14	54.00	-18.86	AVG	

Test Mode : TX 2480MHz \_CH78\_1Mbps

### Horizontal

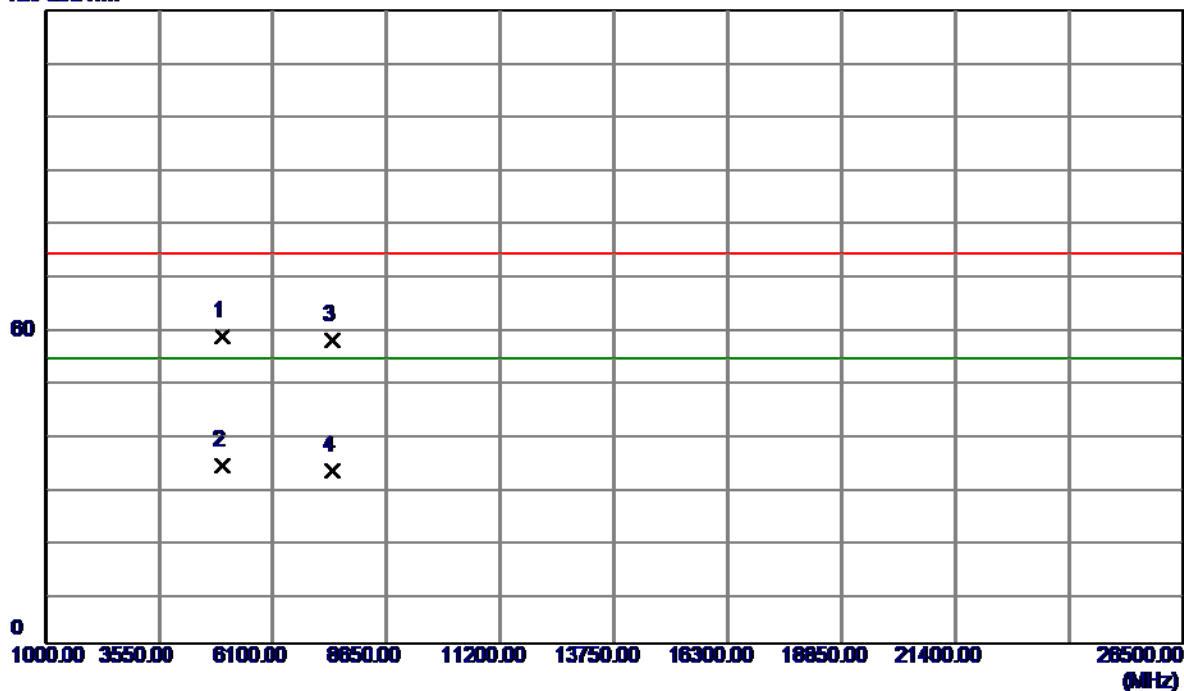


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2480.000	60.99	27.14	88.13	74.00	14.13	peak	No Limit
2	X	2480.000	36.44	27.14	63.58	54.00	9.58	AVG	No Limit
3		2483.994	27.68	27.16	54.84	74.00	-19.16	peak	
4		2483.994	3.13	27.16	30.29	54.00	-23.71	AVG	

Test Mode :	TX 2480MHz _CH78_1Mbps
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### Horizontal

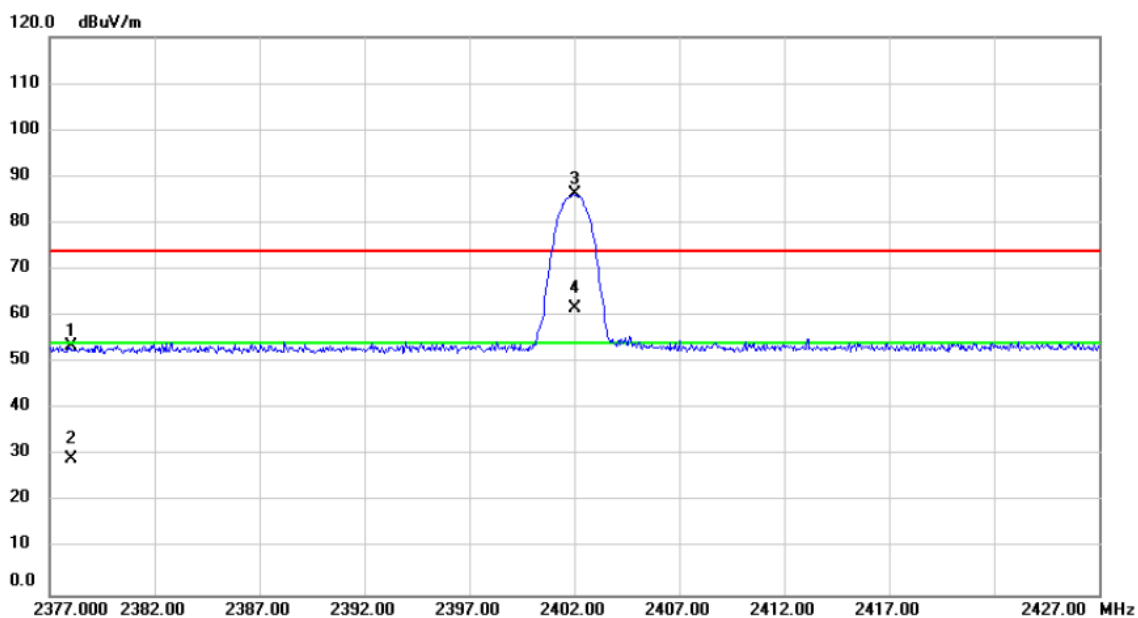
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4960.0000	69.66	-11.26	58.40	74.00	-15.60	Peak	
2	4960.0000	45.11	-11.26	33.85	54.00	-20.15	AVG	
3	7440.0000	62.13	-4.59	57.54	74.00	-16.46	Peak	
4	7440.0000	37.58	-4.59	32.99	54.00	-21.01	AVG	

Test Mode : TX 2402MHz \_CH00\_3Mbps

### Vertical



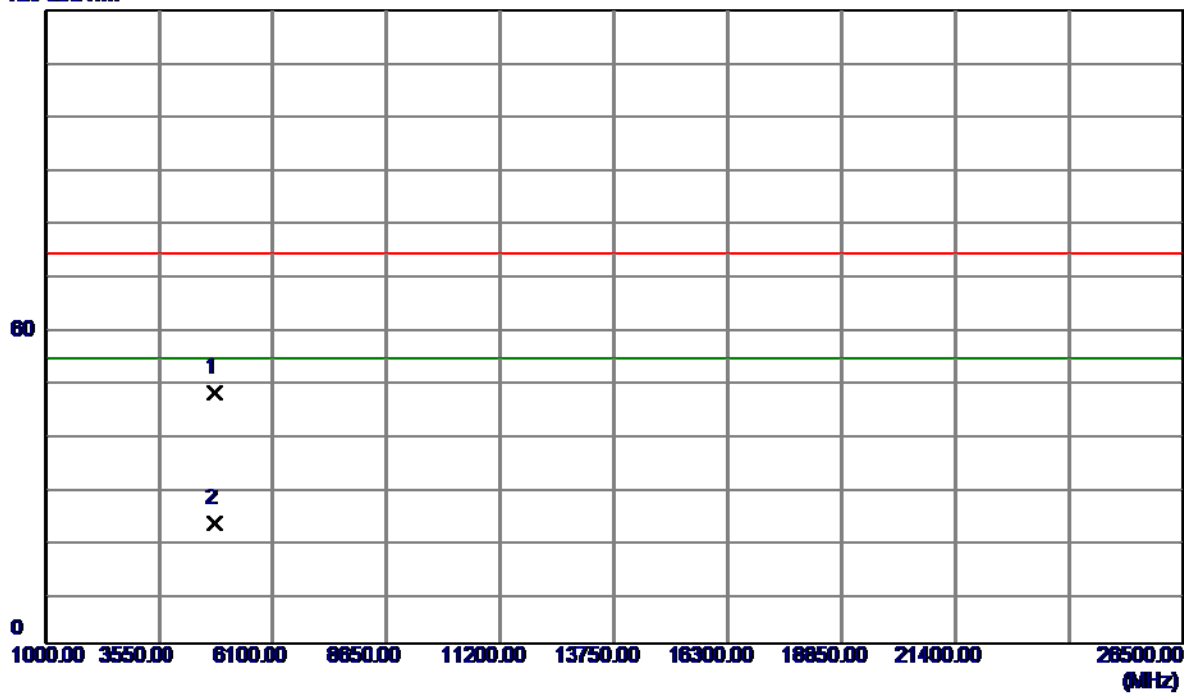
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2378.040	26.80	26.86	53.66	74.00	-20.34	peak	
2		2378.040	2.25	26.86	29.11	54.00	-24.89	AVG	
3	*	2402.000	59.20	26.93	86.13	74.00	12.13	peak	No Limit
4	X	2402.000	34.65	26.93	61.58	54.00	7.58	AVG	No Limit



Test Mode :	TX 2402MHz _CH00_3Mbps
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### Vertical

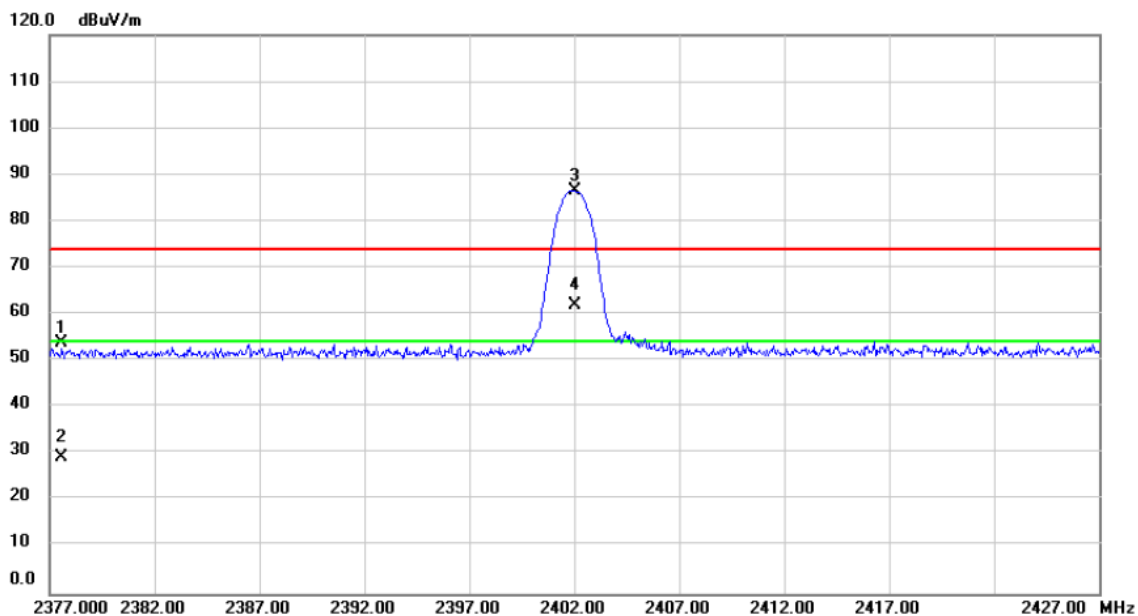
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4804.0000	58.91	-11.50	47.41	74.00	-26.59	Peak	
2	4804.0000	34.36	-11.50	22.86	54.00	-31.14	AVG	

Test Mode :	TX 2402MHz _CH00_3Mbps
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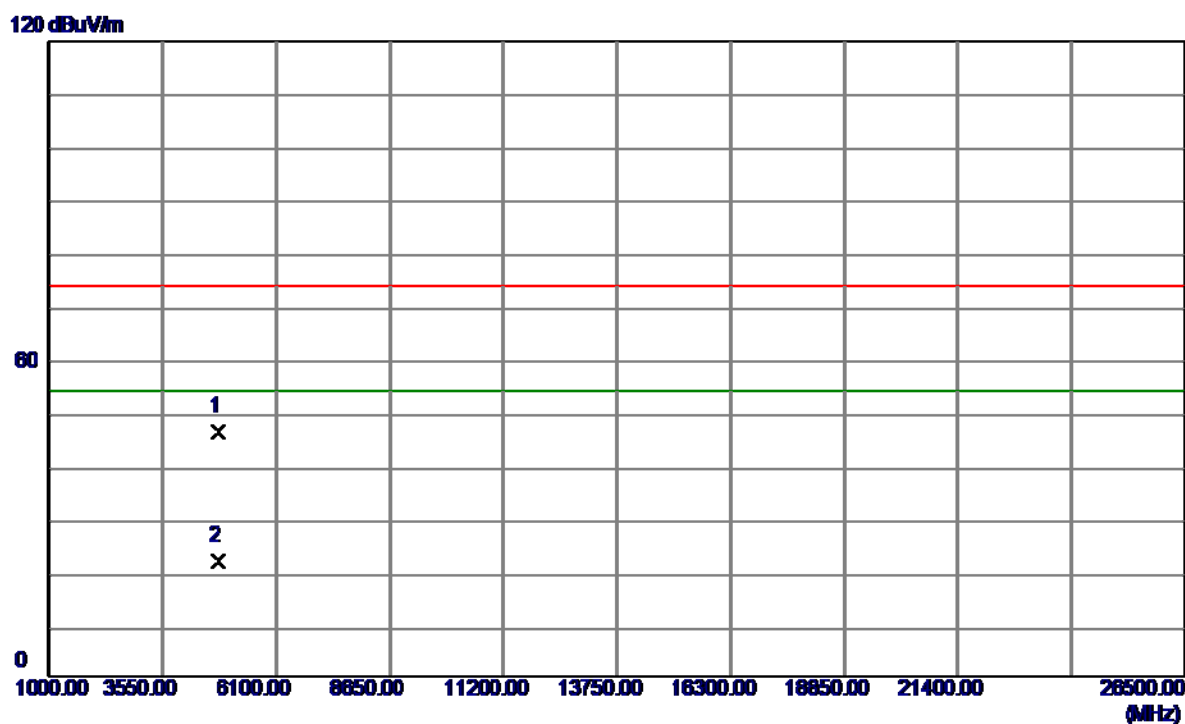
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2377.598	27.01	26.86	53.87	74.00	-20.13	peak	
2		2377.598	2.46	26.86	29.32	54.00	-24.68	AVG	
3	*	2402.000	59.66	26.93	86.59	74.00	12.59	peak	No Limit
4	X	2402.000	35.11	26.93	62.04	54.00	8.04	AVG	No Limit

Test Mode :	TX 2402MHz _CH00_3Mbps
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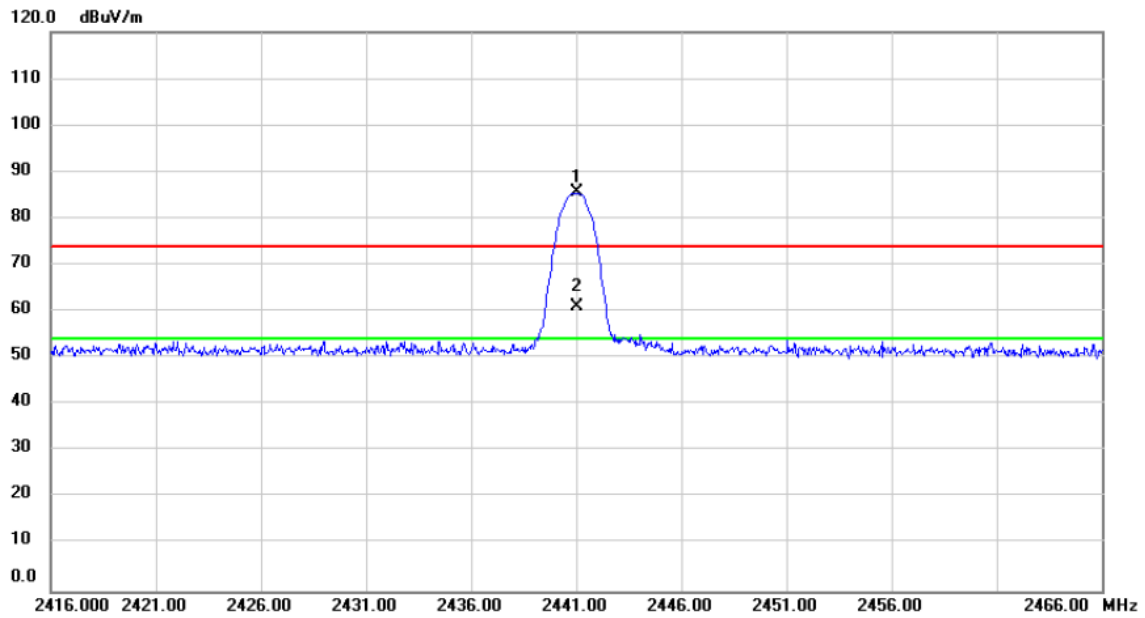
### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4804.0000	57.83	-11.50	46.33	74.00	-27.67	Peak	
2	4804.0000	33.28	-11.50	21.78	54.00	-32.22	AVG	

Test Mode : TX 2441MHz \_CH39\_ 3Mbps

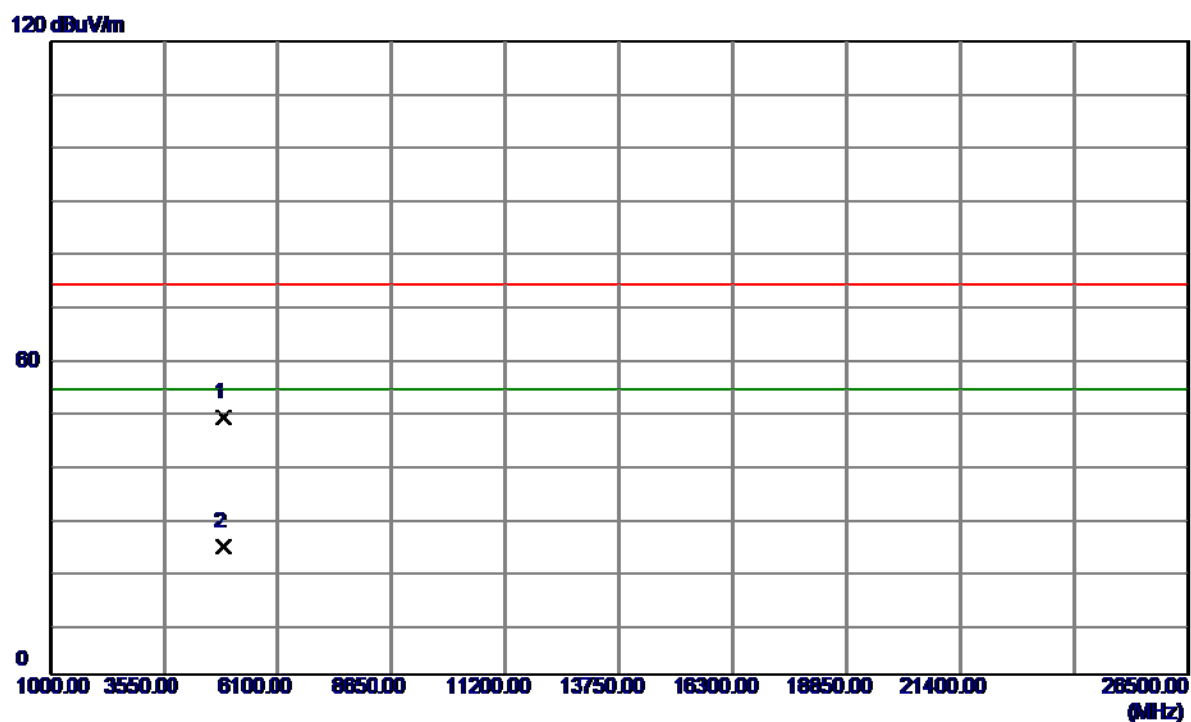
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2441.000	58.53	27.03	85.56	74.00	11.56	peak	No Limit
2	X	2441.000	33.98	27.03	61.01	54.00	7.01	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_3Mbps

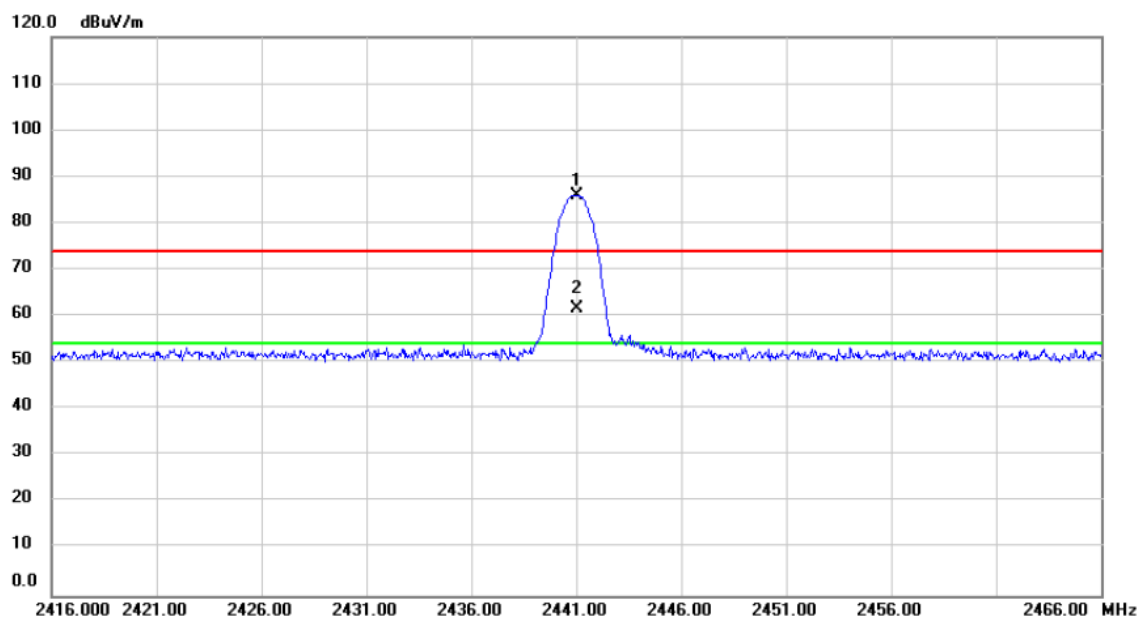
# Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4882.0000	60.09	-11.38	48.71	74.00	-25.29	Peak	
2	4882.0000	35.54	-11.38	24.16	54.00	-29.84	AVG	

Test Mode :	TX 2441MHz _CH39_3Mbps
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### Horizontal

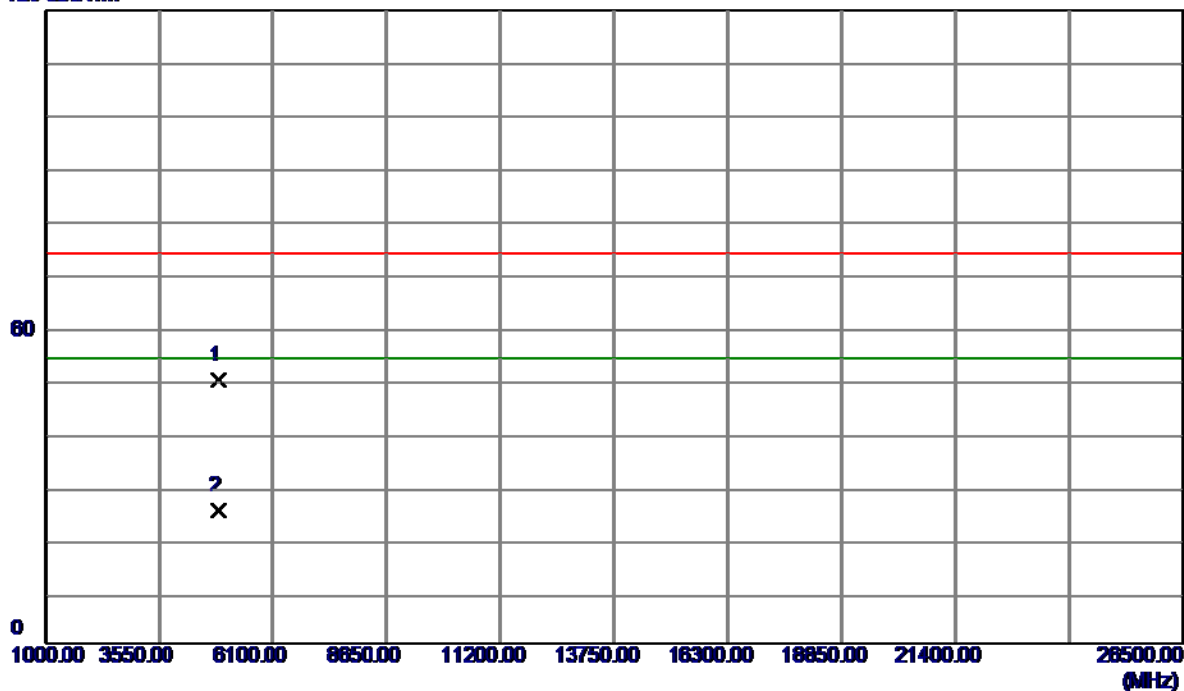


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2441.000	59.04	27.03	86.07	74.00	12.07	peak	No Limit
2	X	2441.000	34.49	27.03	61.52	54.00	7.52	AVG	No Limit

Test Mode : TX 2441MHz \_CH39\_3Mbps

### Horizontal

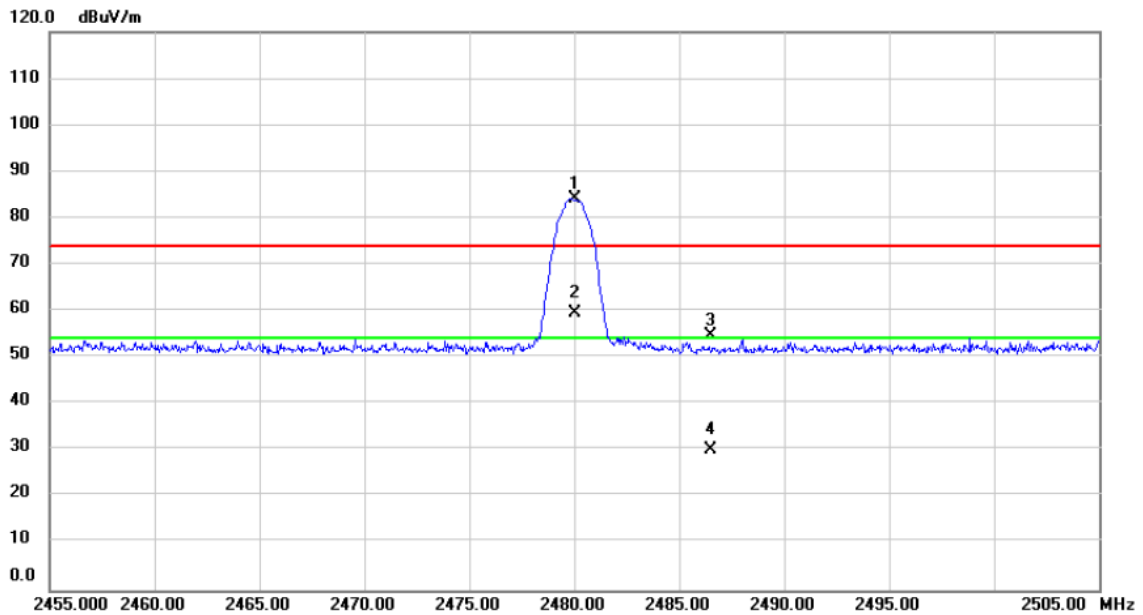
120 dBuV/m



No.	Freq.	Reading	Correct	Measure	Limit	Margin		
	MHz	dBuV/m	Factor	ment	dBuV/m	dB	Detector	Comment
1 *	4882.0000	61.19	-11.38	49.81	74.00	-24.19	Peak	
2	4882.0000	36.64	-11.38	25.26	54.00	-28.74	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

### Vertical

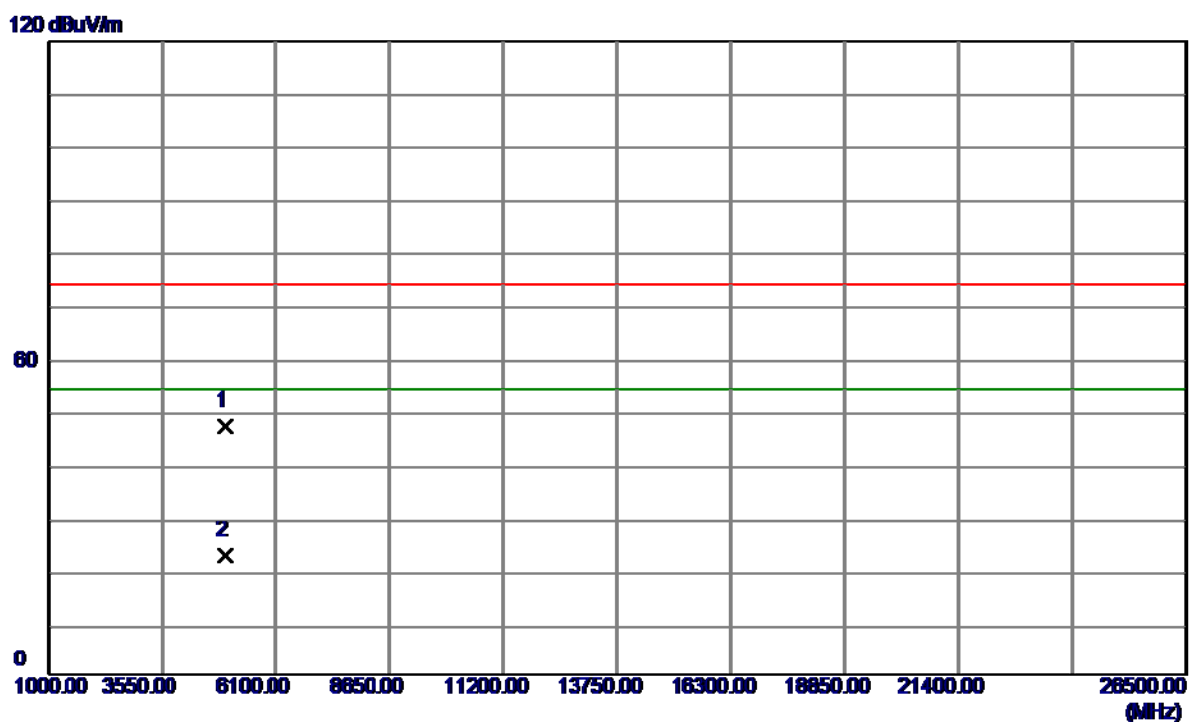


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2480.000	56.99	27.14	84.13	74.00	10.13	peak	No Limit
2	X	2480.000	32.44	27.14	59.58	54.00	5.58	AVG	No Limit
3		2486.467	27.68	27.16	54.84	74.00	-19.16	peak	
4		2486.467	3.13	27.16	30.29	54.00	-23.71	AVG	



Test Mode :	TX 2480MHz _CH78_3Mbps
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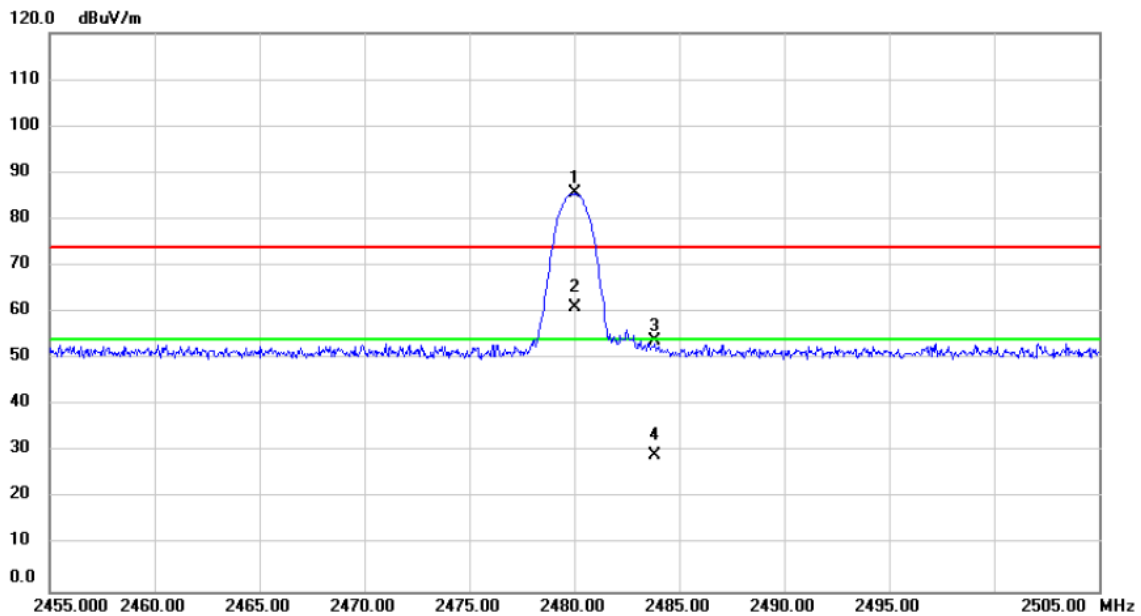
### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4960.0000	58.39	-11.26	47.13	74.00	-26.87	Peak	
2	4960.0000	33.84	-11.26	22.58	54.00	-31.42	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

### Horizontal

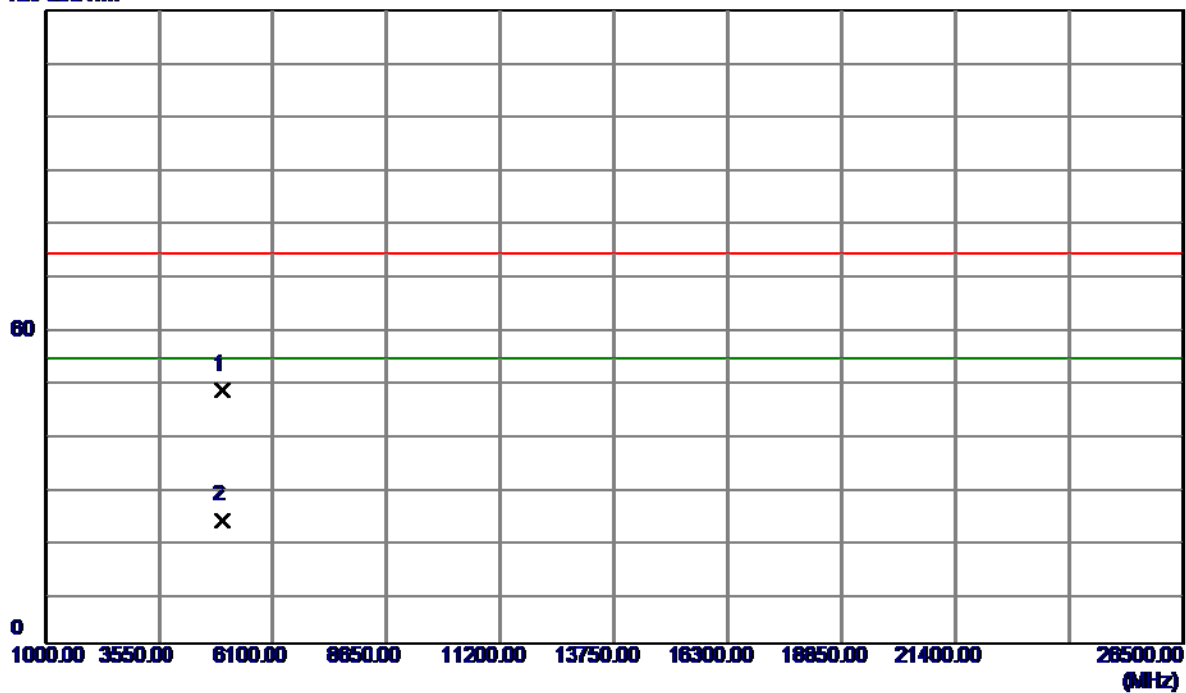


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2480.000	58.37	27.14	85.51	74.00	11.51	peak	No Limit
2	X	2480.000	33.82	27.14	60.96	54.00	6.96	AVG	No Limit
3		2483.801	26.80	27.15	53.95	74.00	-20.05	peak	
4		2483.801	2.25	27.15	29.40	54.00	-24.60	AVG	

Test Mode : TX 2480MHz \_CH78\_3Mbps

### Horizontal

120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4960.0000	59.21	-11.26	47.95	74.00	-26.05	Peak	
2	4960.0000	34.66	-11.26	23.40	54.00	-30.60	AVG	

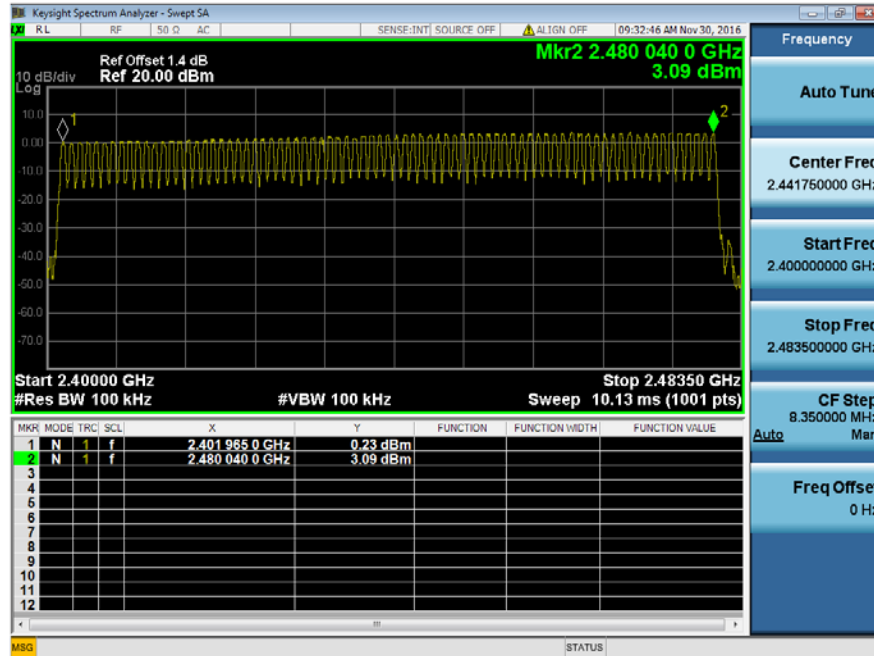
## ATTACHMENT E - NUMBER OF HOPPING CHANNEL

## Test Mode

## Hopping Mode\_1Mbps

Number of Hopping Channel

79

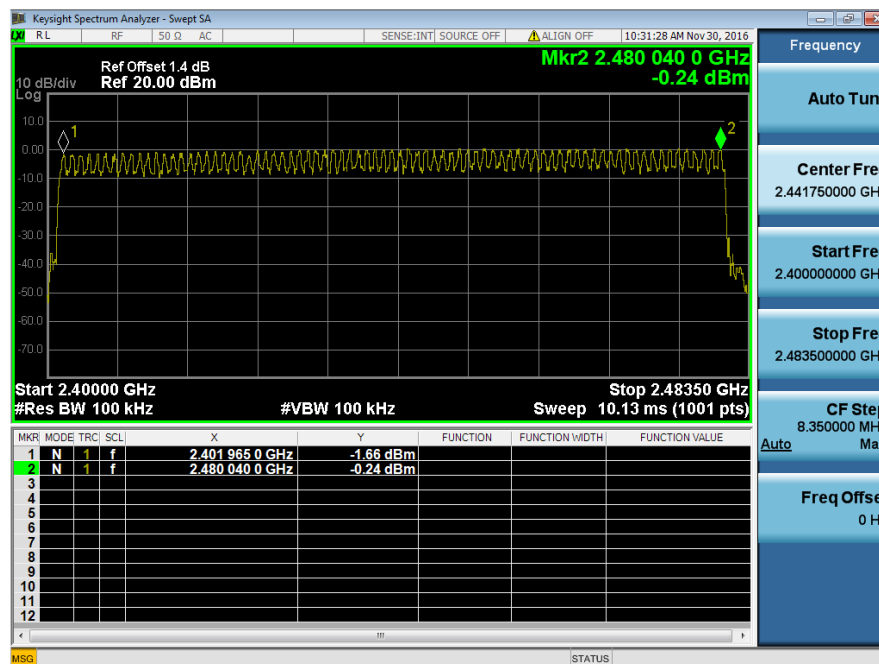


## Test Mode

## Hopping Mode\_3Mbps

Number of Hopping Channel

79

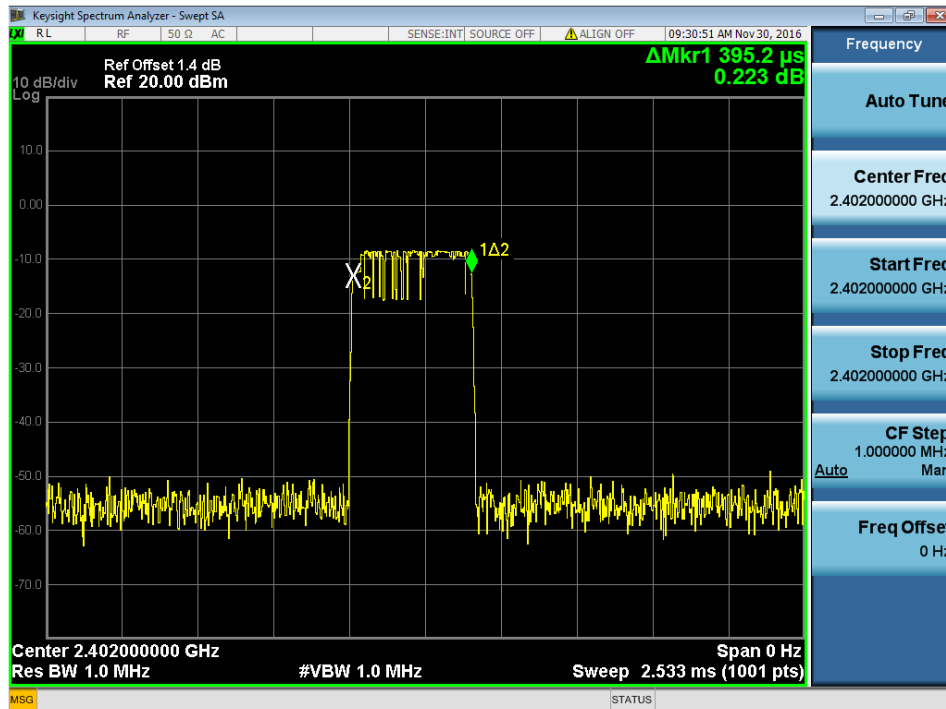


## ATTACHMENT F - AVERAGE TIME OF OCCUPANCY

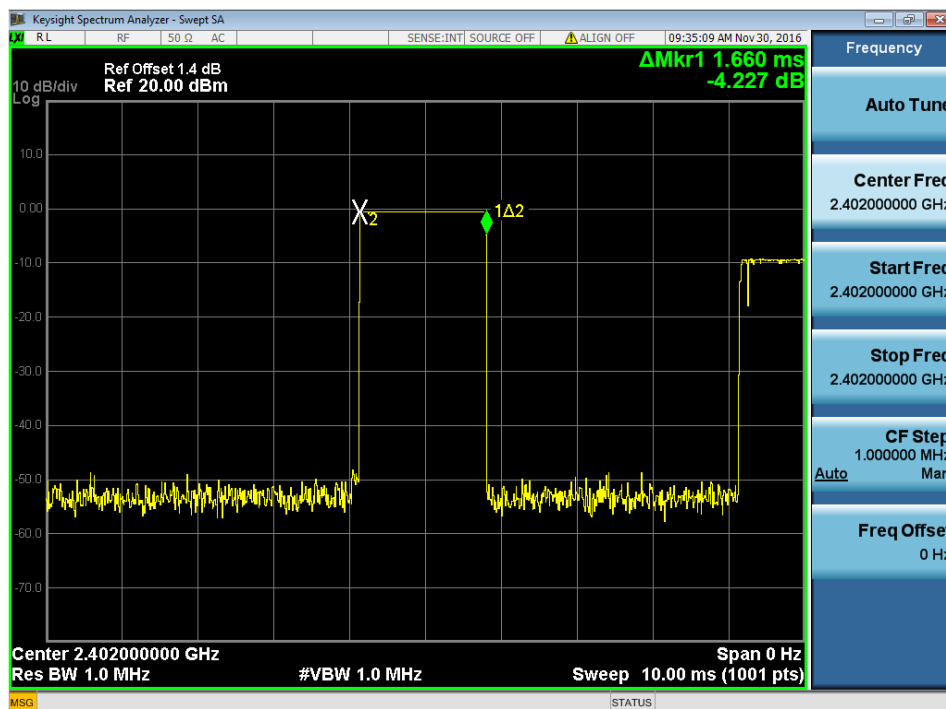
Test Mode :	TX Mode_1Mbps
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Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.9000	0.3093	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH1	2402	0.3952	0.1265	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6600	0.2656	0.4000	Pass
DH1	2441	0.4003	0.1281	0.4000	Pass
DH5	2480	2.9000	0.3093	0.4000	Pass
DH3	2480	1.6500	0.2640	0.4000	Pass
DH1	2480	0.3952	0.1265	0.4000	Pass

### CH00-DH1

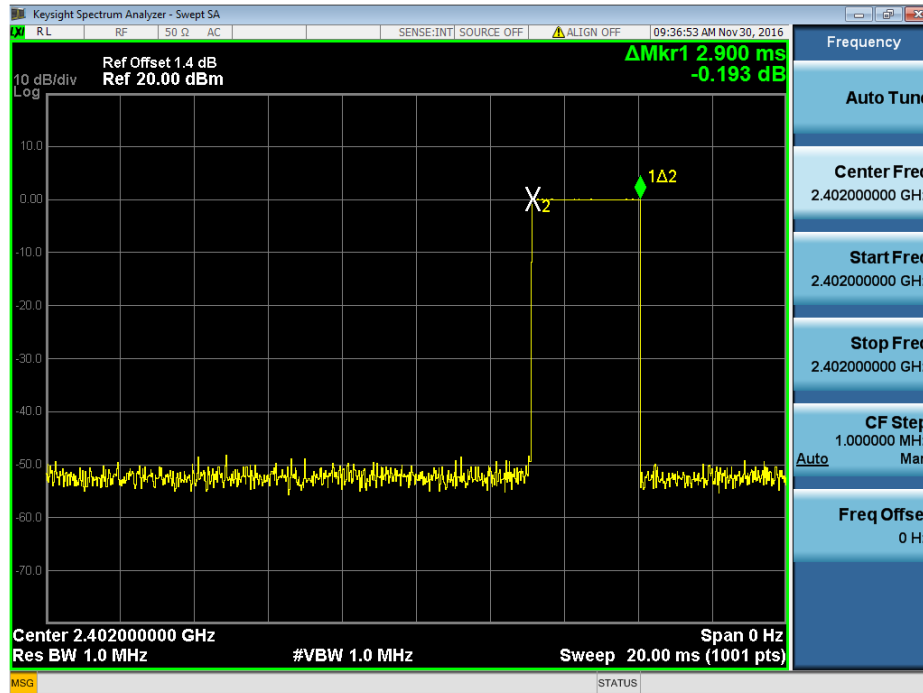


### CH00-DH3

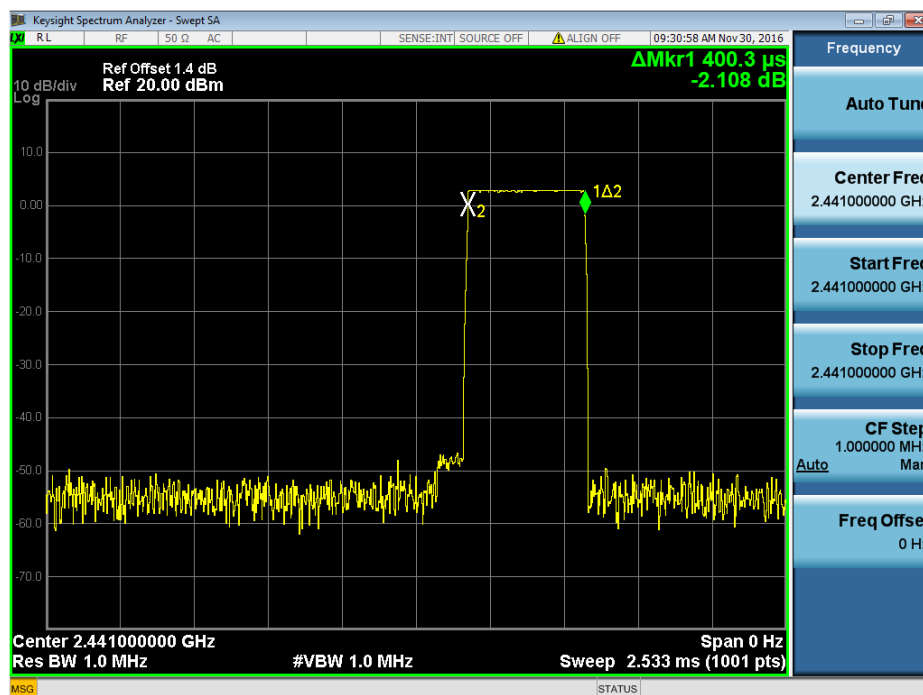




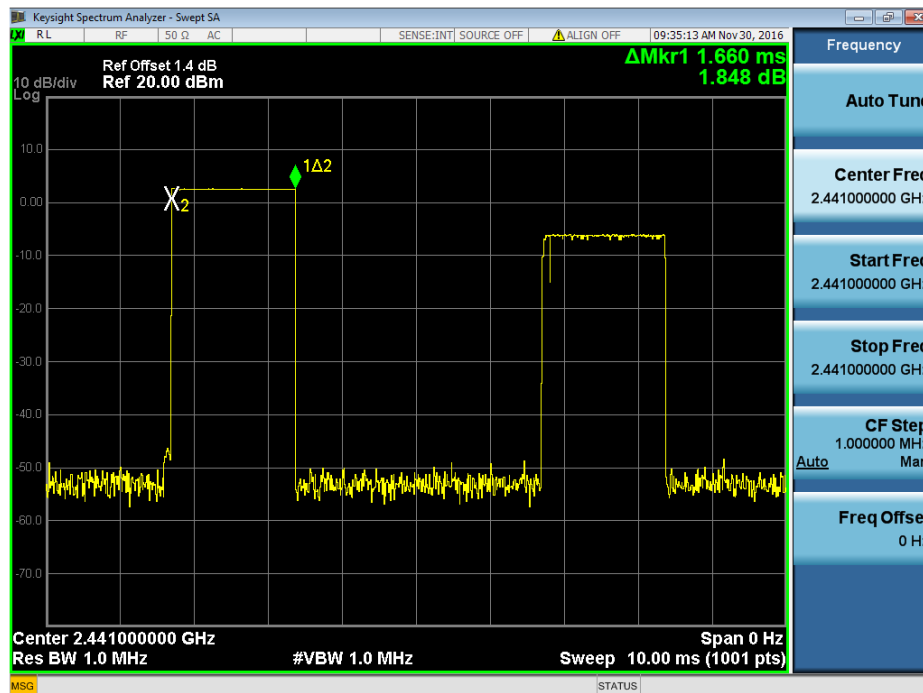
### CH00-DH5



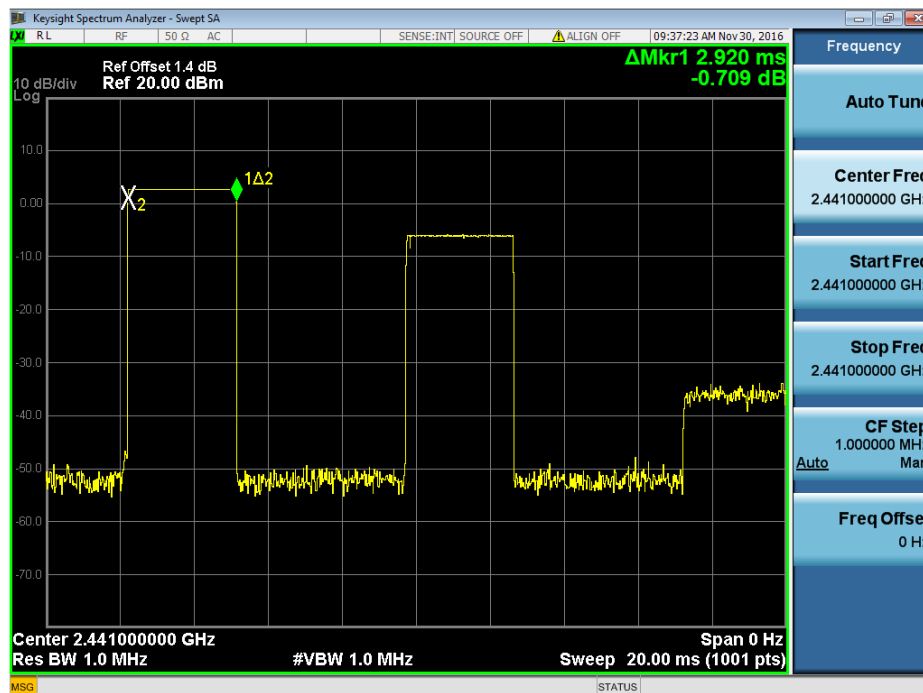
### CH39-DH1



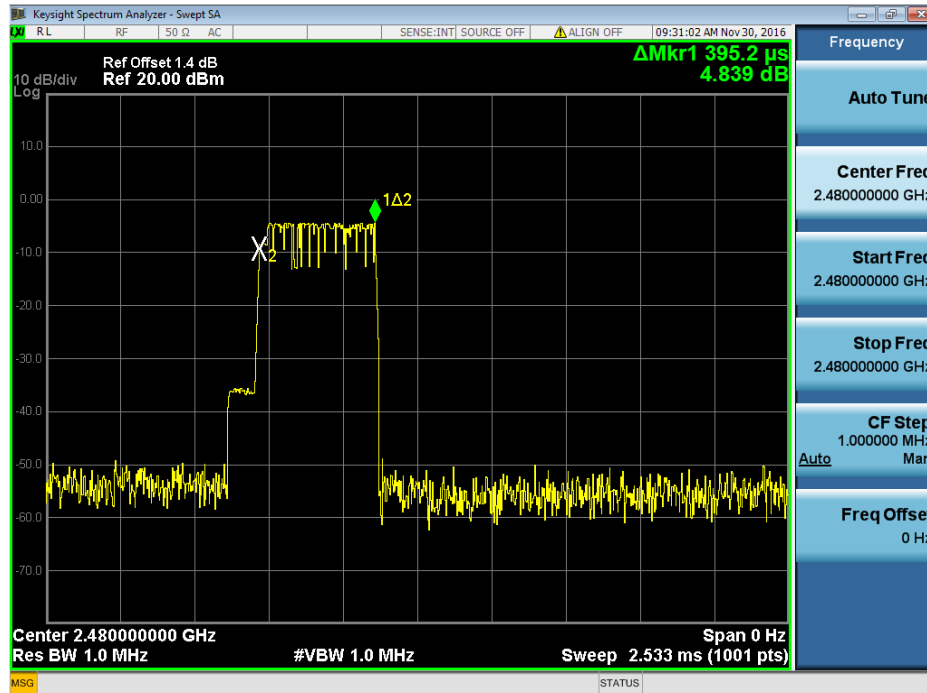
### CH39-DH3



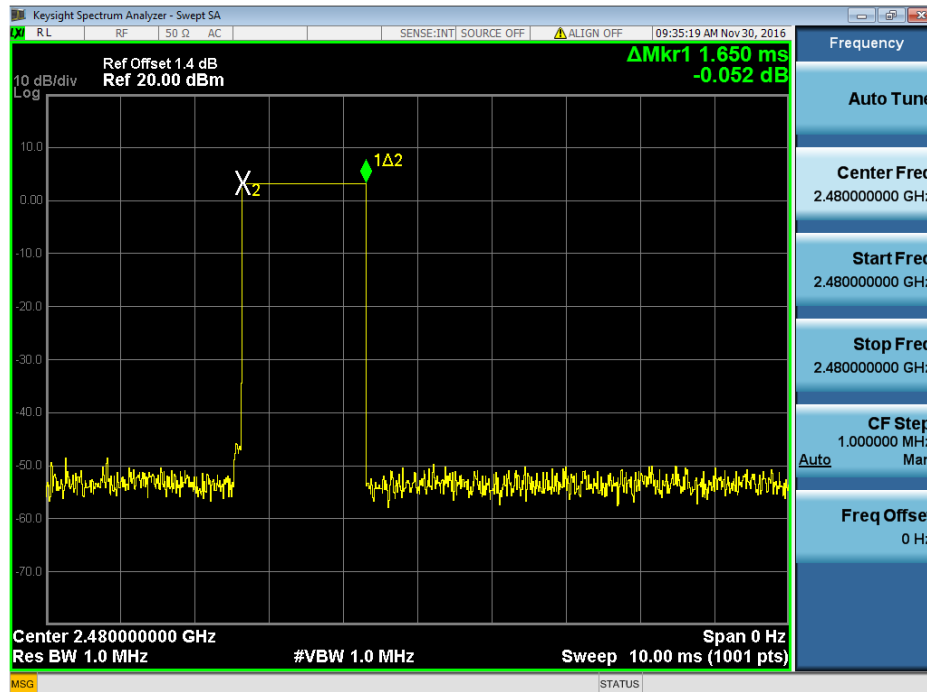
### CH39-DH5



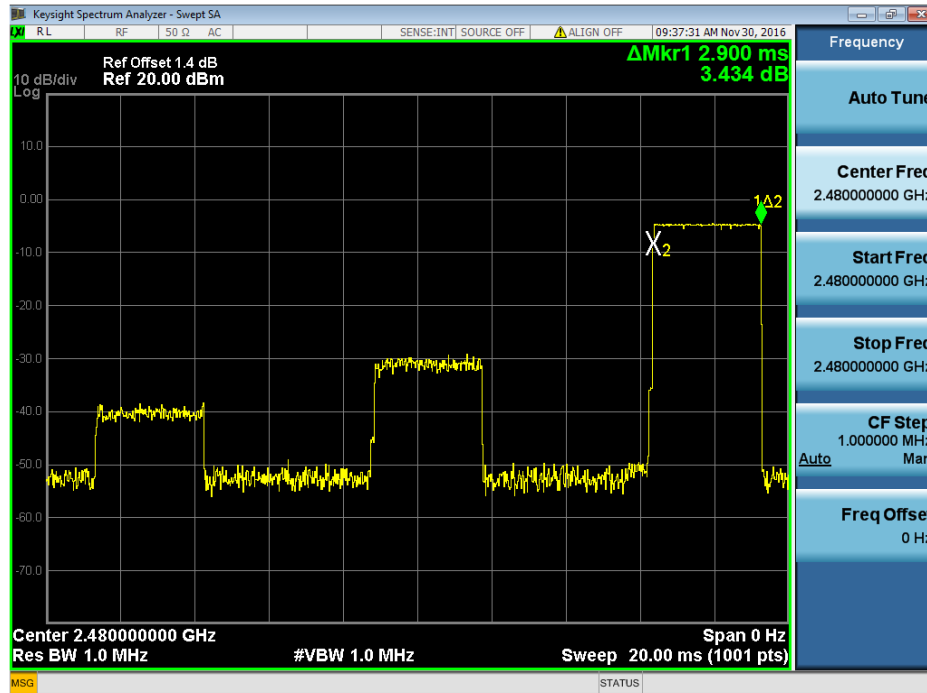
### CH78-DH1



### CH78-DH3



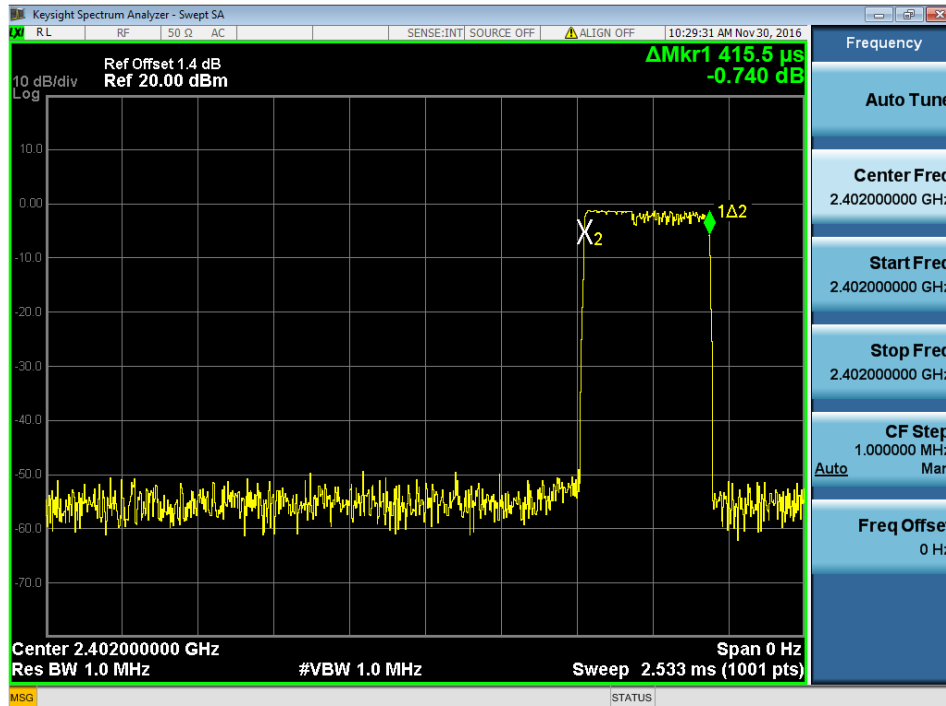
# CH78-DH5



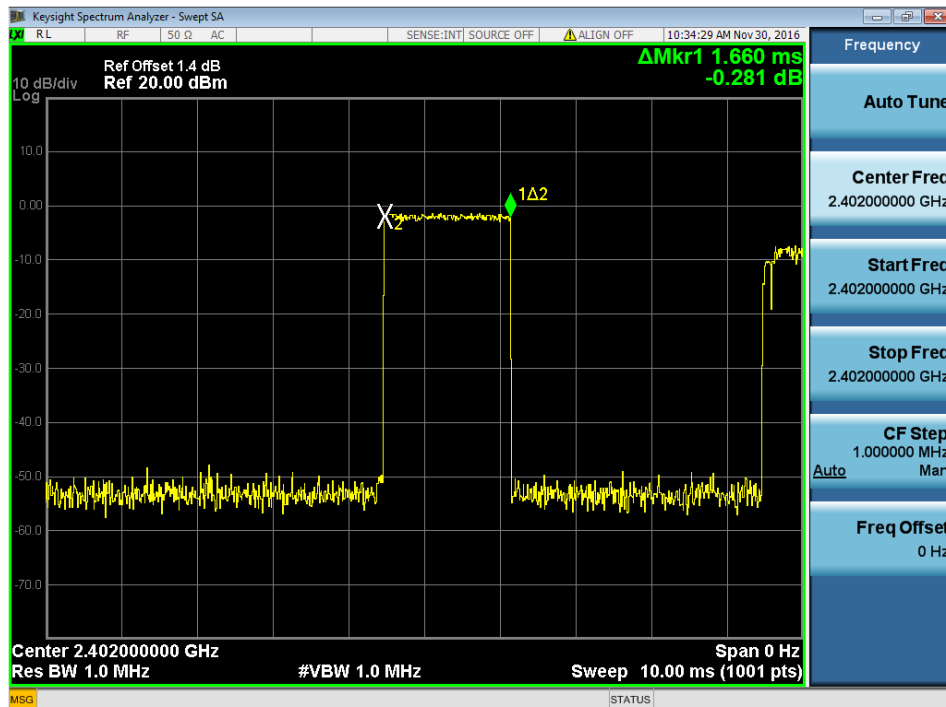
Test Mode :	TX Mode_3Mbps
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Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.9000	0.3093	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH1	2402	0.4155	0.1329	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6300	0.2608	0.4000	Pass
DH1	2441	0.4155	0.1329	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass
DH3	2480	1.6700	0.2672	0.4000	Pass
DH1	2480	0.4155	0.1329	0.4000	Pass

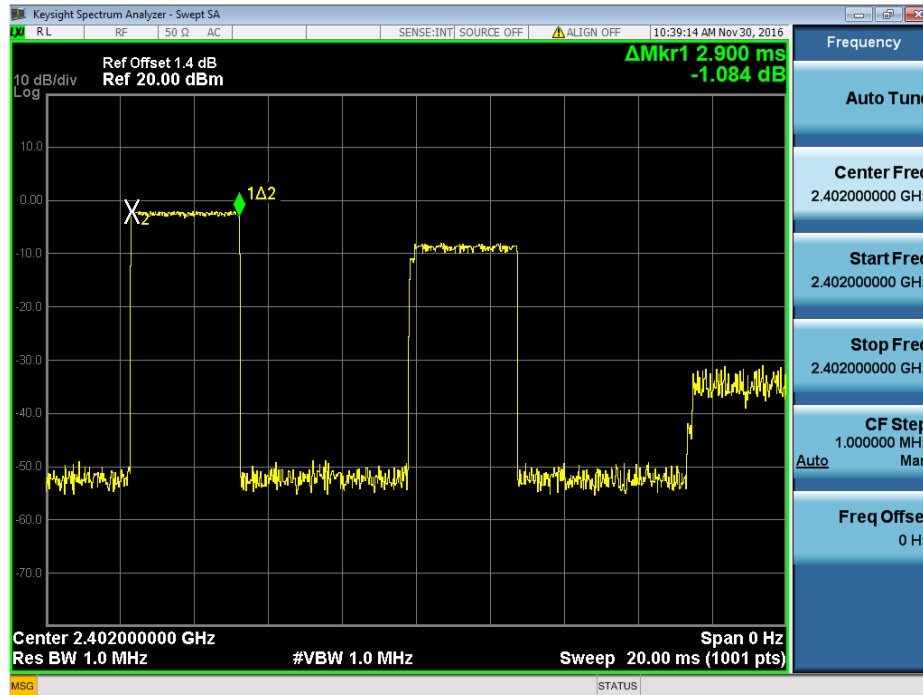
### CH00-DH1



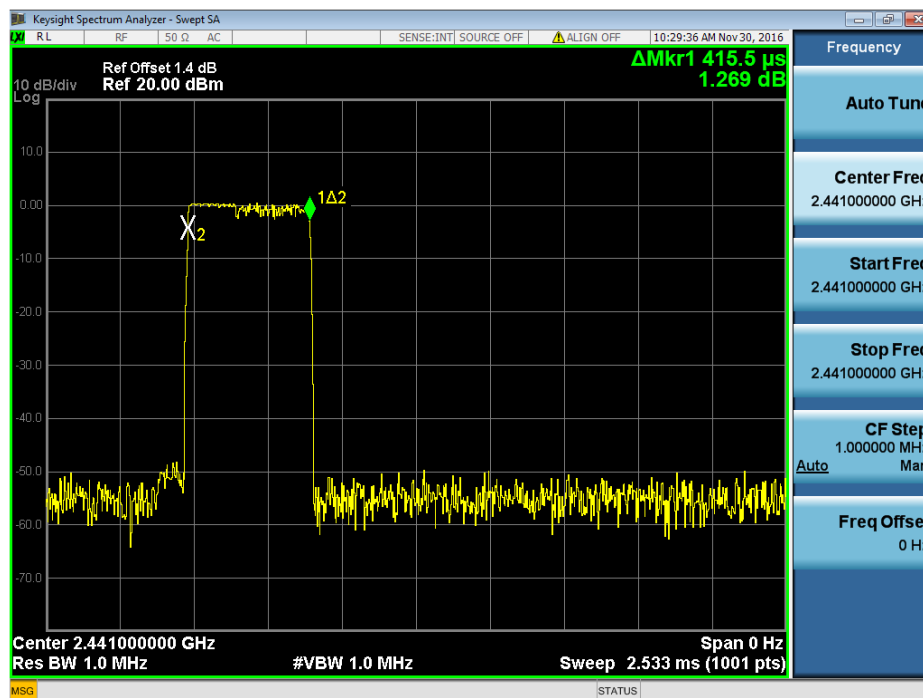
### CH00-DH3



### CH00-DH5



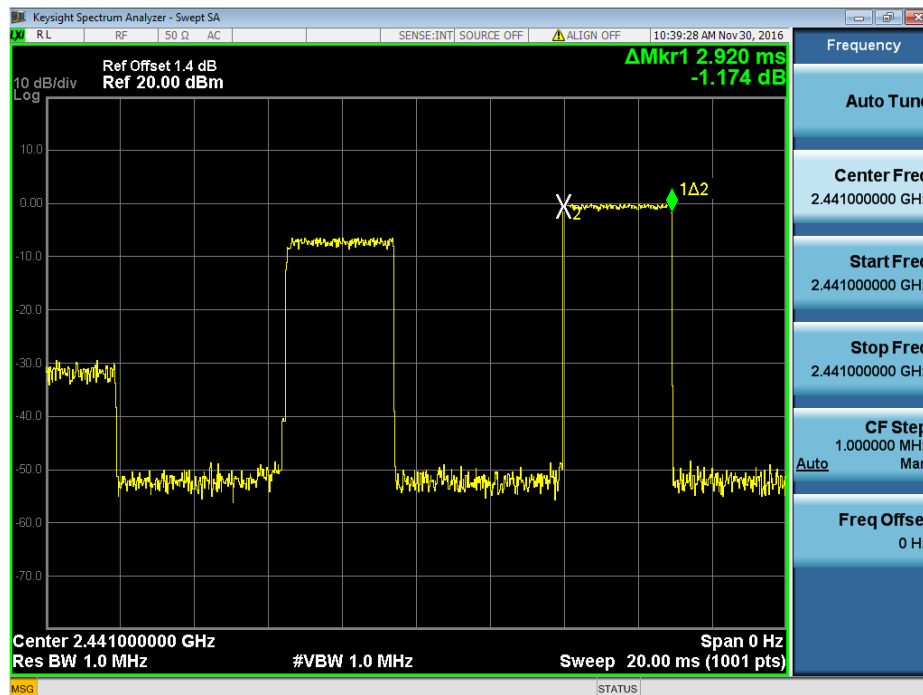
### CH39-DH1



### CH39-DH3

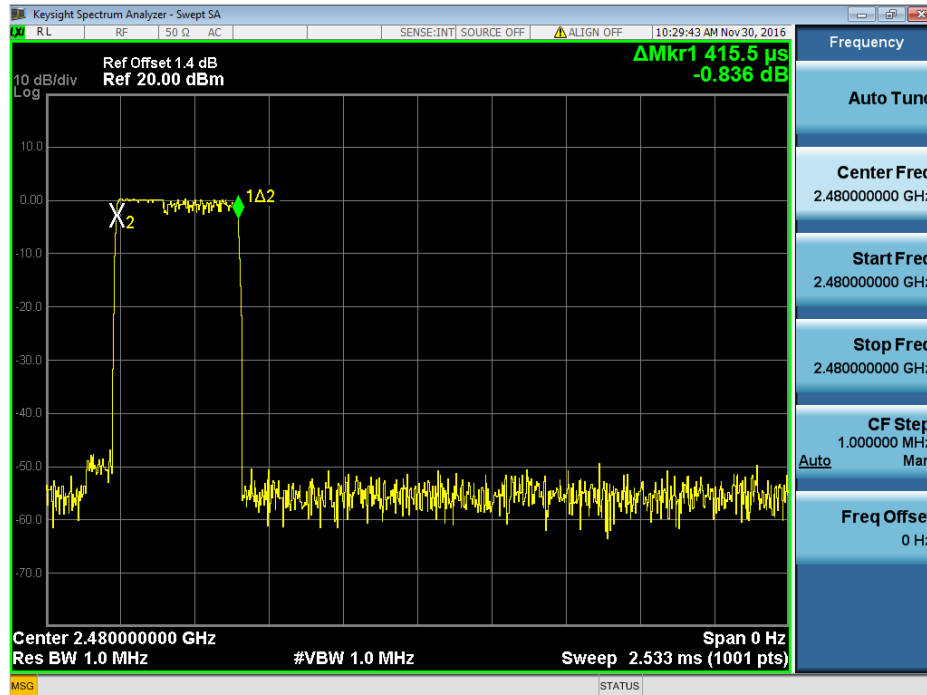


### CH39-DH5

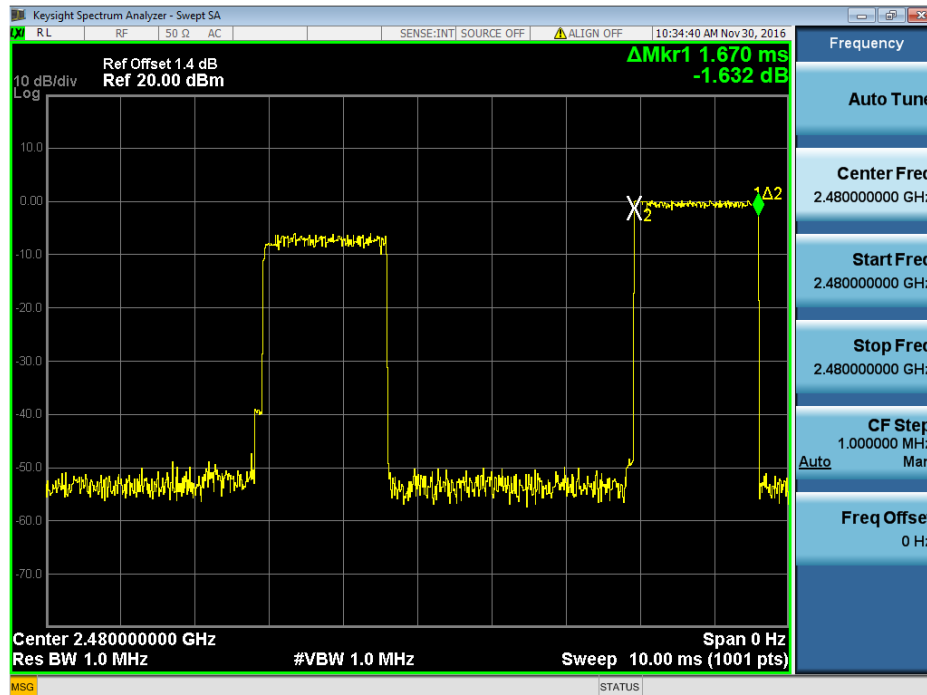




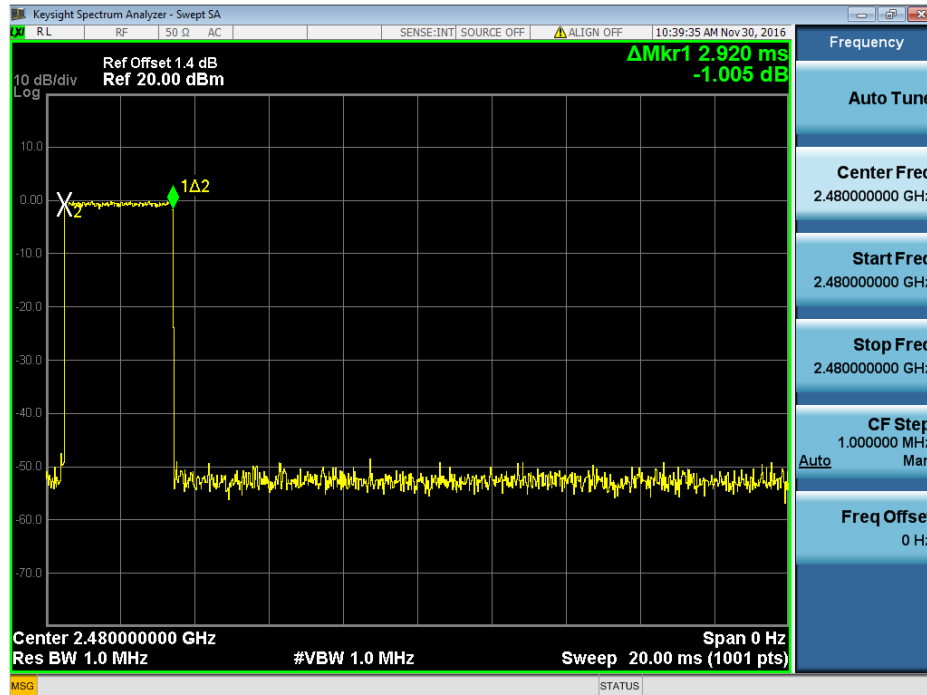
### CH78-DH1



### CH78-DH3



# CH78-DH5

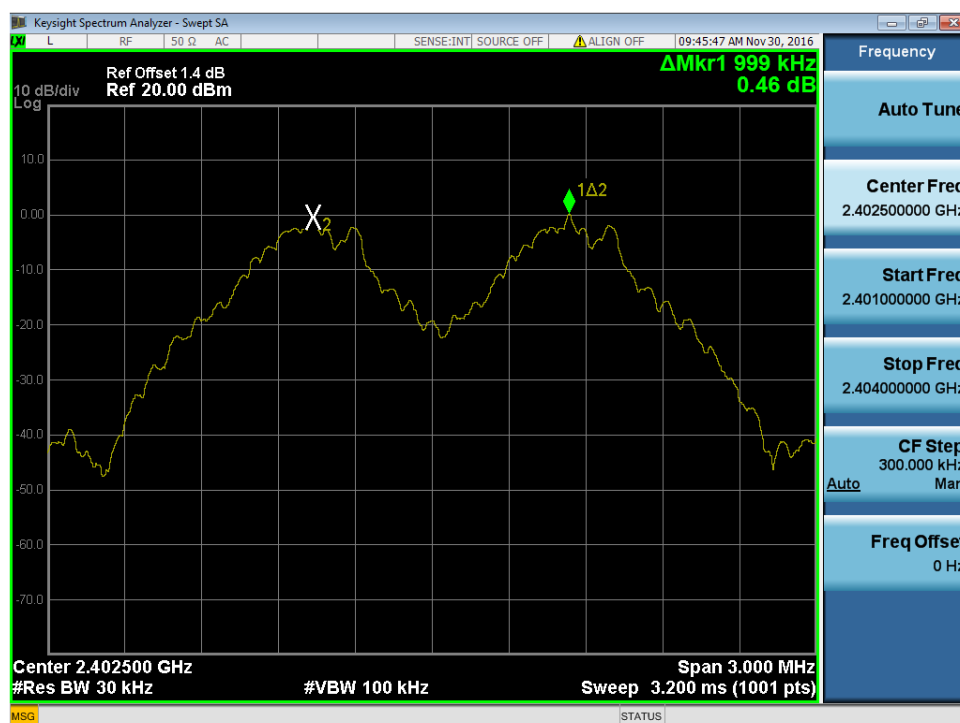


## ATTACHMENT G - HOPPING CHANNEL SEPARATION MEASUREMENT

Test Mode : Hopping on \_1Mbps

Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	0.999	0.683	Pass
2441	0.999	0.627	Pass
2480	0.999	0.632	Pass

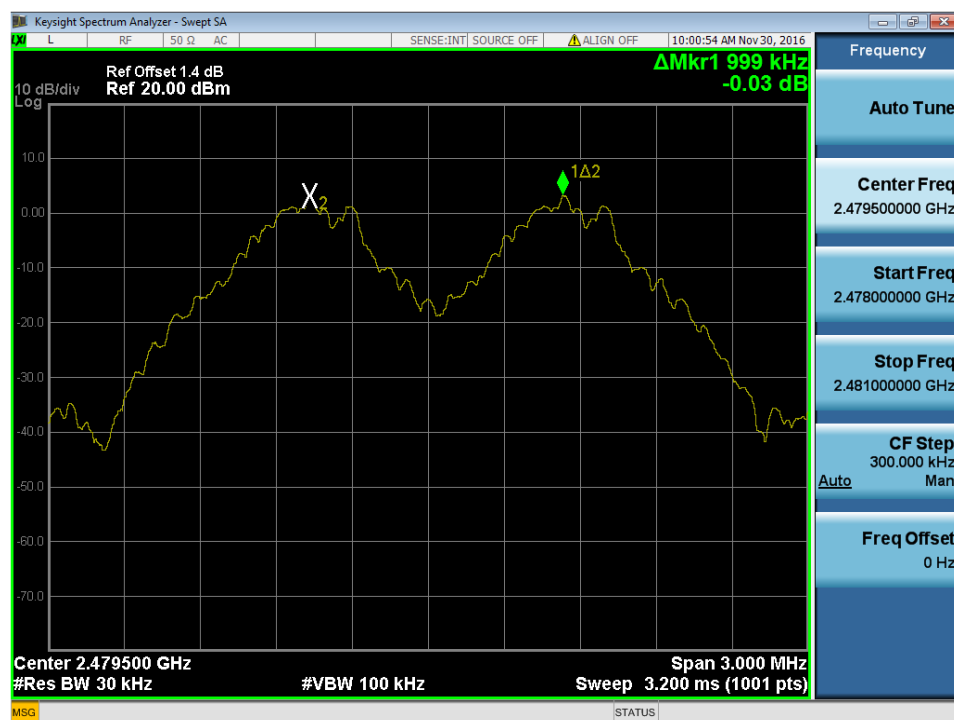
### CH00



### CH39



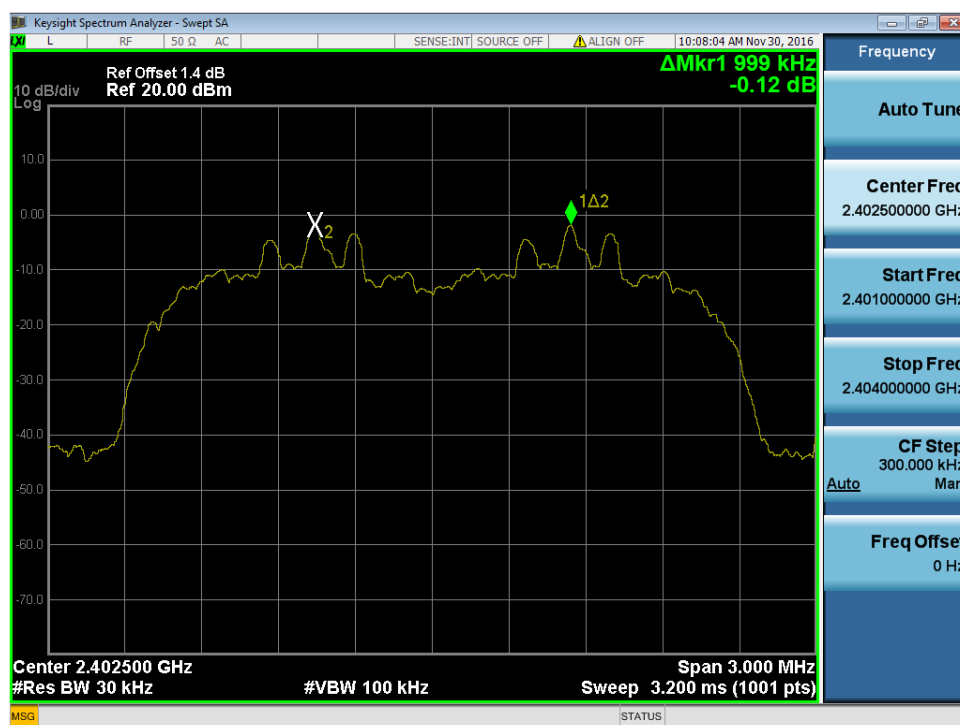
### CH78



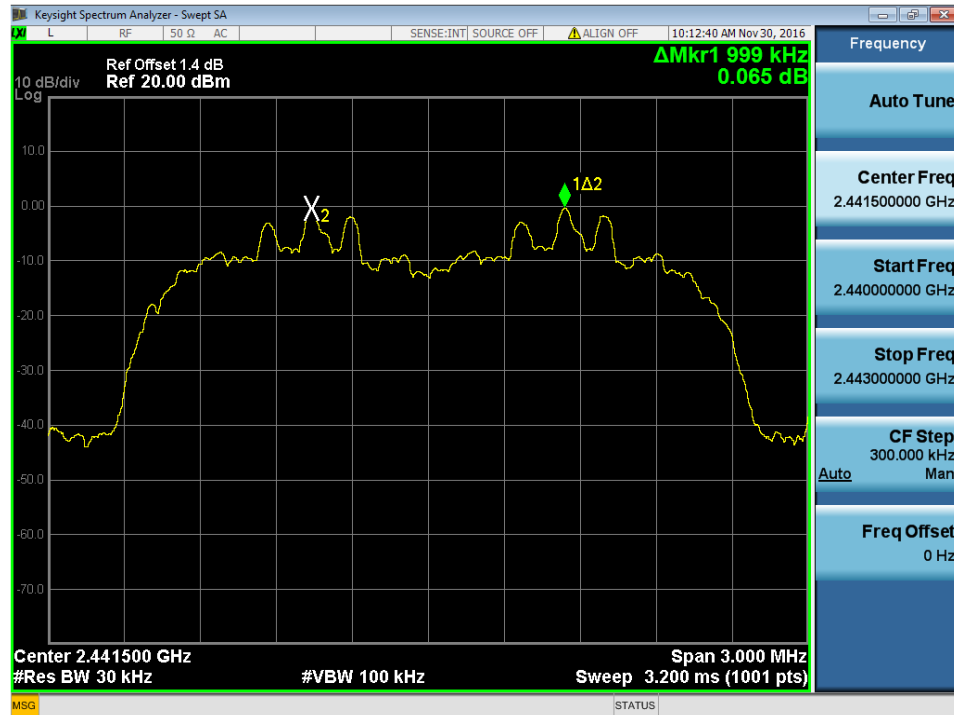
Test Mode :	Hopping on _3Mbps
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Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	0.999	0.839	Pass
2441	0.999	0.840	Pass
2480	0.999	0.841	Pass

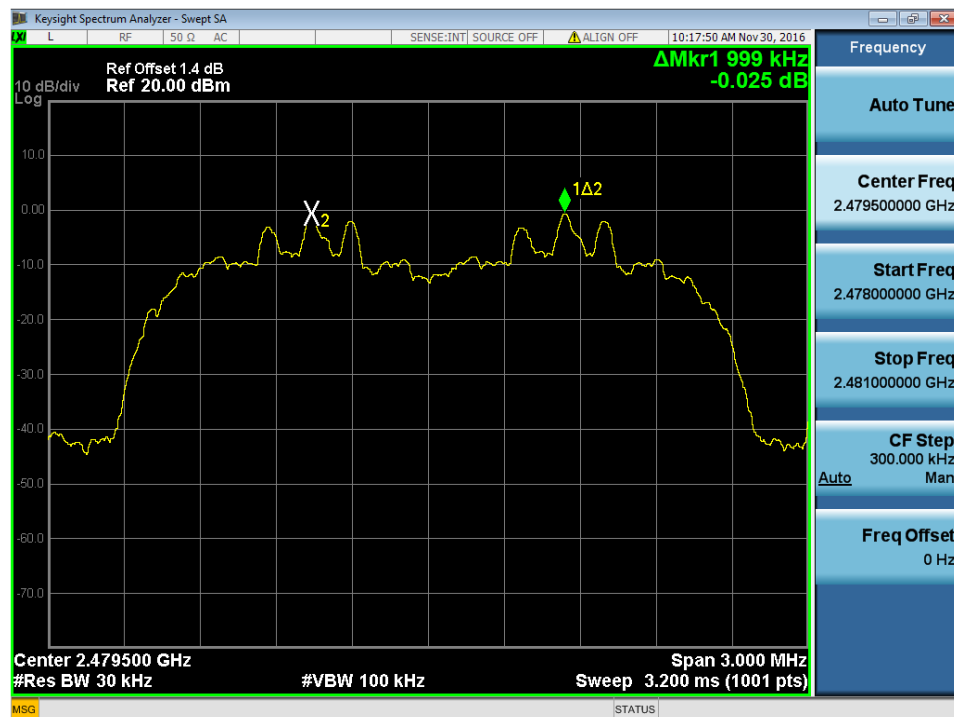
### CH00



### CH39



### CH78



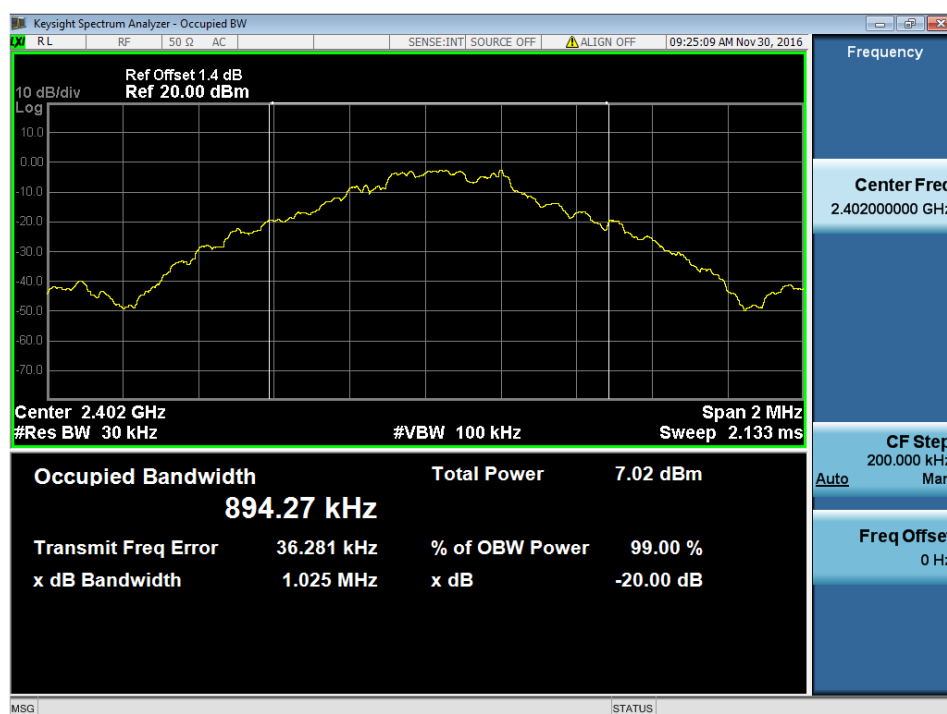
## ATTACHMENT H - BANDWIDTH



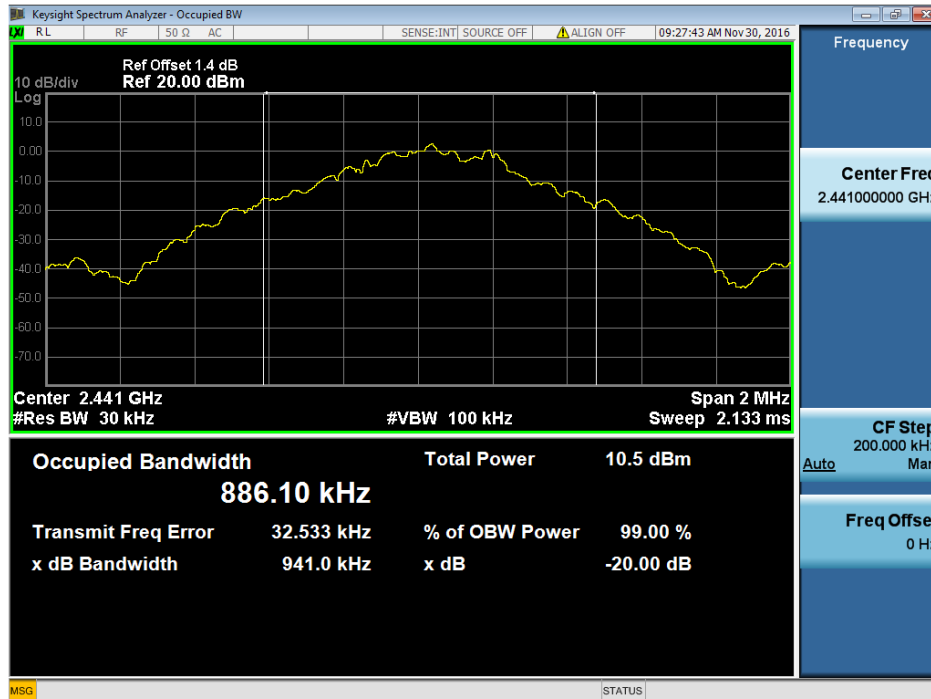
Test Mode :	TX Mode _1Mbps
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.025	0.894	Pass
2441	0.941	0.886	Pass
2480	0.947	0.883	Pass

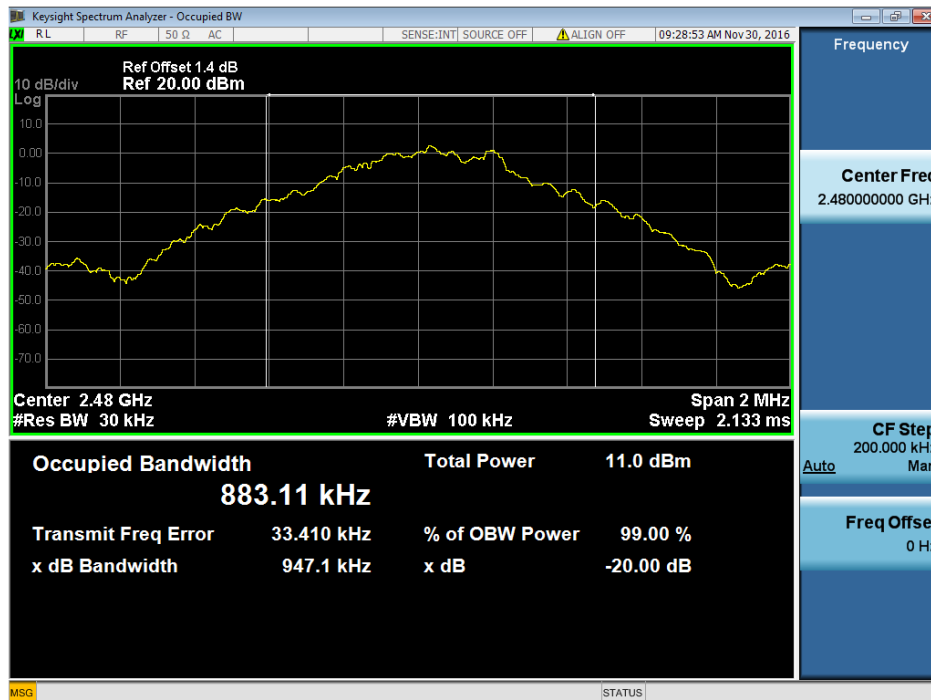
### CH00



### CH39



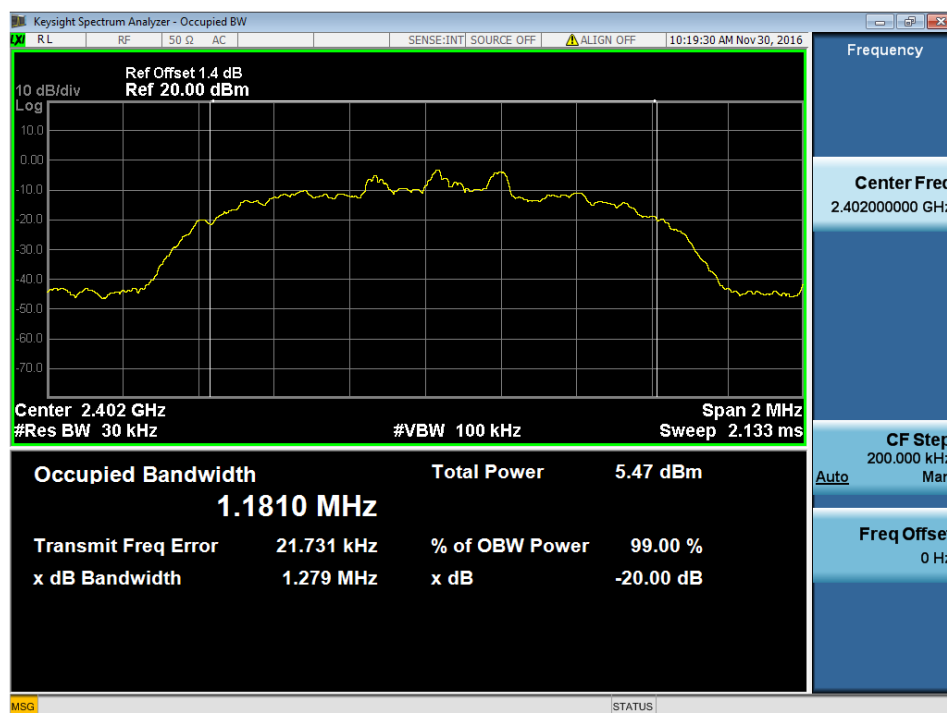
### CH78



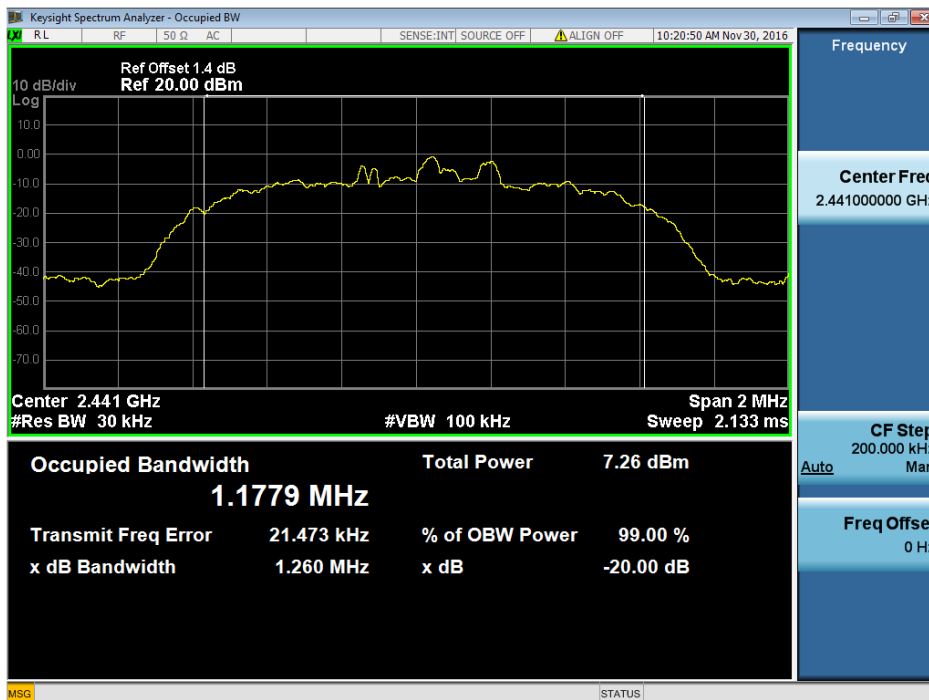
Test Mode :	TX Mode _3Mbps
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.279	1.181	Pass
2441	1.260	1.178	Pass
2480	1.262	1.175	Pass

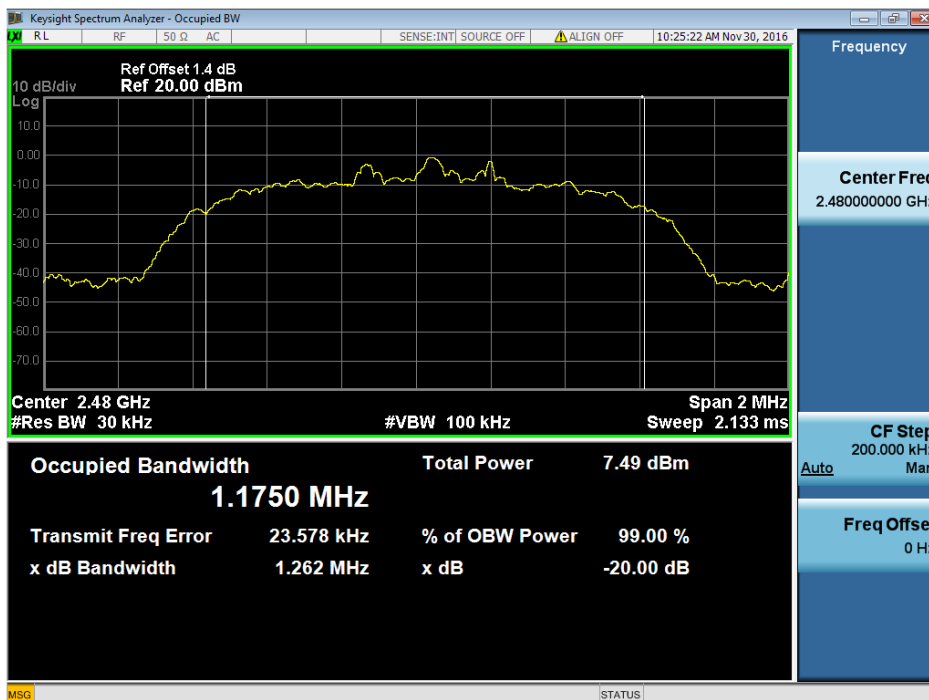
### CH00



### CH39



### CH78

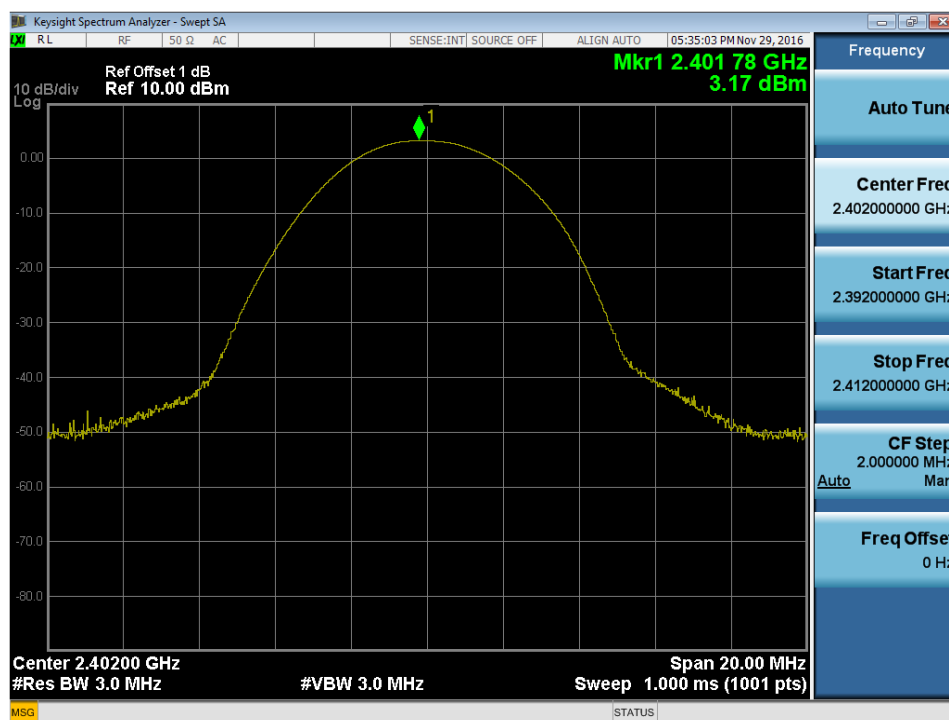


## ATTACHMENT I - PEAK OUTPUT POWER

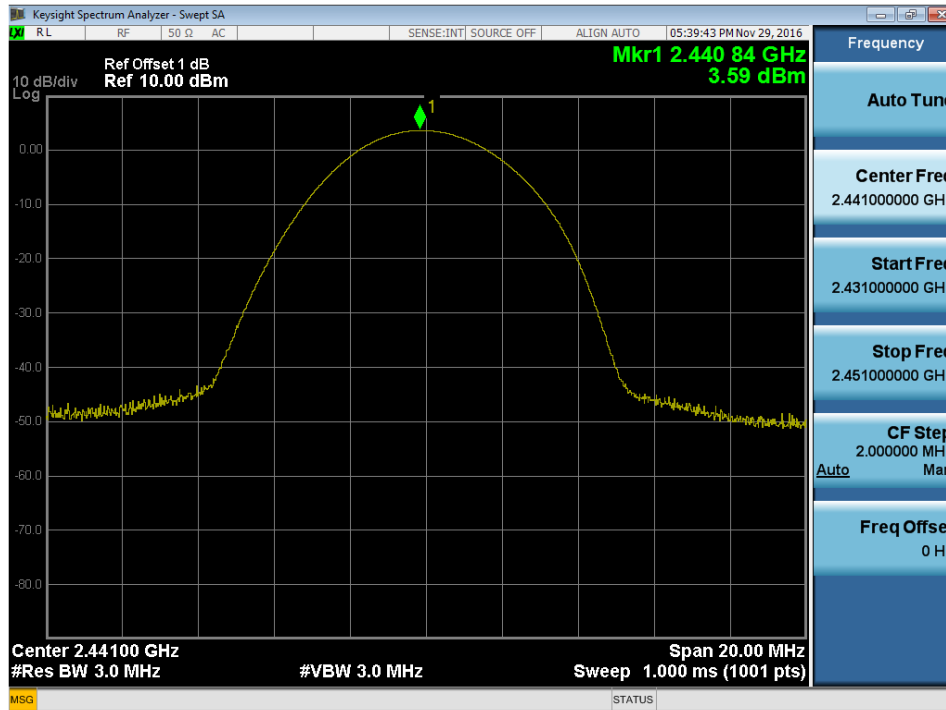
Test Mode :	TX Mode _1Mbps
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Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	3.17	0.0021	30.00	1.00	Pass
2441	3.59	0.0023	30.00	1.00	Pass
2480	4.65	0.0029	30.00	1.00	Pass

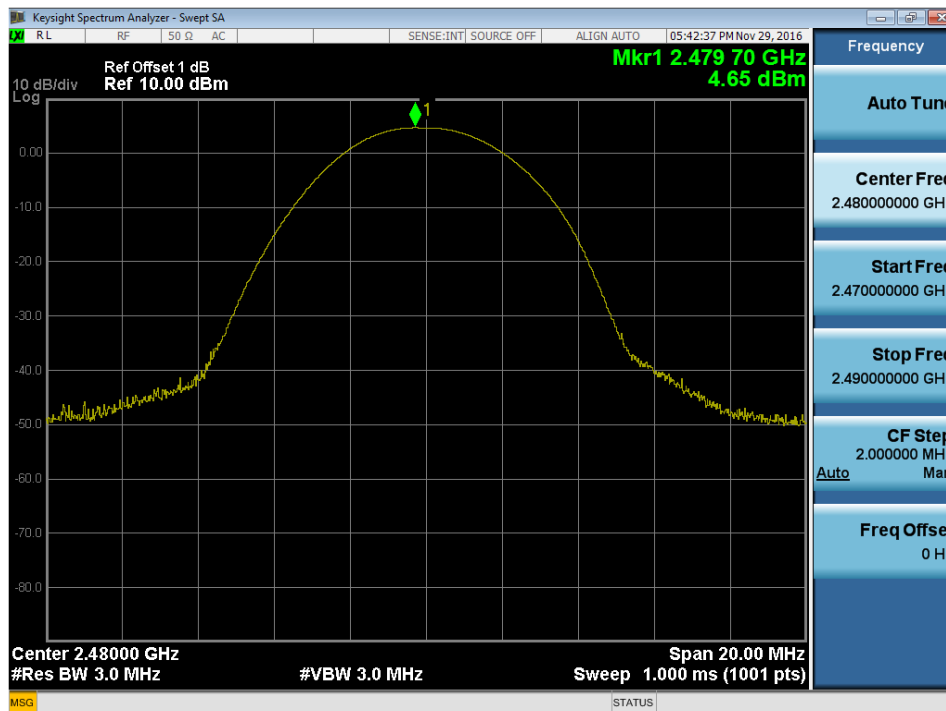
### CH00



### CH39



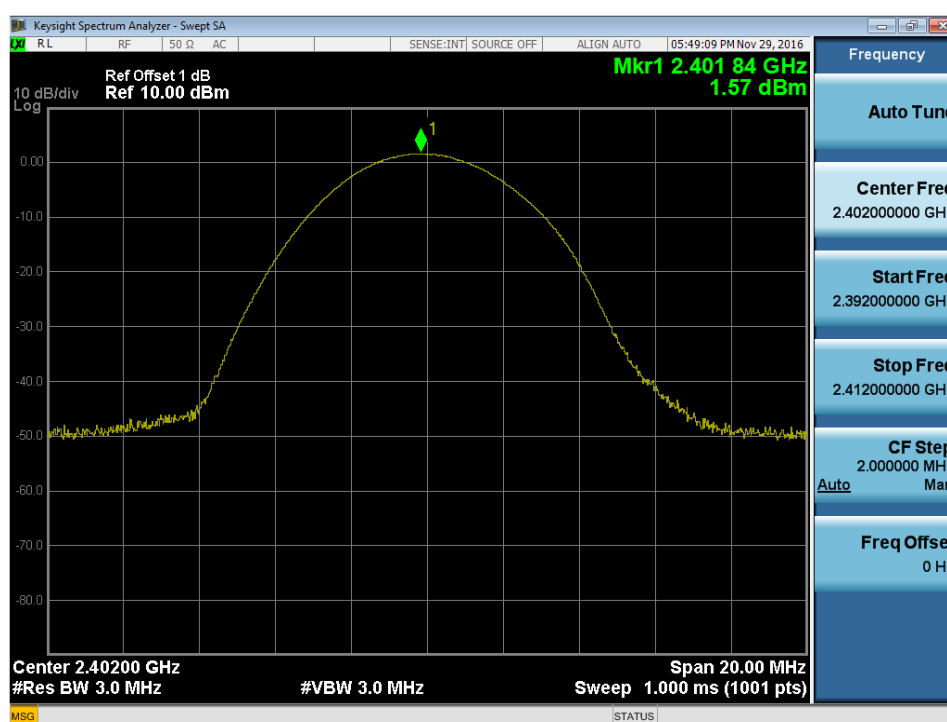
### CH78



Test Mode :	TX Mode _3Mbps
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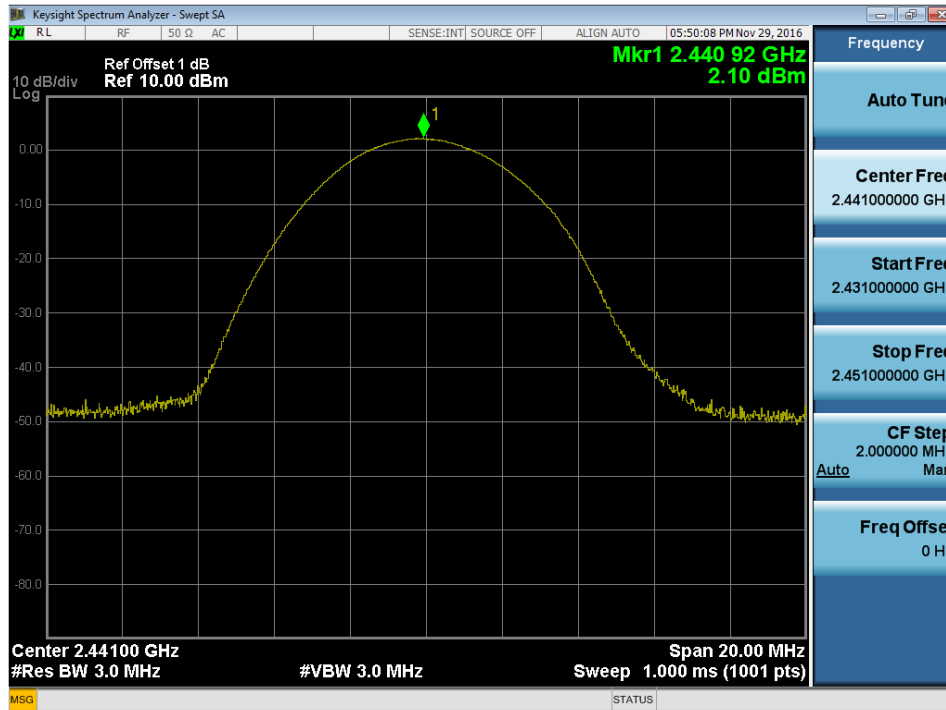
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	1.57	0.0014	30.00	1.00	Pass
2441	2.10	0.0016	30.00	1.00	Pass
2480	2.22	0.0017	30.00	1.00	Pass

### CH00

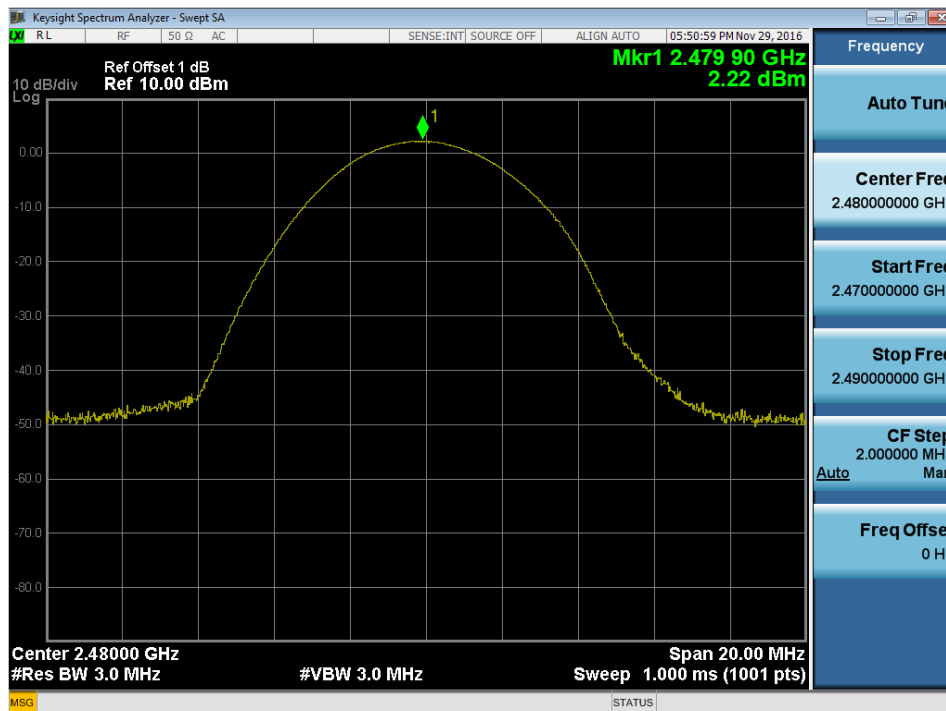




### CH39

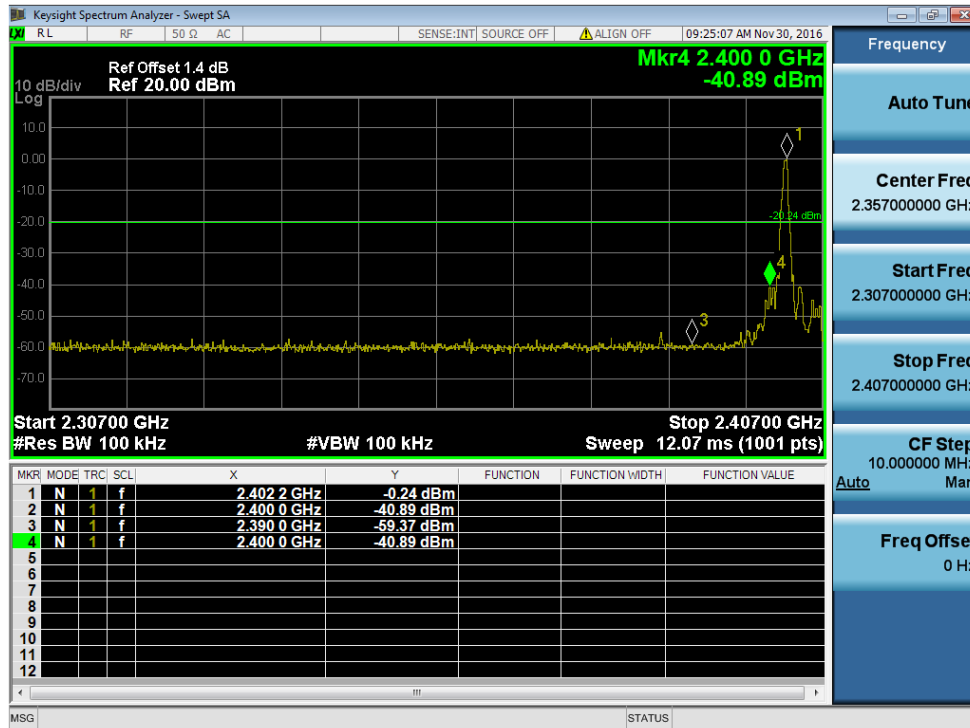


### CH78

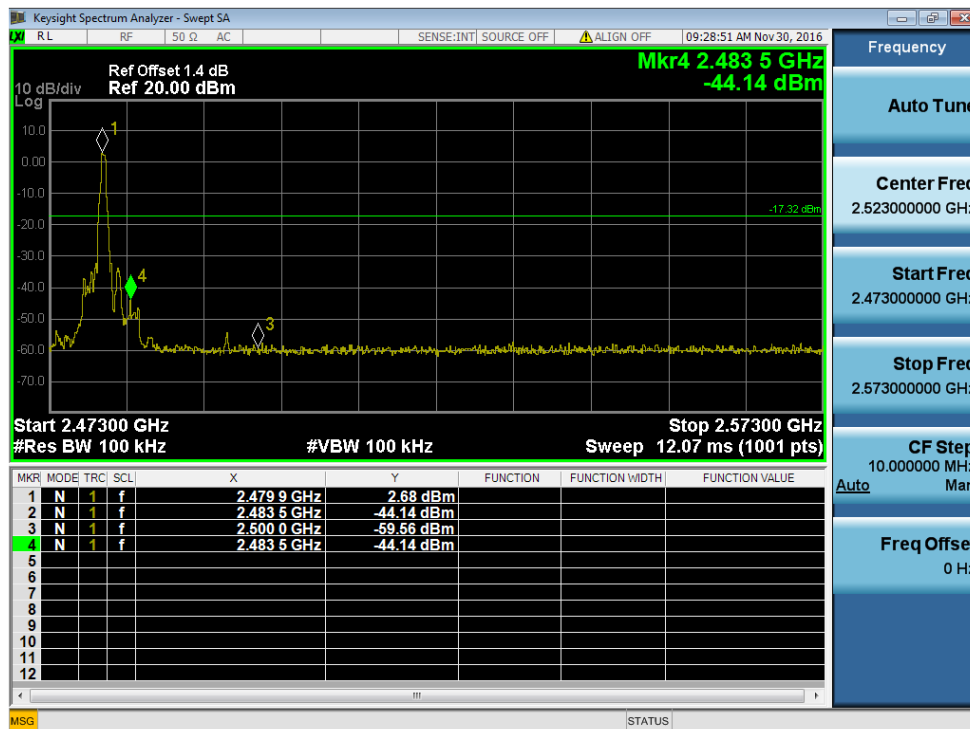


## ATTACHMENT J - ANTENNA CONDUCTED SPURIOUS EMISSION

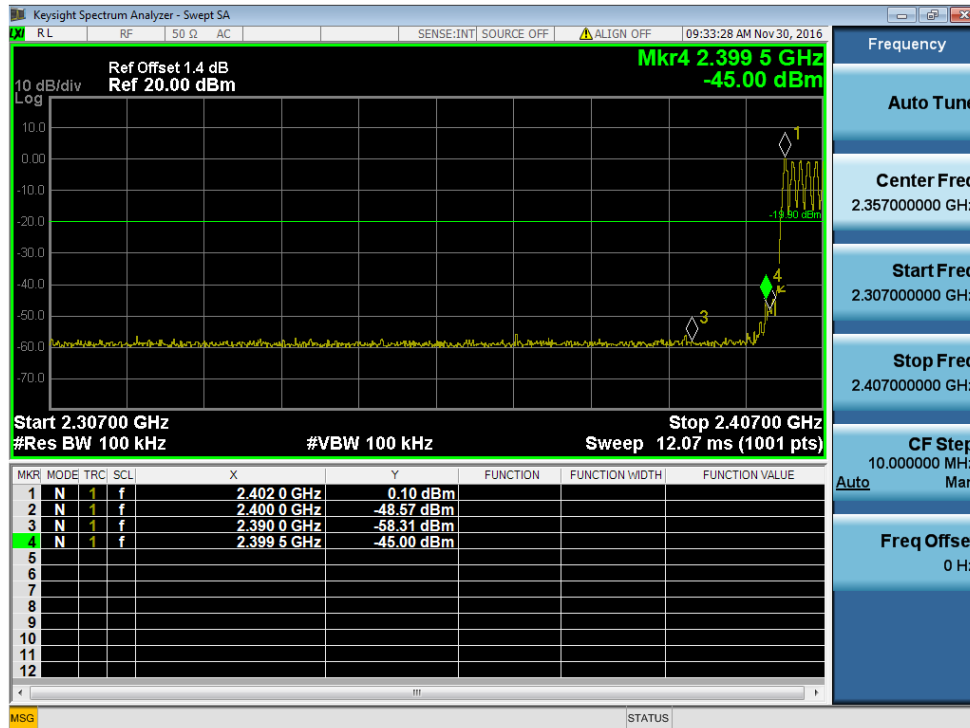
### CH00 (Lower)\_1Mbps



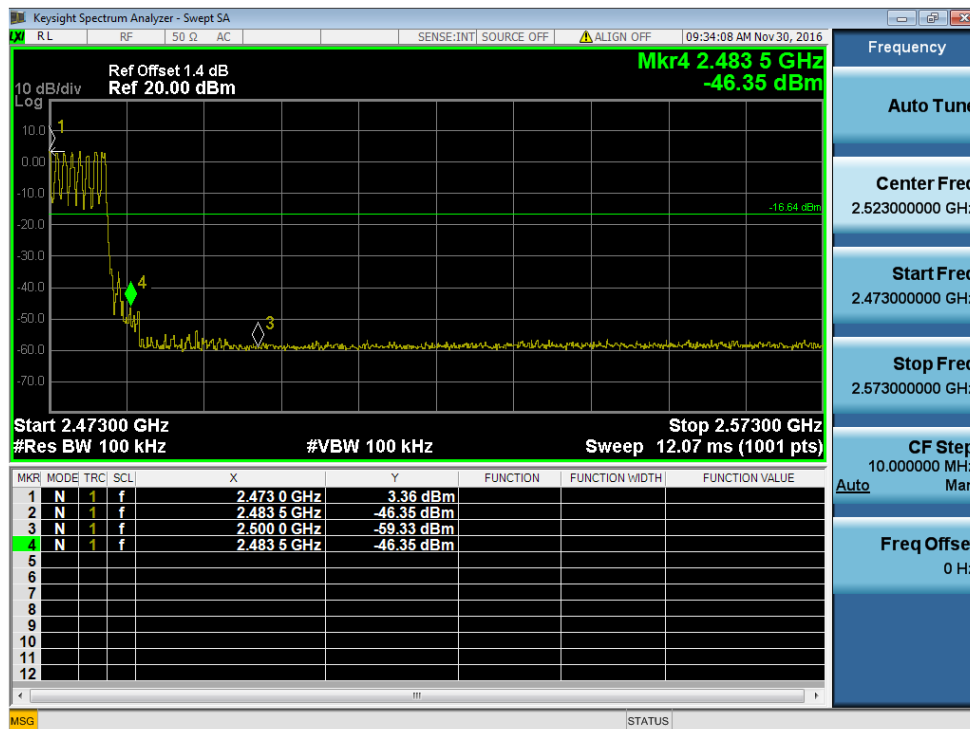
### CH78 (Upper)\_1Mbps



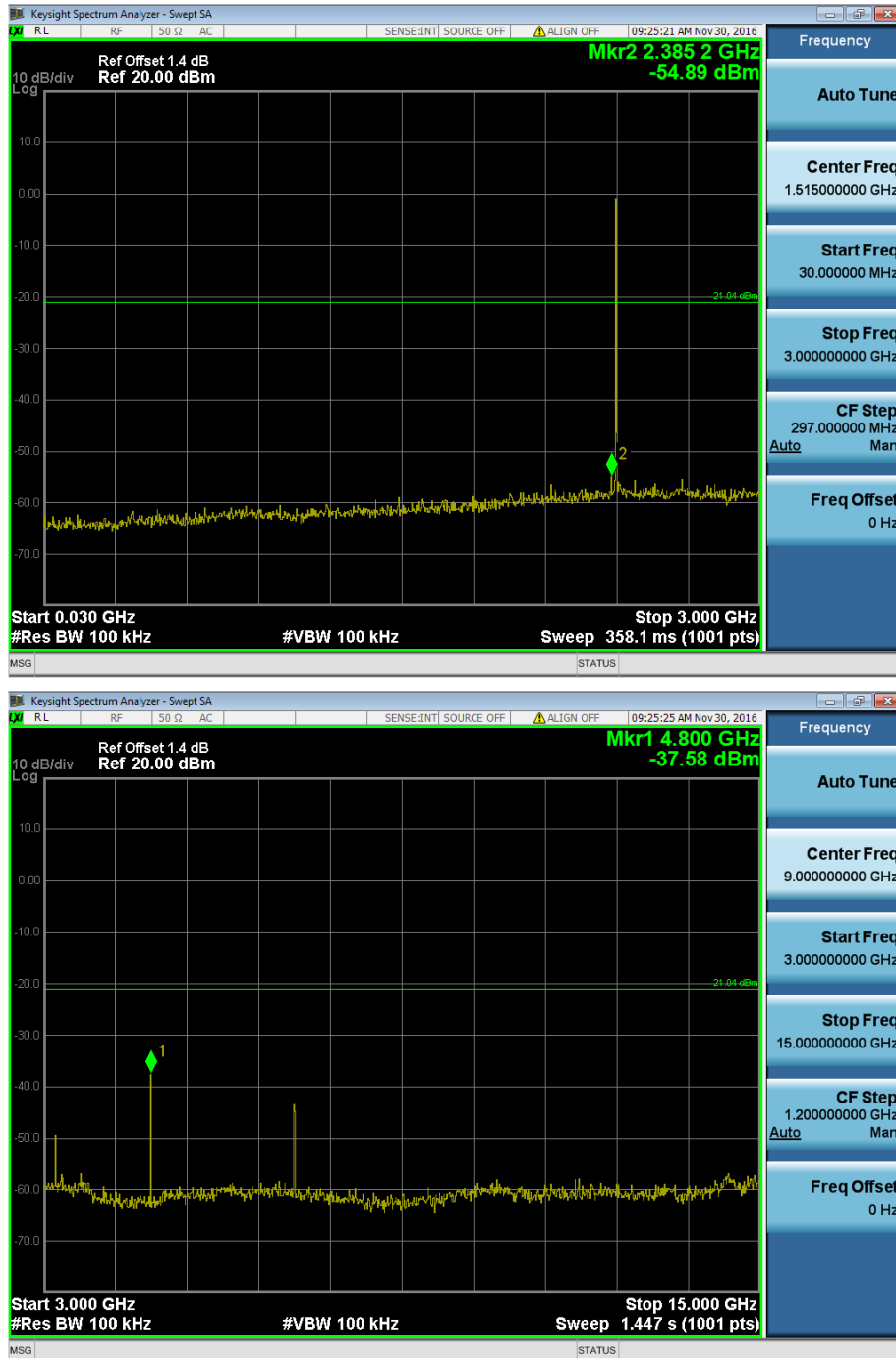
### CH00 Hopping on mode (Lower)\_1Mbps



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

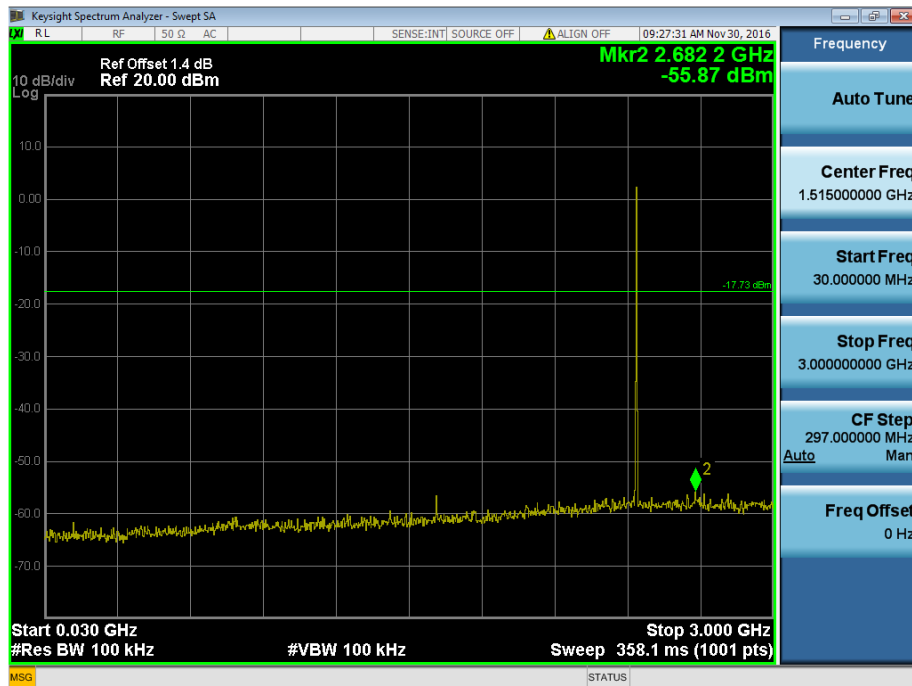


### CH00 (10 Harmonic of the frequency) \_1Mbps



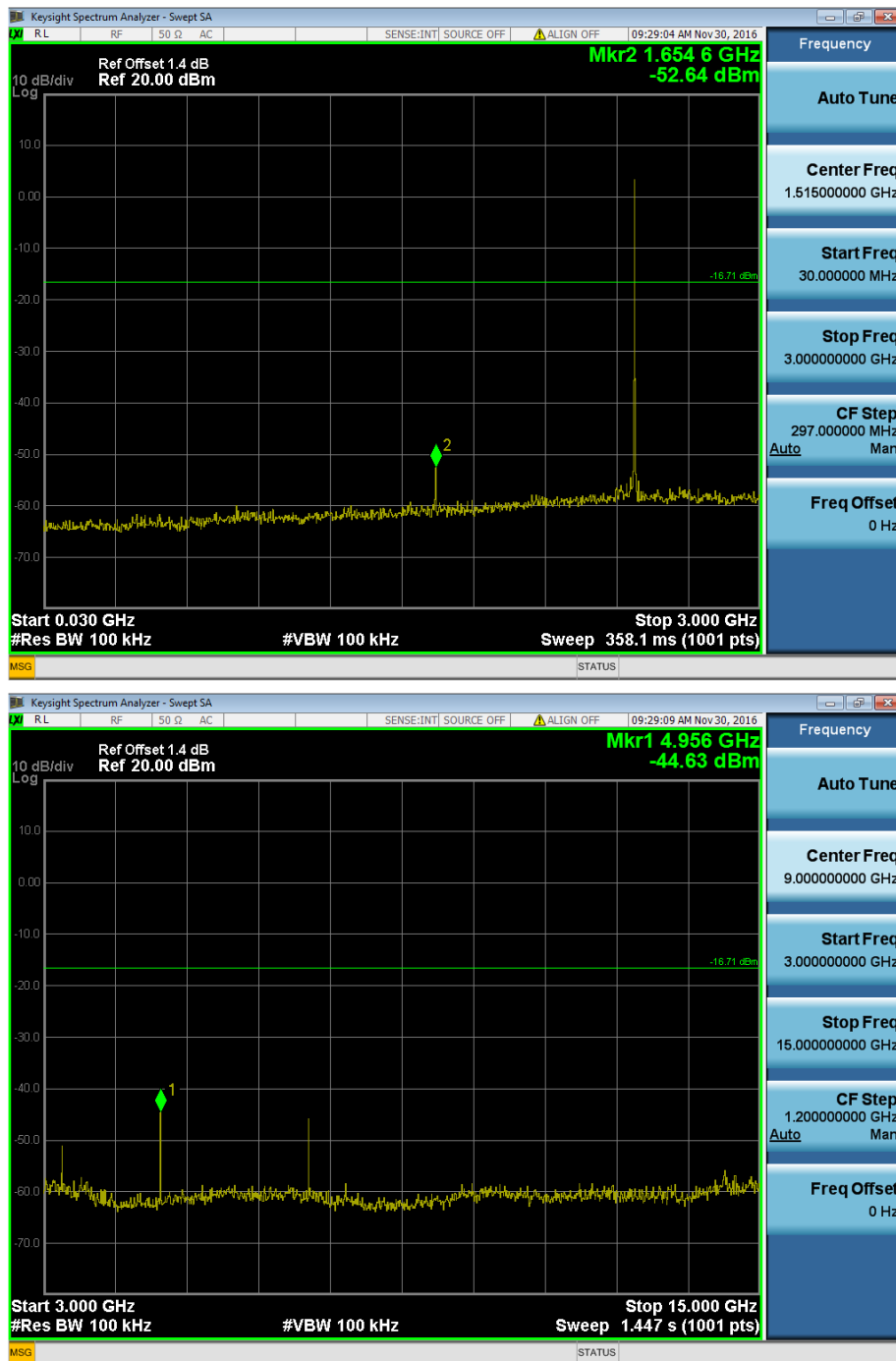


CH39 (10 Harmonic of the frequency) \_1Mbps





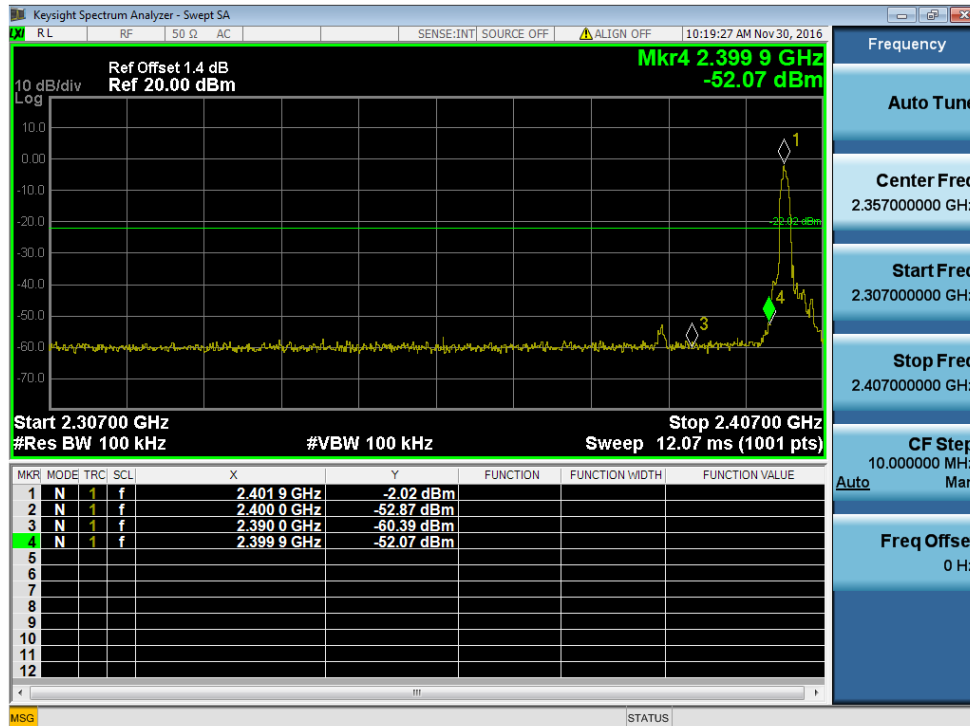
### CH78 (10 Harmonic of the frequency) \_1Mbps



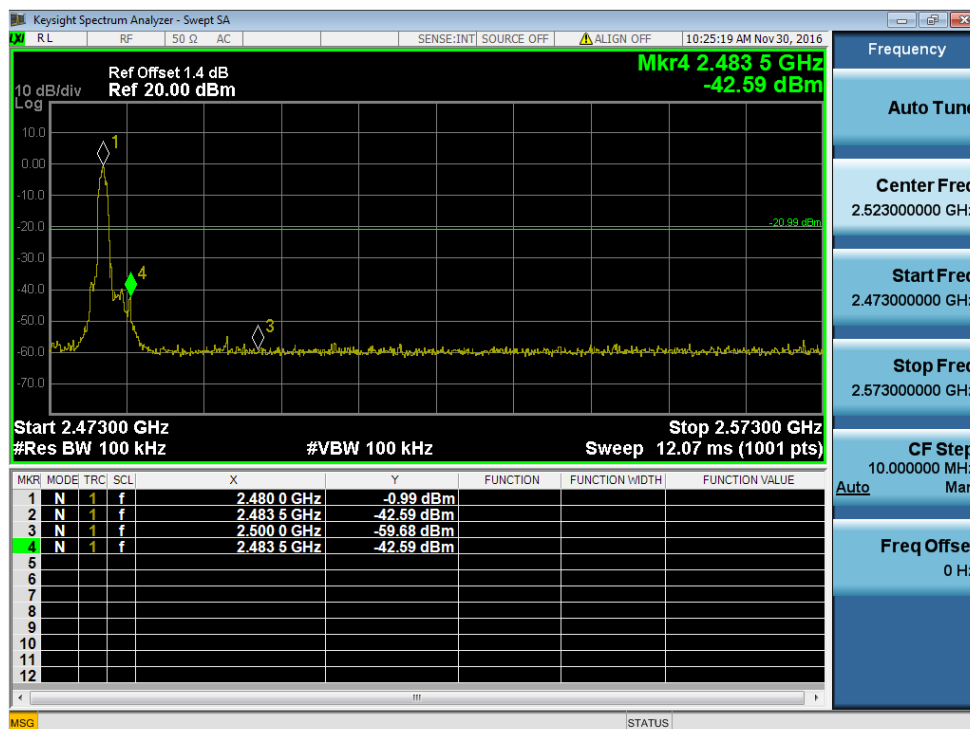




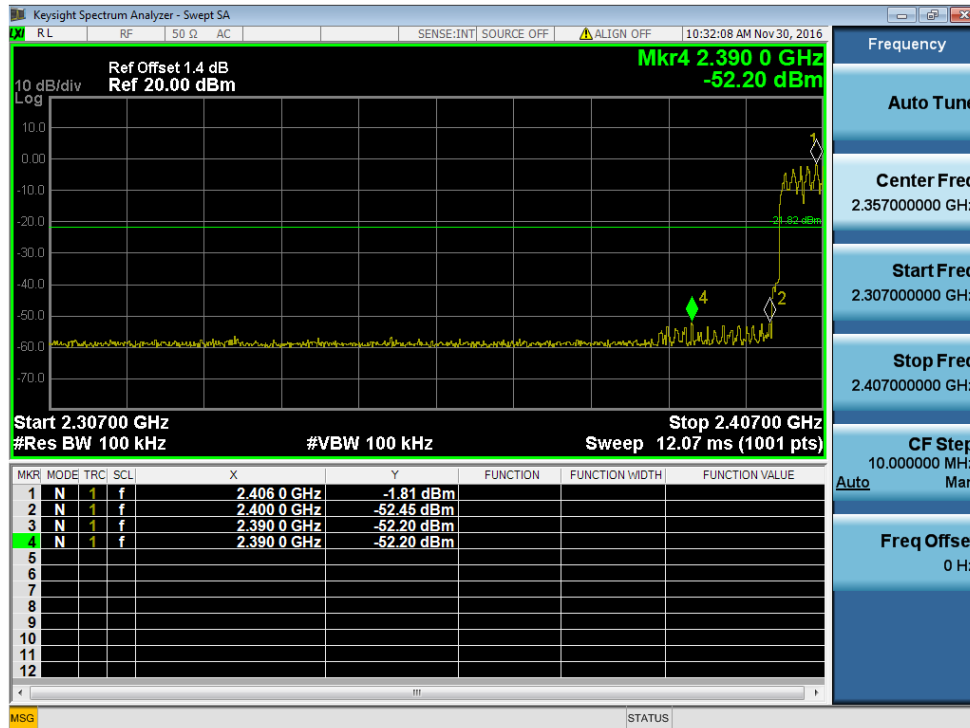
### CH00 (Lower) \_3Mbps



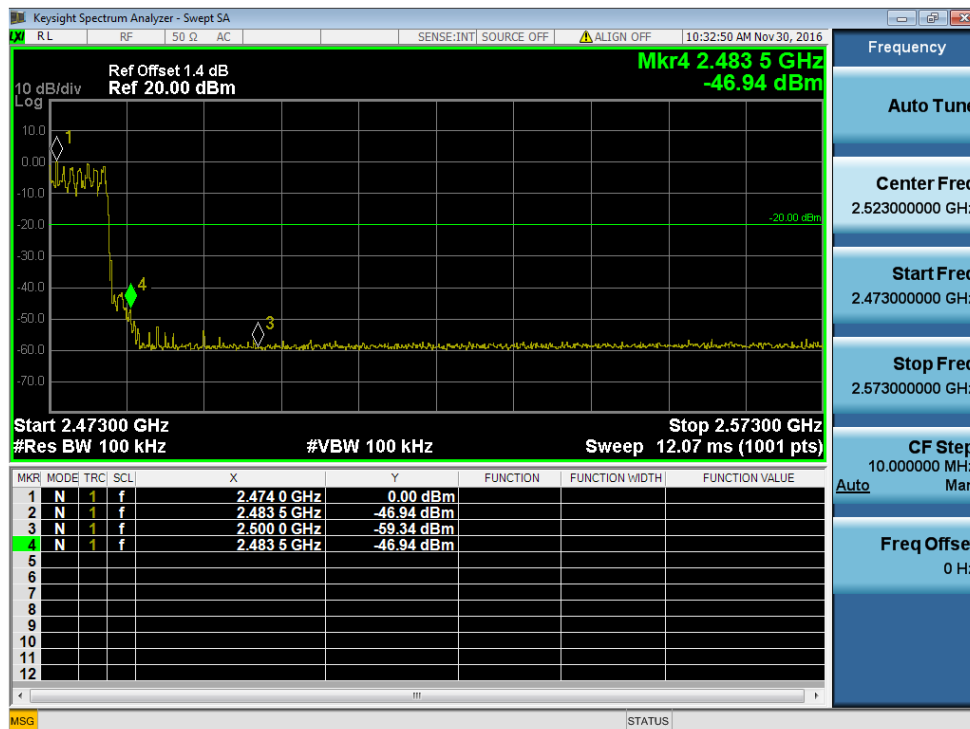
### CH78 (Upper) \_3Mbps



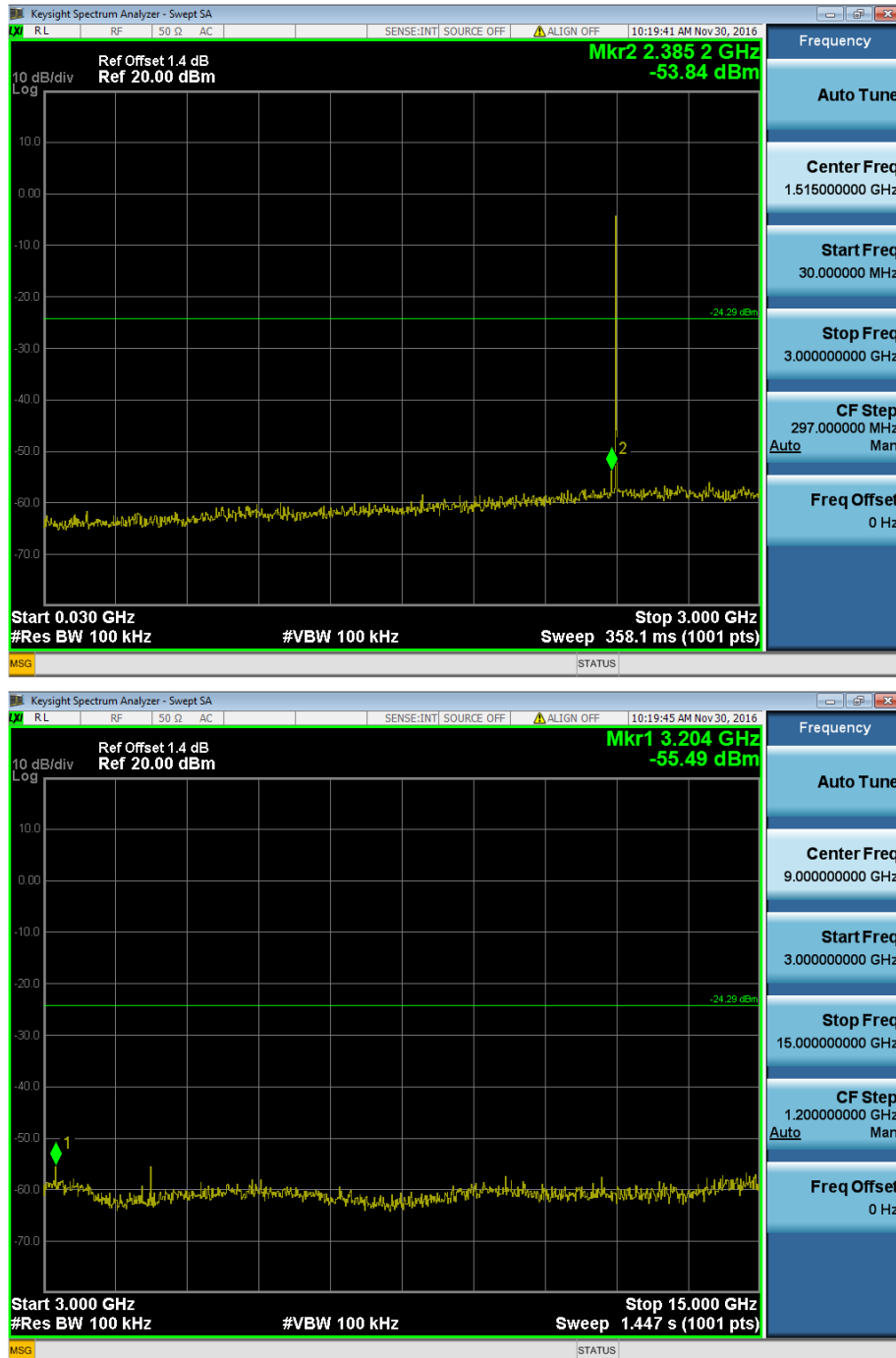
### CH00 Hopping on mode (Lower)\_3Mbps



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

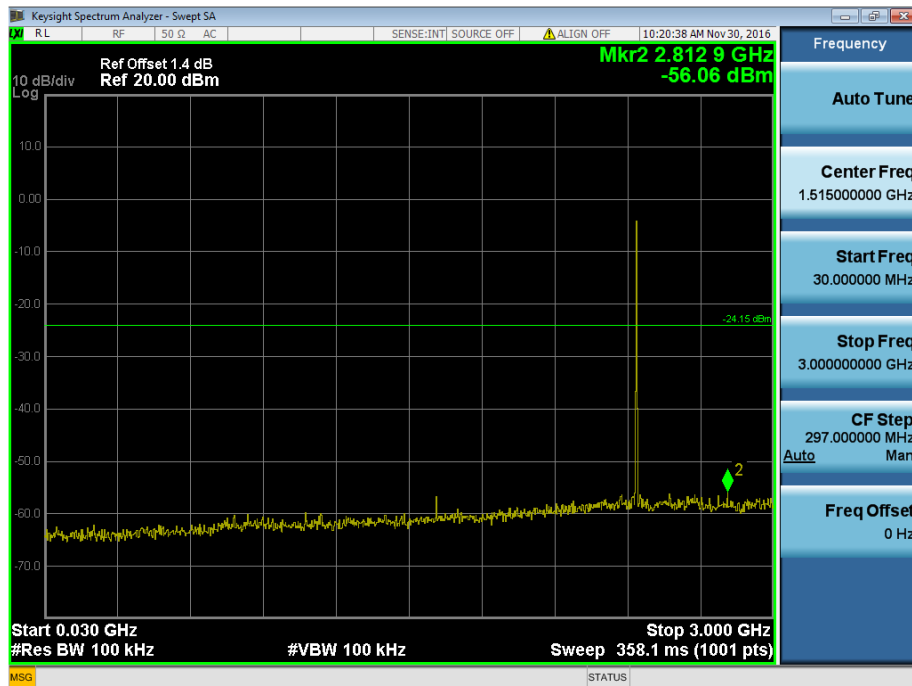


### CH00 (10 Harmonic of the frequency) \_3Mbps





CH39 (10 Harmonic of the frequency) \_3Mbps





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



