

# FCC Radio Test Report

## FCC ID: NW71088

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

**Project No.** : 1603075  
**Equipment** : ION 4K, ION 4K SPORT DIGITAL CAMERA,  
ZEUS 1.6 CAMERA  
**Model Name** : 1088, 1088X, 1089, 1089X, 1090, 1090X, 1091,  
1091X, 1092, 1092X, 1093, 1093X, 1094, 1094X,  
1095, 1095X (X=0~9 or A~Z)  
**Applicant** : World Wide Licenses Limited  
**Address** : Suite D, 16/F., On Hing Building, No 1 On Hing  
Terrace, Central, Hong Kong

**Date of Receipt** : Mar. 22, 2016  
**Date of Test** : Mar. 22, 2016 ~ Mar. 31, 2016  
**Issued Date** : Aug. 15, 2016  
**Tested by** : BTL Inc.

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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-1-1603075	Original Issue.	Aug. 15, 2016

## 1. CERTIFICATION

Equipment : ION 4K, ION 4K SPORT DIGITAL CAMERA, ZEUS 1.6 CAMERA  
Brand Name : ION  
Model Name : 1088, 1088X, 1089, 1089X, 1090, 1090X, 1091, 1091X, 1092, 1092X, 1093, 1093X, 1094, 1094X, 1095, 1095X (X=0~9 or A~Z)  
Applicant : World Wide Licenses Limited  
Date of Test : Mar. 22, 2016 ~ Mar. 31, 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-1-1603075) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): 47 CFR Part 15, Subpart C			
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 (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:949005; FCC DN:TW1082)  
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

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

**CB11:** (VCCI RN: R-4260; FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088)  
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

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

**CB11:** (VCCI RN: G-868; FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088)  
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  $U_{\text{CISPR}}$  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	2.04

### B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)
CB11 (3m)	CISPR	9kHz ~ 150kHz	4.00
		150kHz ~ 30MHz	4.00

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB11 (3m)	CISPR	30 MHz ~ 200 MHz	V	3.06
		30 MHz ~ 200 MHz	H	2.58
		200 MHz ~ 1, 000 MHz	V	3.50
		200 MHz ~ 1, 000 MHz	H	3.10

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB11 (3m)	CISPR	1GHz ~ 6GHz	V	4.14
		1GHz ~ 6GHz	H	4.14

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB11 (3m)	CISPR	6GHz ~ 18GHz	V	5.34
		6GHz ~ 18GHz	H	5.34

Test Site	Method	Measurement Frequency Range	U,(dB)
CB08 (3m)	CISPR	18 ~ 26.5 GHz	4.66
		26.5 ~ 40 GHz	4.74

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  $U_{\text{lab}}$  values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called  $U_{\text{CISPR}}$ , 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  $U_{\text{lab}}$  values are smaller than  $U_{\text{CISPR}}$ .

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	ION 4K, ION 4K SPORT DIGITAL CAMERA, ZEUS 1.6 CAMERA	
Brand Name	ION	
Model Name	1088, 1088X, 1089, 1089X, 1090, 1090X, 1091, 1091X, 1092, 1092X, 1093, 1093X, 1094, 1094X, 1095, 1095X (X=0~9 or A~Z)	
Model Difference	Different model distribute to different area.	
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.	8.23 dBm(1Mbps) 6.46 dBm(3Mbps)
Power Source	#1 DC Voltage supplied from USB power source. #2 Supplied from battery. Model: FT853548P	
Power Rating	#1 I/P: DC --- 5.0~5.5V/1A #2 DC 3.7V 5.55Wh 1500mAh	

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	Yageo	ANT3216LL11 R2400A	Chip	N/A	-1.0

### 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>
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 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

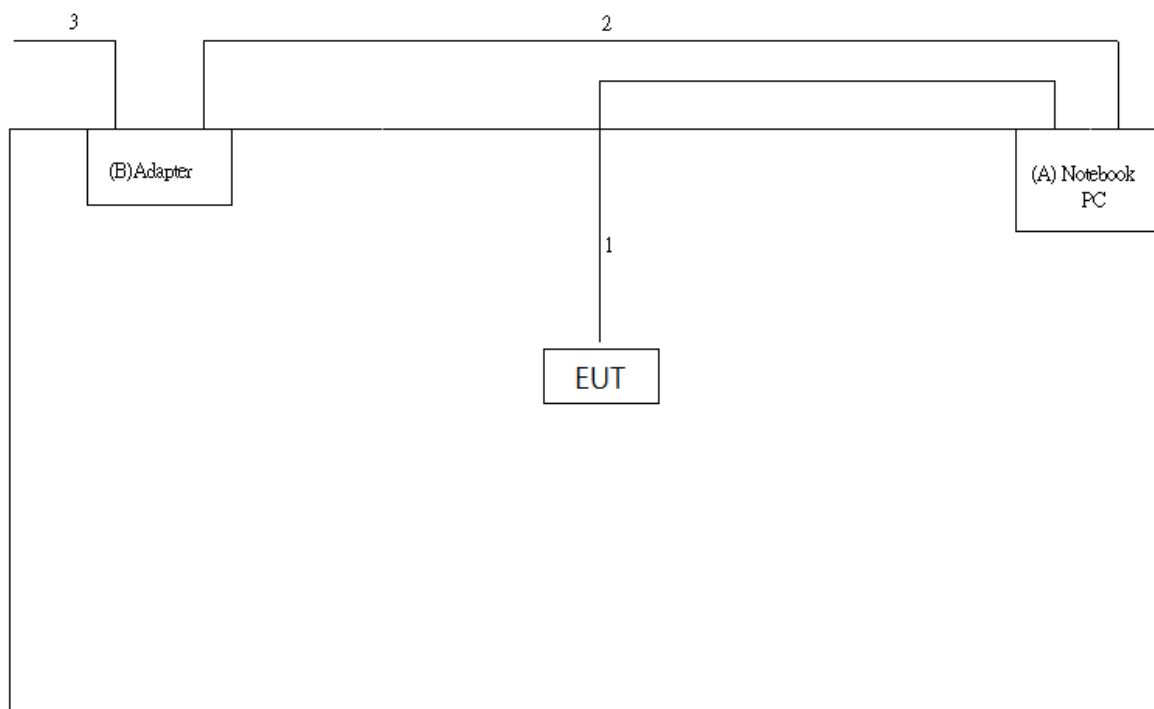
1Mbps

Test Software Version	Amba FW Debug 01.03.20140804.OD		
Frequency (MHz)	2402	2441	2480
Parameters	DEF	DEF	DEF

3Mbps

Test Software Version	Amba FW Debug 01.03.20140804.OD		
Frequency (MHz)	2402	2441	2480
Parameters	DEF	DEF	DEF

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



### 3.5 DESCRIPTION OF SUPPORT UNITS

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

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
A	Notebook PC	DELL	E5430	DOC	25285457557
B	Adapter	Dell Inc	HA65NS5-00	DOC	A065R039L

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.6m	USB Cable
2	NO	NO	1.8m	Power Cable
3	NO	NO	1.8m	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 -0.5	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

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

The following table is the setting of the receiver

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

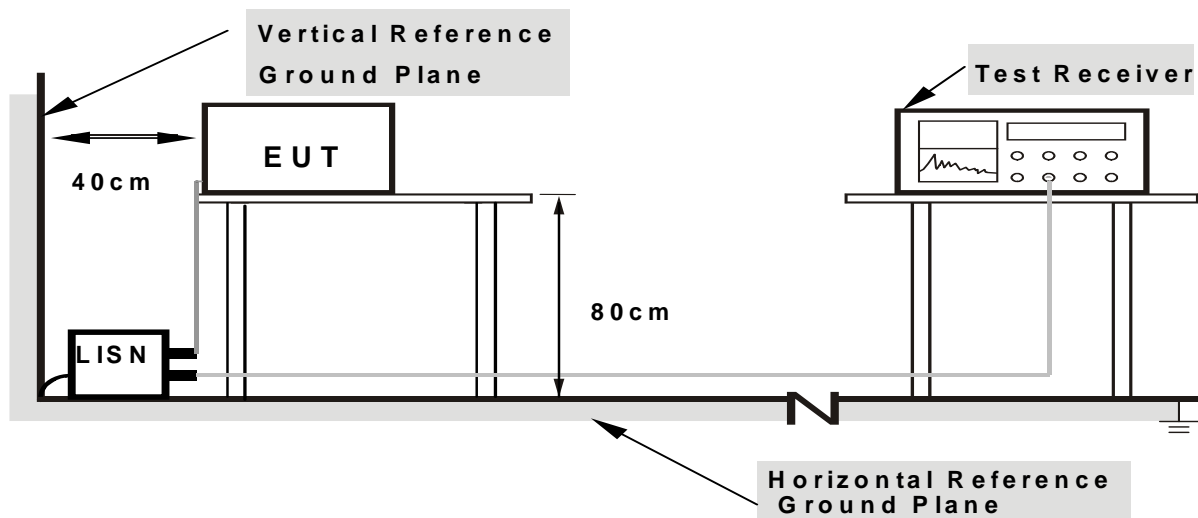
#### 4.1.2 TEST PROCEDURE

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

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.4 TEST SETUP



**Note:** 1.Support units were connected to second LISN.  
 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 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 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)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (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

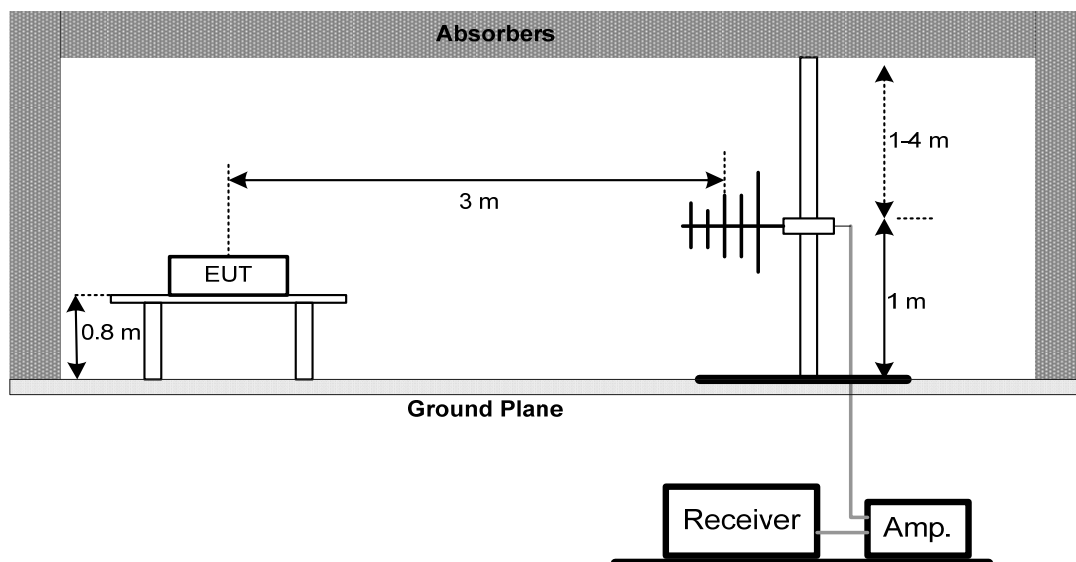
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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).
- 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.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.2.3 DEVIATION FROM TEST STANDARD

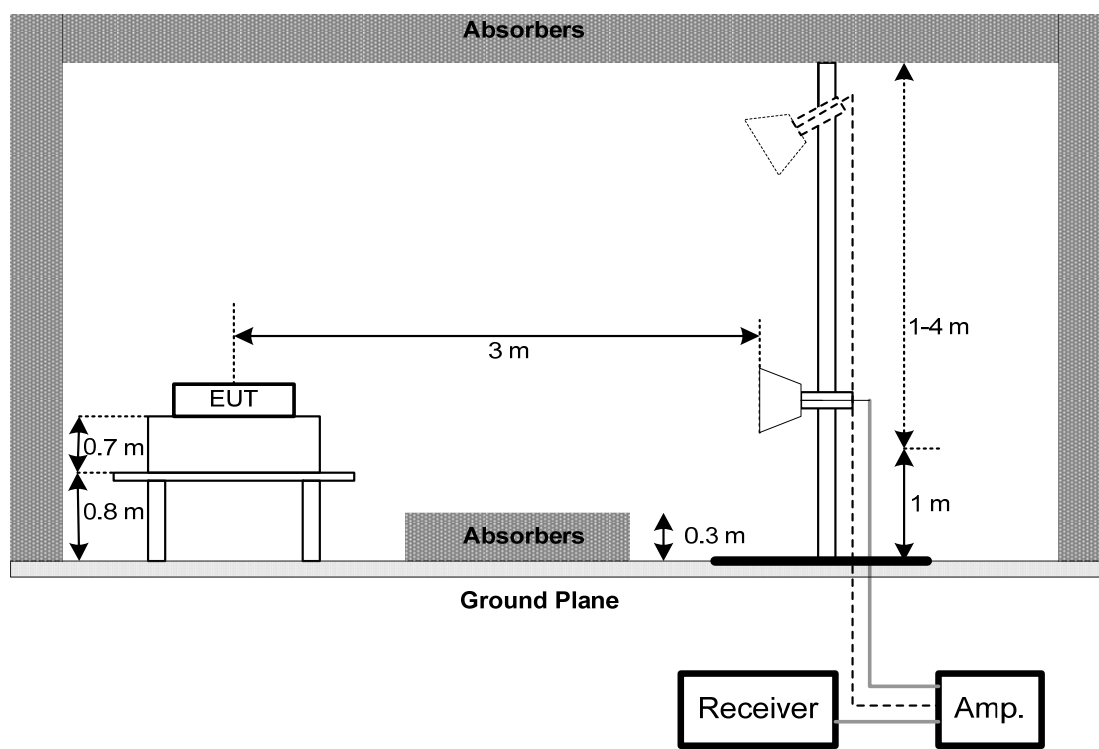
No deviation

#### 4.2.4 TEST SETUP

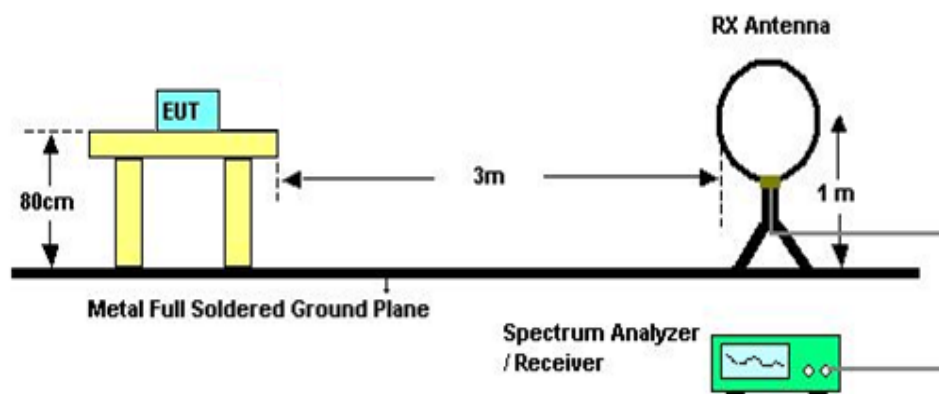
##### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



#### 4.2.5 EUT OPERATING CONDITIONS

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

#### 4.2.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 45%

Test Voltage: AC 120V/60Hz

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

Please refer to the Attachment B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

#### **4.2.8 TEST RESULTS (BETWEEN 30MHZ TO 1000 MHZ)**

**Please refer to the Attachment C.**

Remark:

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (2) Measuring frequency range from 30MHz to 1000MHz.
- (3) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

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

**Please refer to the Attachment D.**

Remark:

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (2) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (3) EUT Orthogonal Axis:  
"X" - denotes Laid on Table; "Y" - denotes Vertical Stand; "Z" - denotes Side Stand
- (4) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (5) No limit: This is fundamental signal, the judgment is not applicable.  
For fundamental signal judgment was referred to Peak output test.

## 5. NUMBER OF HOPPING CHANNEL

### 5.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C			
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: 60%  
 Test Voltage: AC 120V/60Hz

#### 5.1.6 TEST RESULTS

Please refer to the Attachment E

## 6. AVERAGE TIME OF OCCUPANCY

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
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: 60%

Test Voltage: AC 120V/60Hz

#### **6.1.6 TEST RESULTS**

**Please refer to the Attachment F**

## 7. HOPPING CHANNEL SEPARATION MEASUREMENT

### 7.1 APPLIED PROCEDURES / LIMIT

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

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

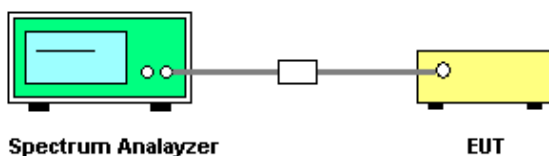
#### 7.1.1 TEST PROCEDURE

- 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: 60%  
 Test Voltage: AC 120V/60Hz

#### 7.1.5 TEST RESULTS

Please refer to the Attachment G



## 8. BANDWIDTH TEST

### 8.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C		
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

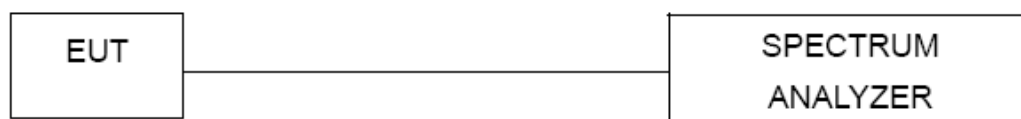
#### 8.1.1 TEST PROCEDURE

- 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: 60%  
 Test Voltage: AC 120V/60Hz

#### 8.1.6 TEST RESULTS

Please refer to the Attachment H

## 9. PEAK OUTPUT POWER TEST

### 9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1)	Peak Output Power	1 Watt or 30dBm	2400-2483.5	PASS

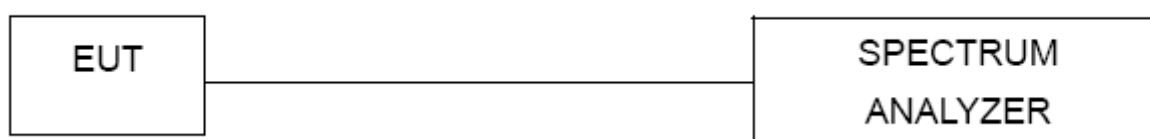
#### 9.1.1 TEST PROCEDURE

- 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: 60%

Test Voltage: AC 120V/60Hz

#### 9.1.6 TEST RESULTS

Please refer to the Attachment I

## **10. ANTENNA CONDUCTED SPURIOUS EMISSION**

### **10.1 APPLIED PROCEDURES / LIMIT**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

#### **10.1.1 TEST PROCEDURE**

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

#### **10.1.2 DEVIATION FROM STANDARD**

No deviation.

#### **10.1.3 TEST SETUP**



#### **10.1.4 EUT OPERATION CONDITIONS**

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

#### **10.1.5 EUT TEST CONDITIONS**

Temperature: 25°C

Relative Humidity: 60%

Test Voltage: AC 120V/60Hz

#### **10.1.6 TEST RESULTS**

**Please refer to the Attachment J**

## 11. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	Jan. 26, 2017
2	Test Cable	TIMES	CFD300-NL	C02	Jun. 13, 2017
3	EMI Test Receiver	R&S	ESR7	101433	Dec. 09, 2016
4	Power Dividers	HP	11636A	8103	May 03, 2017
5	Measurement Software	EZ	EZ EMC (Version NB-03A)	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jul. 29, 2017
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Apr. 19, 2017
3	Horn Antenna	Schwarzbeck	BBHA 9120	9120D-1333	May 19, 2017
4	Pre-Amplifier	Anritsu	MH648A	M92649	Jun. 15, 2017
5	Pre-Amplifier	Agilent	8449B	3008A01714	Apr. 13, 2017
6	Test Cable	LMR	LMR-400	01(10M)	May 11, 2017
7	Test Cable	LMR	LMR-400	01(3M)	May 11, 2017
8	Test Cable	Harbour industries	27478LL142	1M	May 11, 2017
9	Test Cable	Harbour industries	27478LL142	3M	May 11, 2017
10	Test Cable	AISI	S104-SMAP-1	8M	May 11, 2017
11	Spectrum Analyzer	Agilent	N9020A	MY51160196	Aug. 01, 2017
12	EMI Test Receiver	R&S	ESCI	100080	May 12, 2017
13	Measurement Software	Farad	EZ EMC (Version NB-03A)	N/A	N/A

### Number of Hopping Channel

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017

### Average Time of Occupancy

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017

### Hopping Channel Separation Measurement

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017

### Bandwidth

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017

### Peak Output Power

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017

### Antenna Conducted Spurious Emission

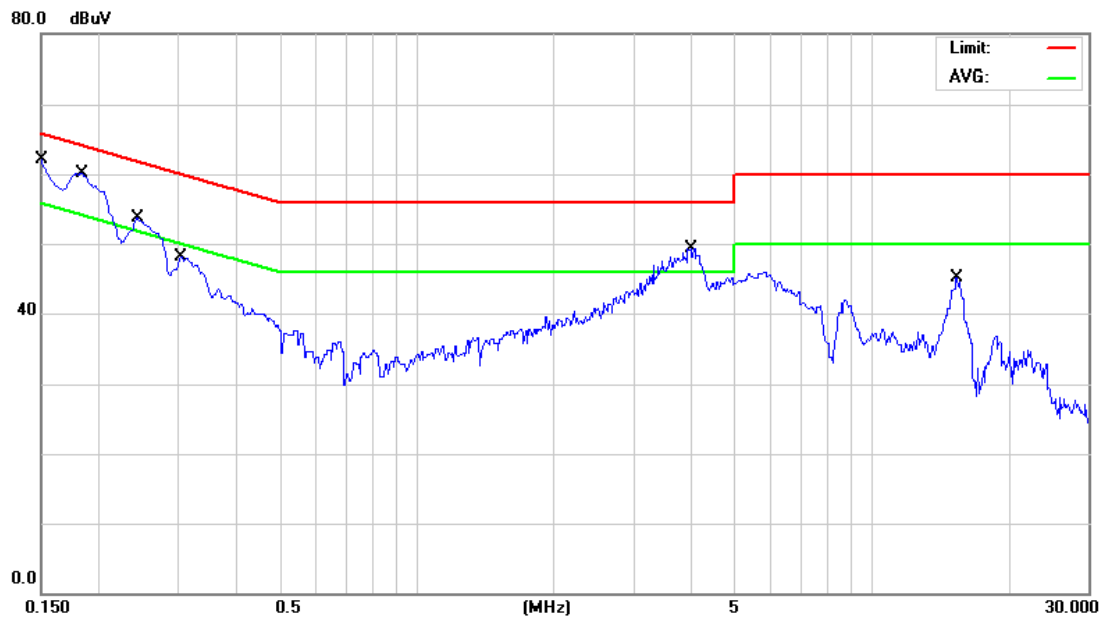
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017

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

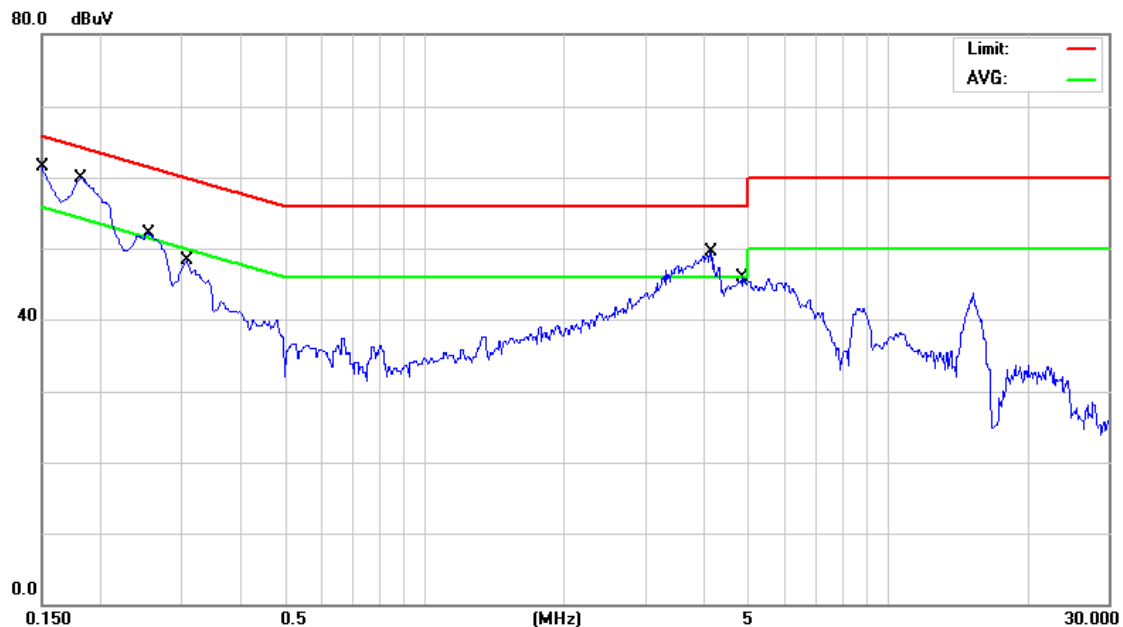
### Line



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
1		0.1500	37.60	9.68	47.28	65.99	-18.71	QP	
2		0.1500	22.80	9.68	32.48	55.99	-23.51	AVG	
3	*	0.1836	46.00	9.68	55.68	64.32	-8.64	QP	
4		0.1836	28.40	9.68	38.08	54.32	-16.24	AVG	
5		0.2438	37.80	9.68	47.48	61.96	-14.48	QP	
6		0.2438	18.20	9.68	27.88	51.96	-24.08	AVG	
7		0.3047	27.90	9.68	37.58	60.11	-22.53	QP	
8		0.3047	8.20	9.68	17.88	50.11	-32.23	AVG	
9		4.0010	34.50	9.86	44.36	56.00	-11.64	QP	
10		4.0010	24.80	9.86	34.66	46.00	-11.34	AVG	
11		15.3500	27.80	9.87	37.67	60.00	-22.33	QP	
12		15.3500	19.30	9.87	29.17	50.00	-20.83	AVG	

Test Mode: Bluetooth

### Neutral



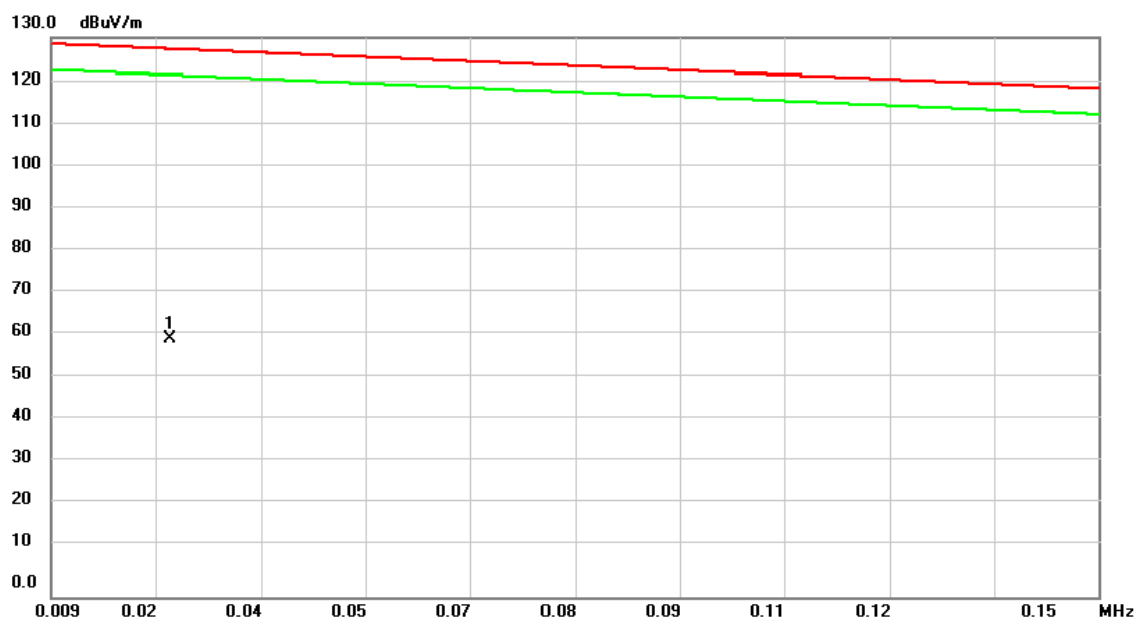
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	37.10	9.69	46.79	65.99	-19.20	QP	
2		0.1500	22.00	9.69	31.69	55.99	-24.30	AVG	
3	*	0.1822	45.40	9.68	55.08	64.38	-9.30	QP	
4		0.1822	26.20	9.68	35.88	54.38	-18.50	AVG	
5		0.2536	35.10	9.68	44.78	61.64	-16.86	QP	
6		0.2536	18.90	9.68	28.58	51.64	-23.06	AVG	
7		0.3075	29.60	9.68	39.28	60.04	-20.76	QP	
8		0.3075	9.30	9.68	18.98	50.04	-31.06	AVG	
9		4.1359	31.30	9.86	41.16	56.00	-14.84	QP	
10		4.1359	21.50	9.86	31.36	46.00	-14.64	AVG	
11		4.8380	30.10	9.89	39.99	56.00	-16.01	QP	
12		4.8380	22.80	9.89	32.69	46.00	-13.31	AVG	



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

Test Mode: TX Mode

### OPEN



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	0.0250	43.61	16.38	59.99	127.37	-67.38	peak	

Test Mode: TX Mode

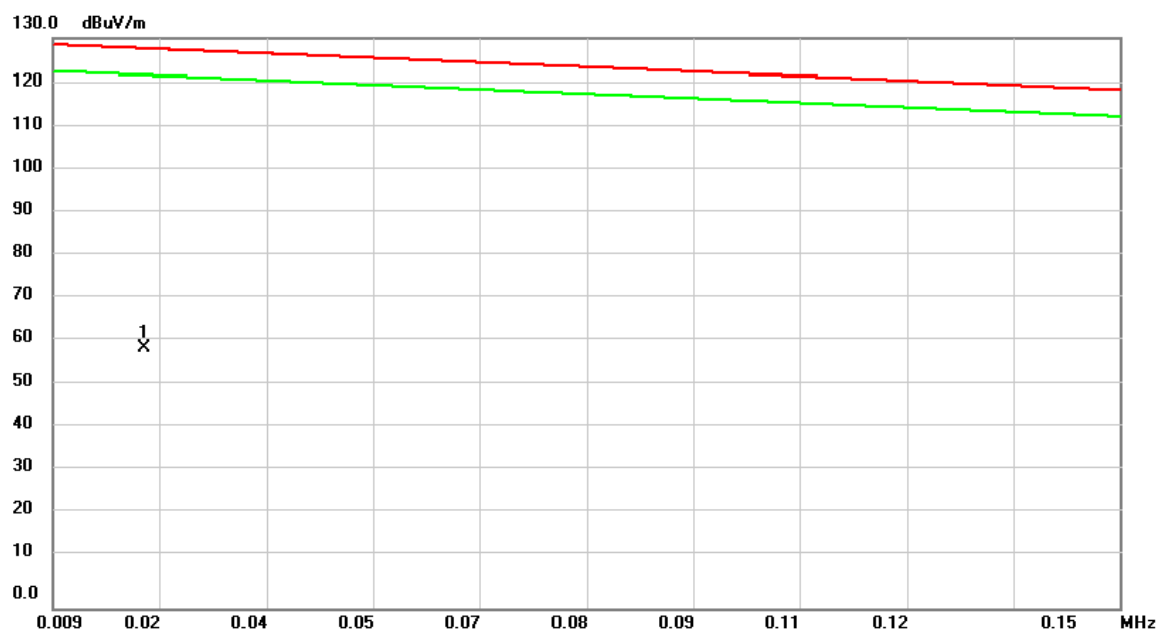
OPEN



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1500	47.93	12.03	59.96	118.34	-58.38	peak	
2	*	0.6276	33.55	11.85	45.40	72.57	-27.17	peak	
3		1.5430	25.44	11.76	37.20	64.41	-27.21	peak	
4		2.6574	20.87	11.25	32.12	69.54	-37.42	peak	
5		3.6524	17.70	11.20	28.90	69.54	-40.64	peak	
6		5.9210	14.25	11.38	25.63	69.54	-43.91	peak	

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

### CLOSE



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0212	42.01	17.42	59.43	127.64	-68.21	peak	

Test Mode: TX Mode

### CLOSE

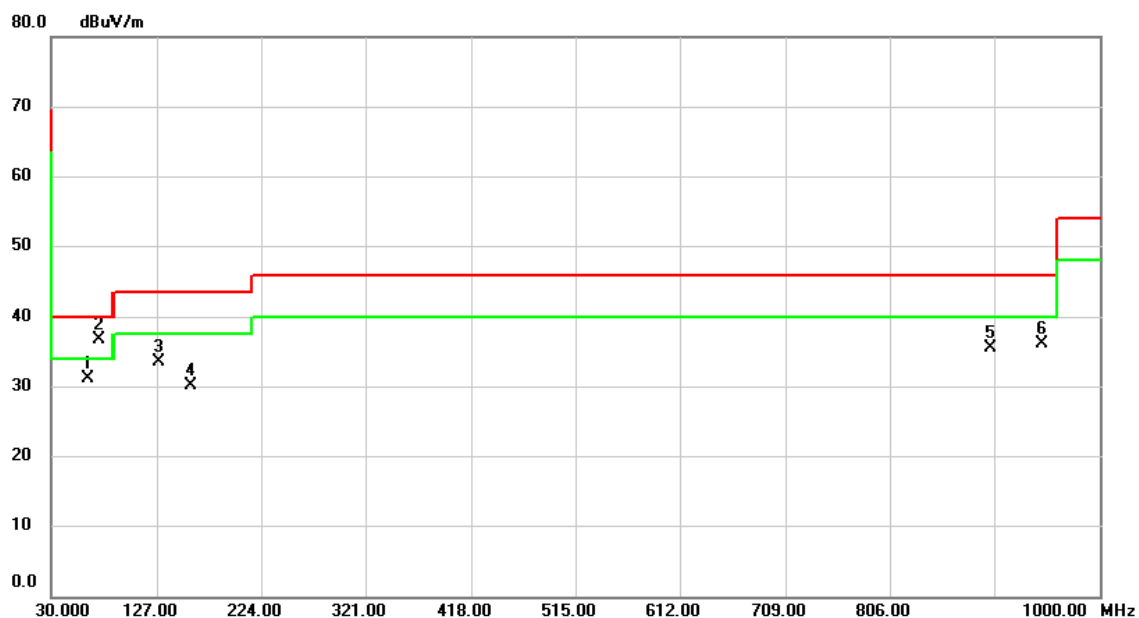


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.1898	45.98	11.97	57.95	115.47	-57.52	peak	
2	*	1.1450	27.95	11.93	39.88	67.96	-28.08	peak	
3		2.2196	22.69	11.45	34.14	69.54	-35.40	peak	
4		4.8464	15.98	11.38	27.36	69.54	-42.18	peak	
5		6.3986	14.84	11.37	26.21	69.54	-43.33	peak	
6		10.7766	10.54	11.28	21.82	69.54	-47.72	peak	

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

Test Mode: TX Mode

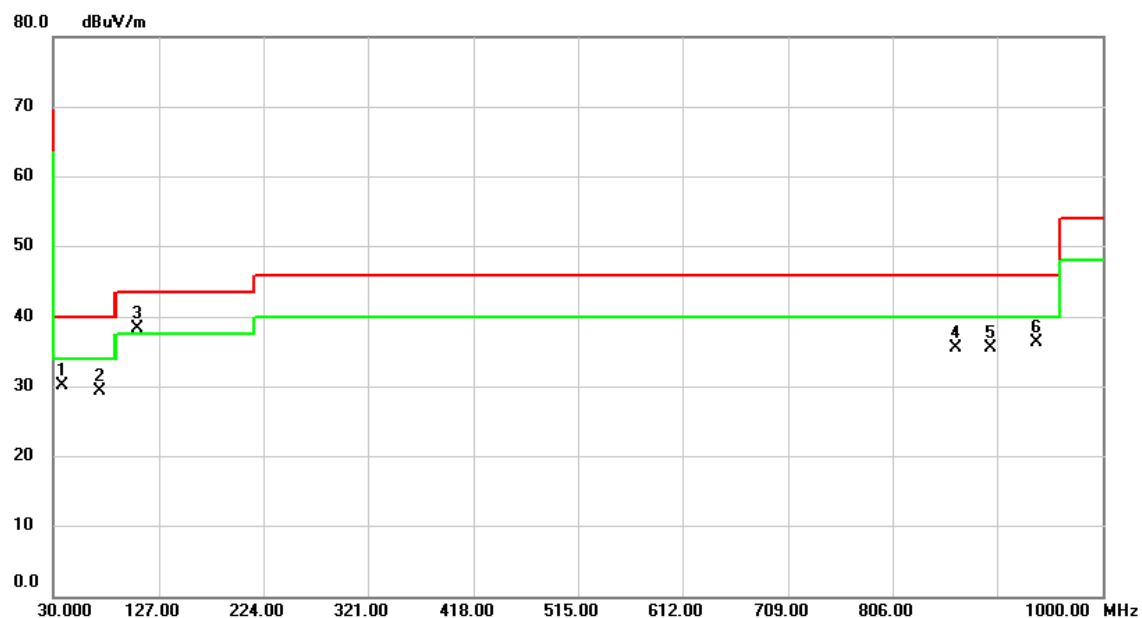
## Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		63.9500	40.64	-9.48	31.16	40.00	-8.84	peak	
2	*	74.6200	47.99	-11.30	36.69	40.00	-3.31	peak	
3		128.9400	43.22	-9.67	33.55	43.50	-9.95	peak	
4		159.0100	38.74	-8.58	30.16	43.50	-13.34	peak	
5		899.1200	30.89	4.60	35.49	46.00	-10.51	peak	
6		946.6500	30.62	5.43	36.05	46.00	-9.95	peak	

Test Mode: TX Mode

## Horizontal



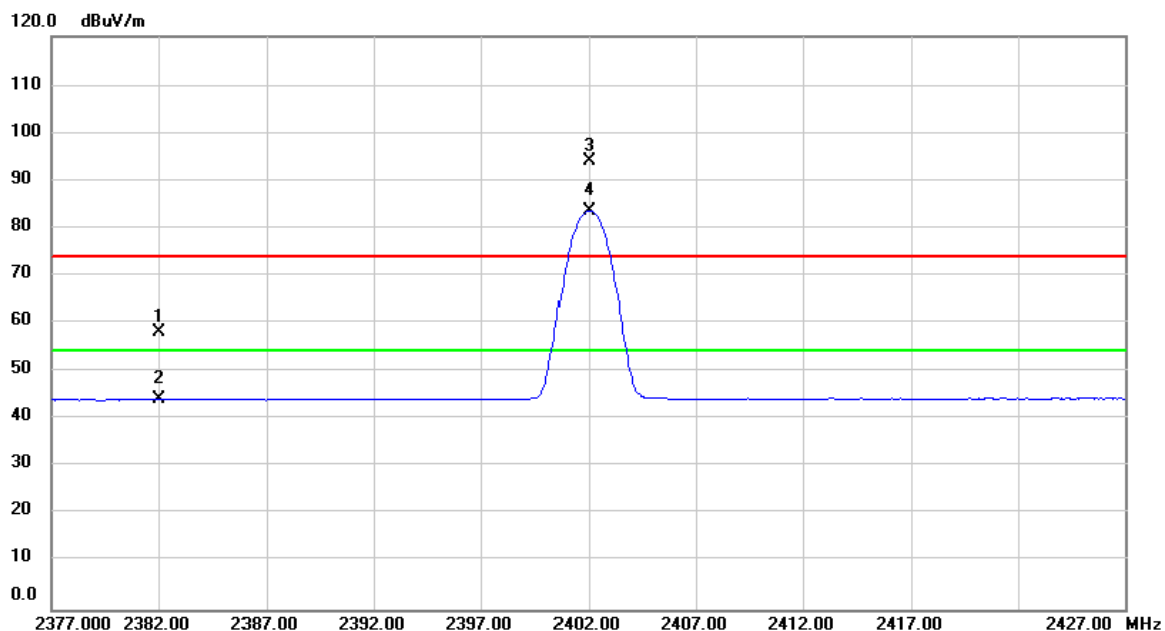
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		38.7300	38.78	-8.75	30.03	40.00	-9.97	peak	
2		73.6500	40.42	-11.13	29.29	40.00	-10.71	peak	
3	*	106.6300	49.92	-11.63	38.29	43.50	-5.21	peak	
4		864.2000	31.64	3.89	35.53	46.00	-10.47	peak	
5		897.1800	30.91	4.55	35.46	46.00	-10.54	peak	
6		938.8900	30.98	5.29	36.27	46.00	-9.73	peak	



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

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

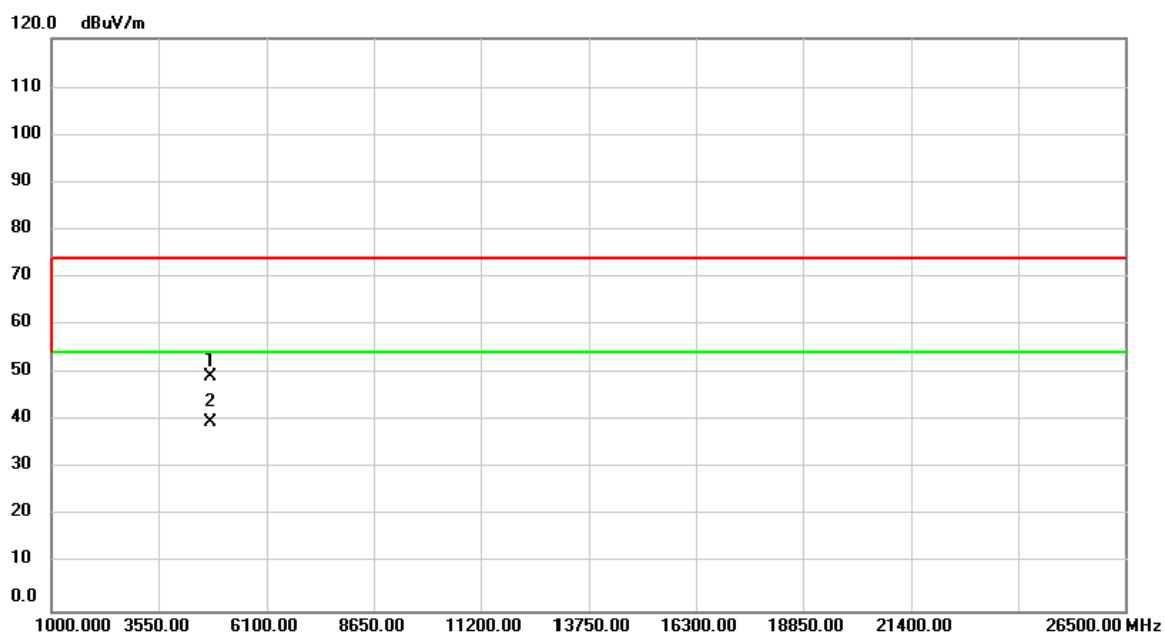
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2382.000	26.40	31.67	58.07	74.00	-15.93	peak	
2		2382.000	12.53	31.67	44.20	54.00	-9.80	AVG	
3	X	2402.000	62.44	31.76	94.20	74.00	20.20	peak	No Limit
4	*	2402.000	51.91	31.76	83.67	54.00	29.67	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

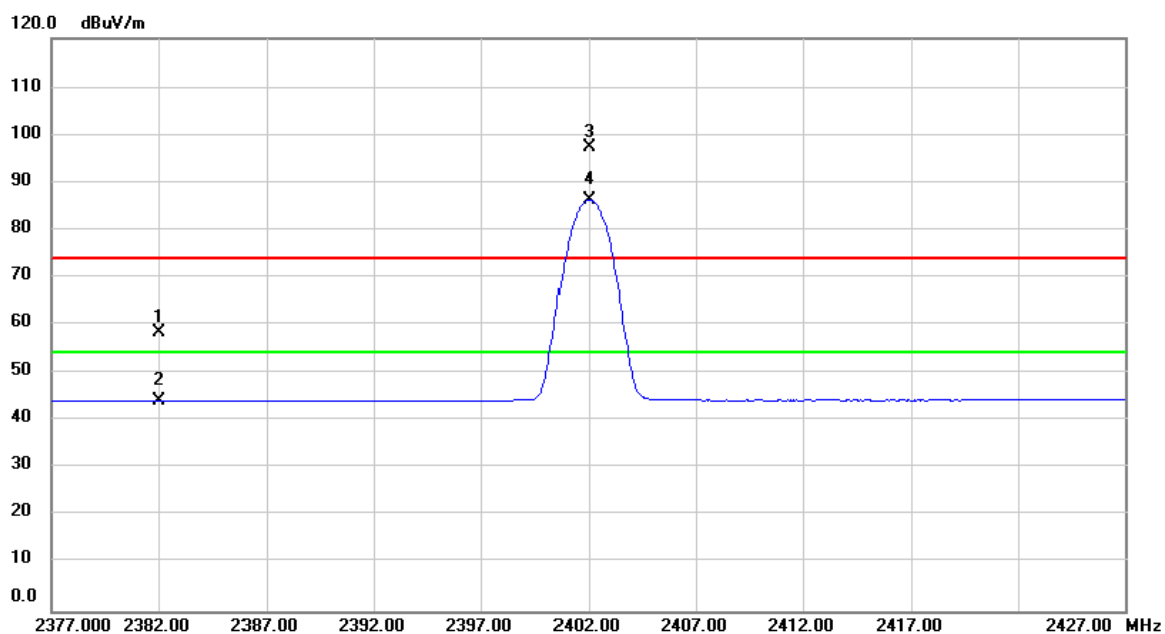
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	59.75	-10.51	49.24	74.00	-24.76	peak	
2	*	4804.000	50.19	-10.51	39.68	54.00	-14.32	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

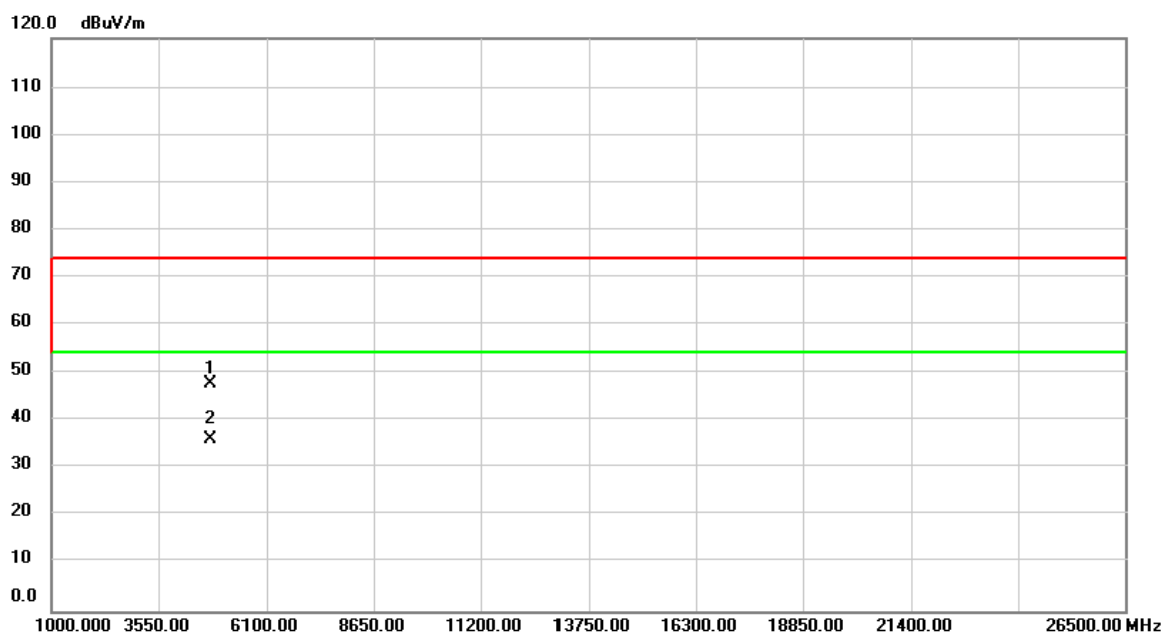
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2382.000	26.53	31.67	58.20	74.00	-15.80	peak	
2		2382.000	12.55	31.67	44.22	54.00	-9.78	AVG	
3	X	2402.000	65.55	31.76	97.31	74.00	23.31	peak	No Limit
4	*	2402.000	54.43	31.76	86.19	54.00	32.19	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

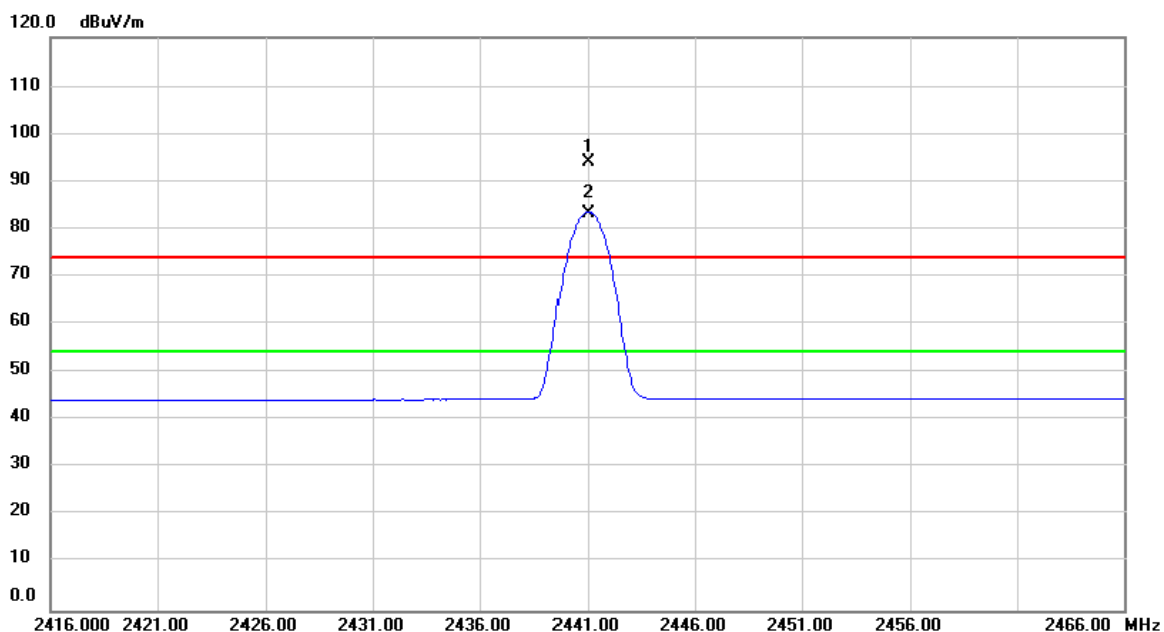
### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	58.24	-10.51	47.73	74.00	-26.27	peak	
2	*	4804.000	46.58	-10.51	36.07	54.00	-17.93	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_1Mbps

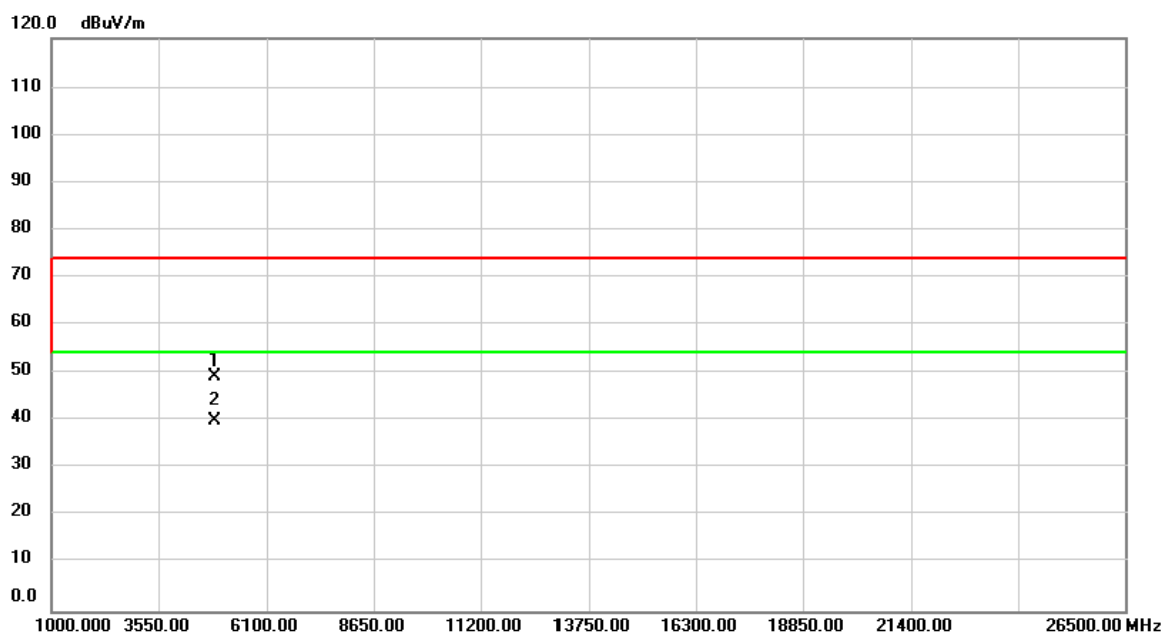
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2441.000	62.16	31.90	94.06	74.00	20.06	peak	No Limit
2	*	2441.000	51.44	31.90	83.34	54.00	29.34	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_1Mbps

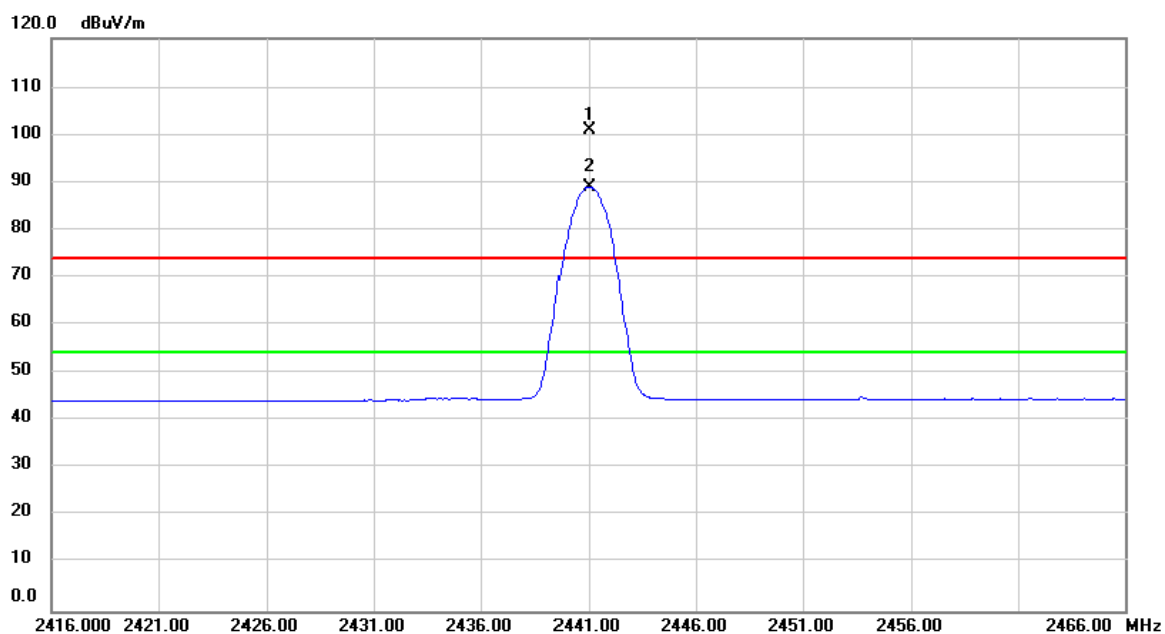
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	59.62	-10.39	49.23	74.00	-24.77	peak	
2	*	4882.000	50.44	-10.39	40.05	54.00	-13.95	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_1Mbps

### Horizontal

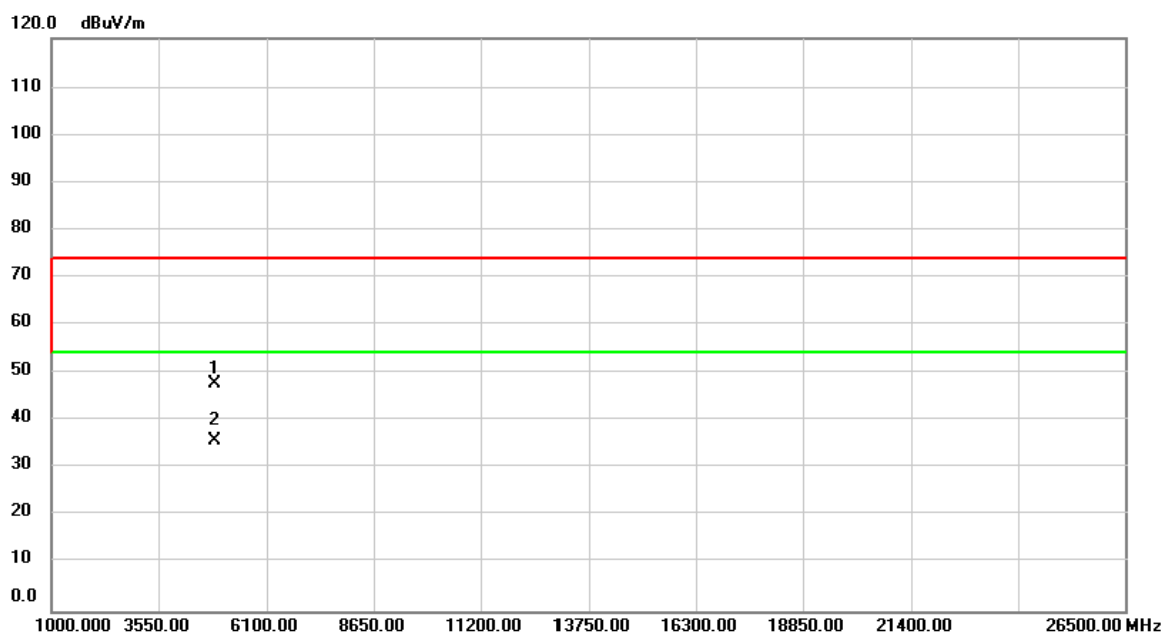


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2441.000	69.02	31.90	100.92	74.00	26.92	peak	No Limit
2	*	2441.000	57.15	31.90	89.05	54.00	35.05	AVG	No Limit



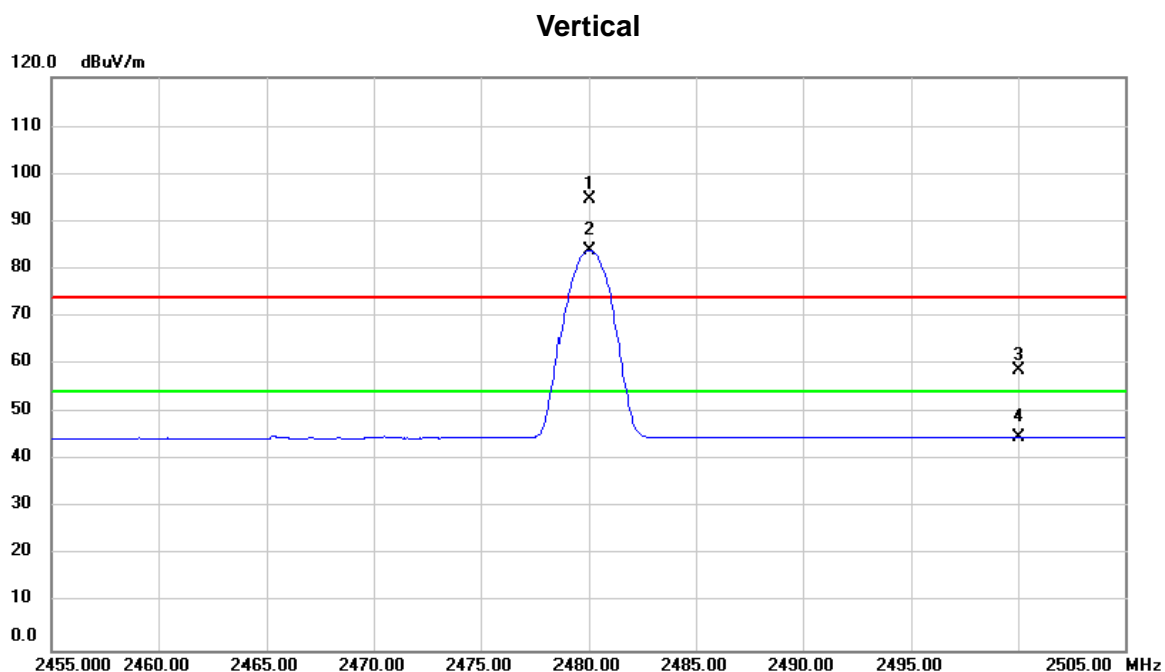
Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_1Mbps

### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	58.33	-10.39	47.94	74.00	-26.06	peak	
2	*	4882.000	46.34	-10.39	35.95	54.00	-18.05	AVG	

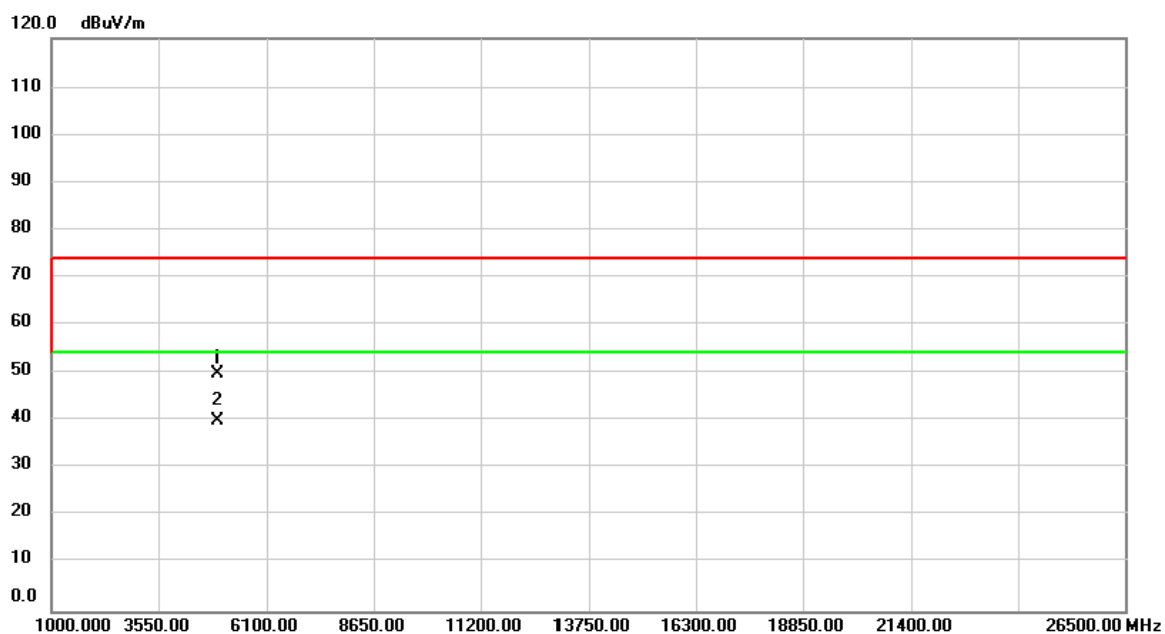
Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_1Mbps



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2480.000	62.46	32.05	94.51	74.00	20.51	peak	No Limit
2	*	2480.000	51.84	32.05	83.89	54.00	29.89	AVG	No Limit
3		2500.000	26.67	32.13	58.80	74.00	-15.20	peak	
4		2500.000	12.75	32.13	44.88	54.00	-9.12	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_1Mbps

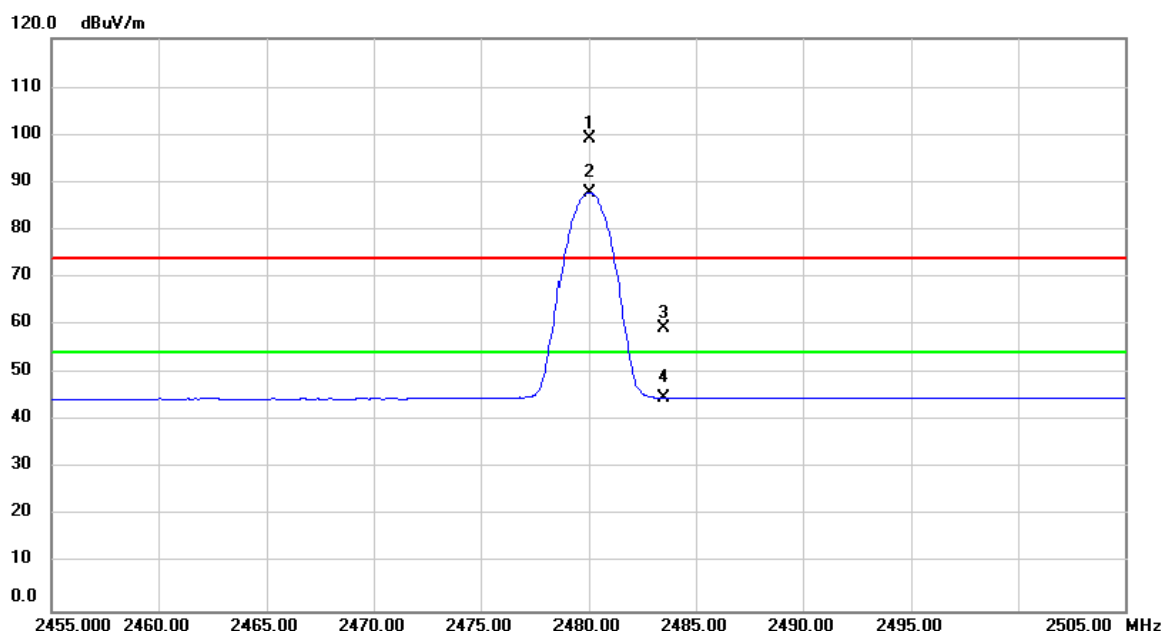
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	60.12	-10.26	49.86	74.00	-24.14	peak	
2	*	4960.000	50.23	-10.26	39.97	54.00	-14.03	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_1Mbps

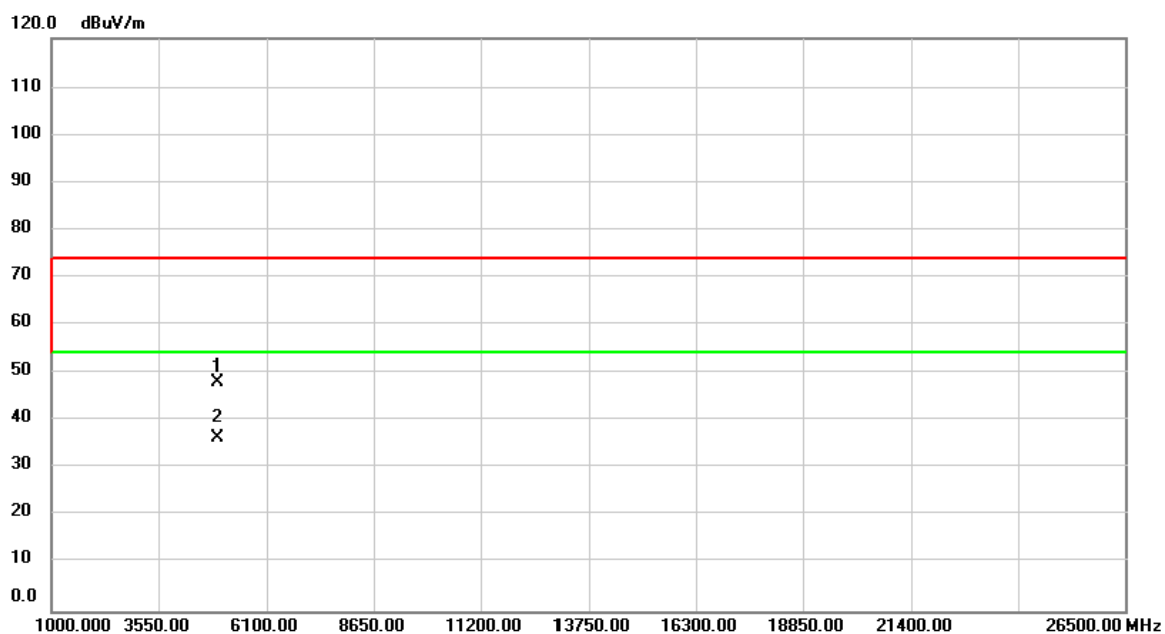
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	67.23	32.05	99.28	74.00	25.28	peak	No Limit
2	*	2480.000	55.74	32.05	87.79	54.00	33.79	AVG	No Limit
3		2483.500	27.15	32.06	59.21	74.00	-14.79	peak	
4		2483.500	12.88	32.06	44.94	54.00	-9.06	AVG	

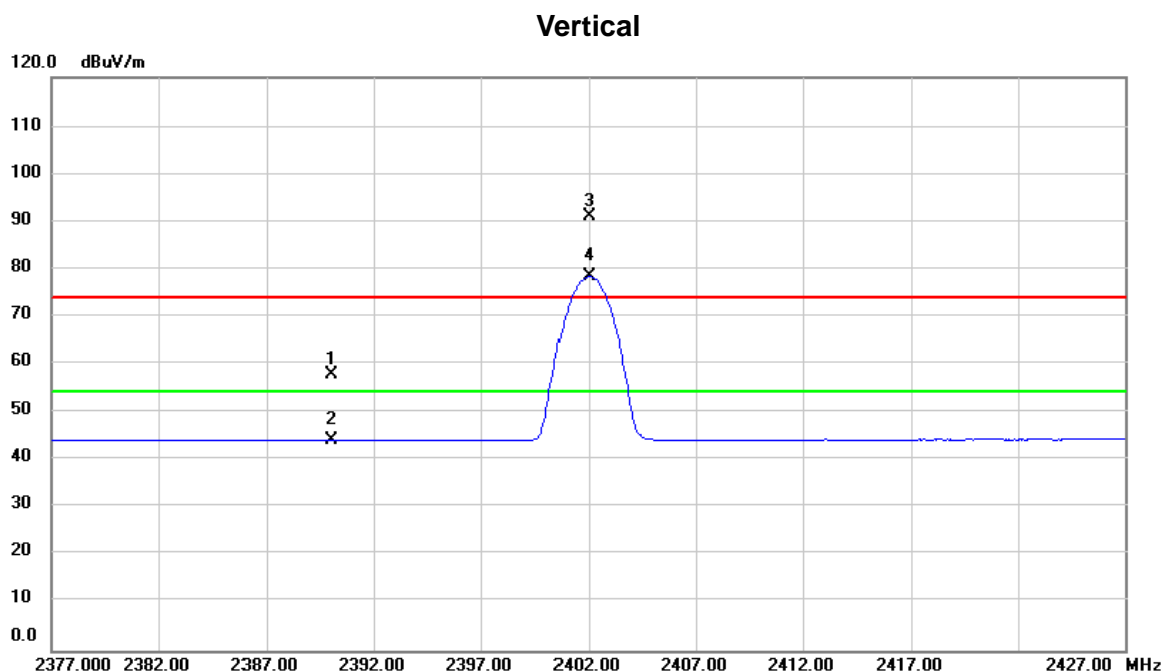
Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_1Mbps

### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	58.44	-10.26	48.18	74.00	-25.82	peak	
2	*	4960.000	46.85	-10.26	36.59	54.00	-17.41	AVG	

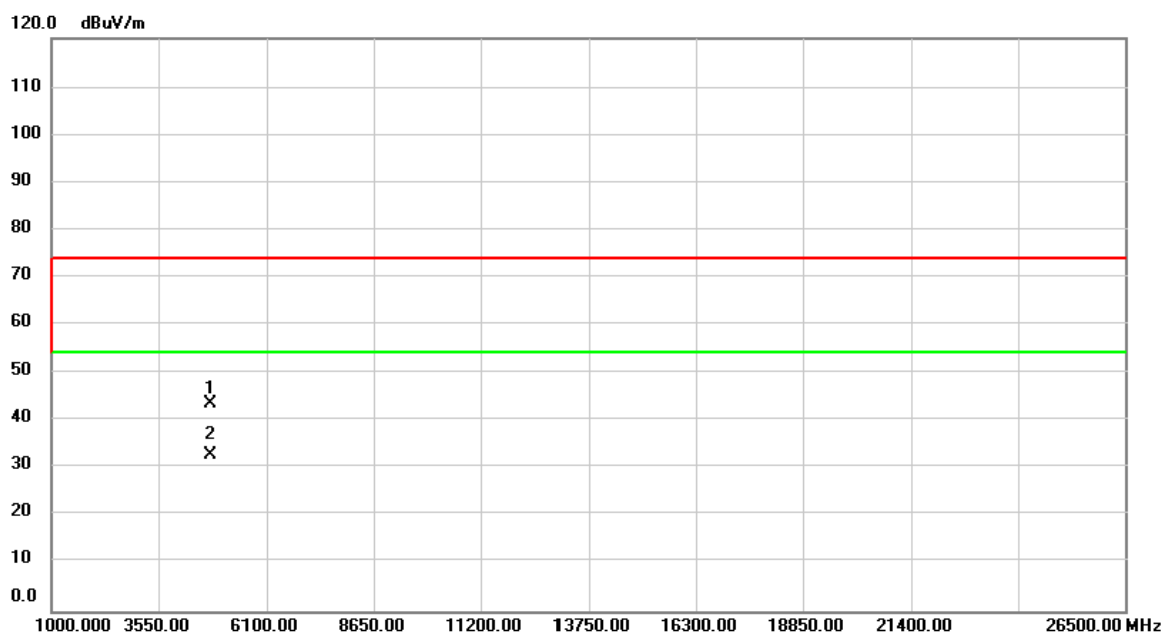
Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_3Mbps



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	26.13	31.70	57.83	74.00	-16.17	peak	
2		2390.000	12.51	31.70	44.21	54.00	-9.79	AVG	
3	X	2402.000	59.39	31.76	91.15	74.00	17.15	peak	No Limit
4	*	2402.000	46.61	31.76	78.37	54.00	24.37	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_3Mbps

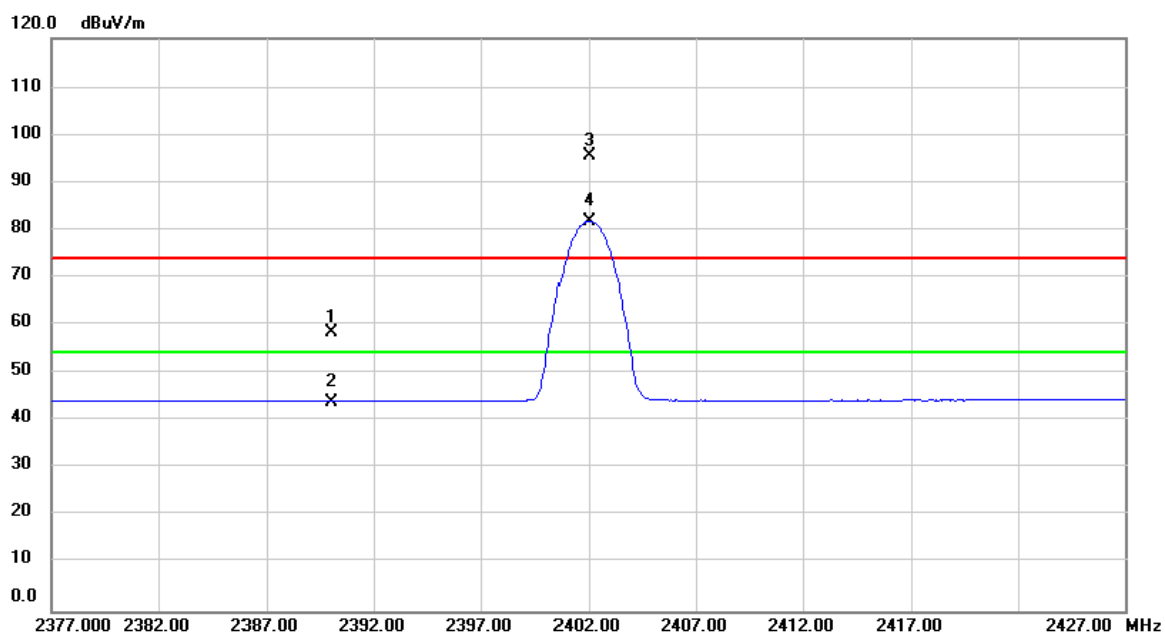
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	54.20	-10.51	43.69	74.00	-30.31	peak	
2	*	4804.000	43.27	-10.51	32.76	54.00	-21.24	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_3Mbps

### Horizontal

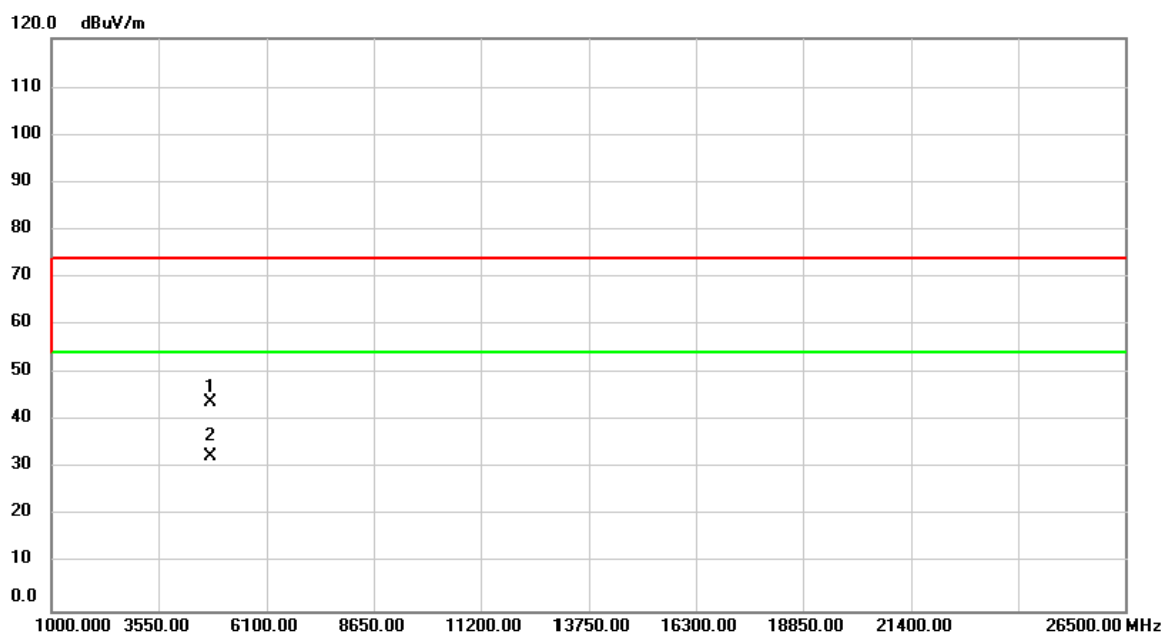


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	26.80	31.70	58.50	74.00	-15.50	peak	
2		2390.000	12.36	31.70	44.06	54.00	-9.94	AVG	
3	X	2402.000	63.73	31.76	95.49	74.00	21.49	peak	No Limit
4	*	2402.000	50.11	31.76	81.87	54.00	27.87	AVG	No Limit



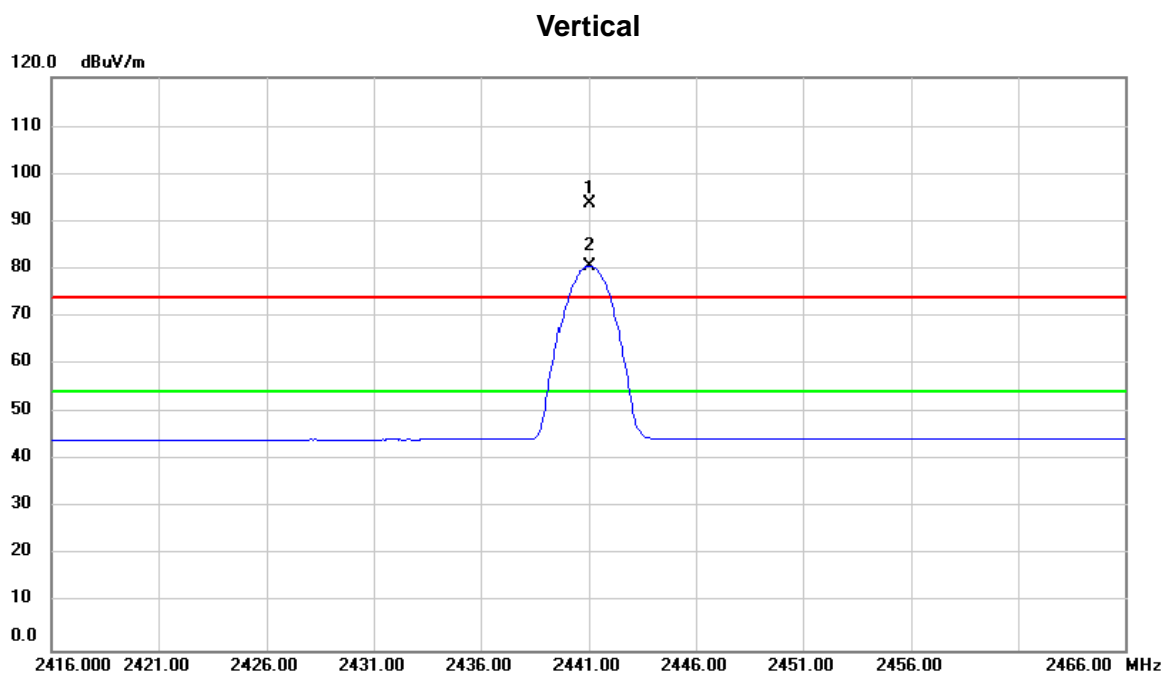
Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_3Mbps

### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	54.49	-10.51	43.98	74.00	-30.02	peak	
2	*	4804.000	43.15	-10.51	32.64	54.00	-21.36	AVG	

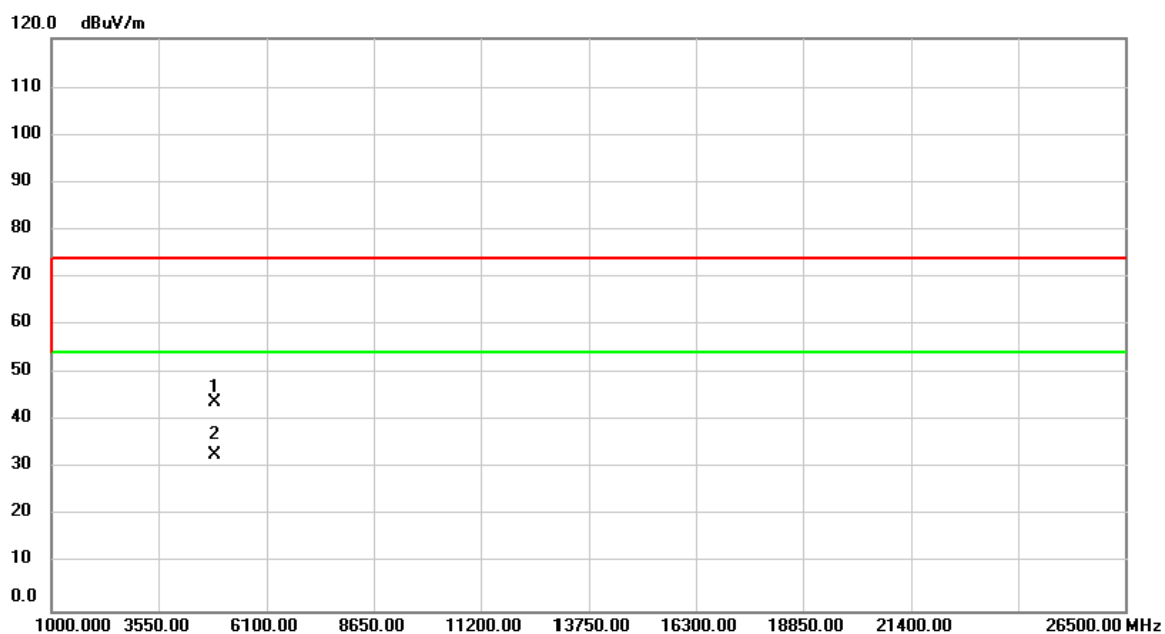
Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_3Mbps



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2441.000	61.93	31.90	93.83	74.00	19.83	peak	No Limit
2	*	2441.000	48.72	31.90	80.62	54.00	26.62	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_3Mbps

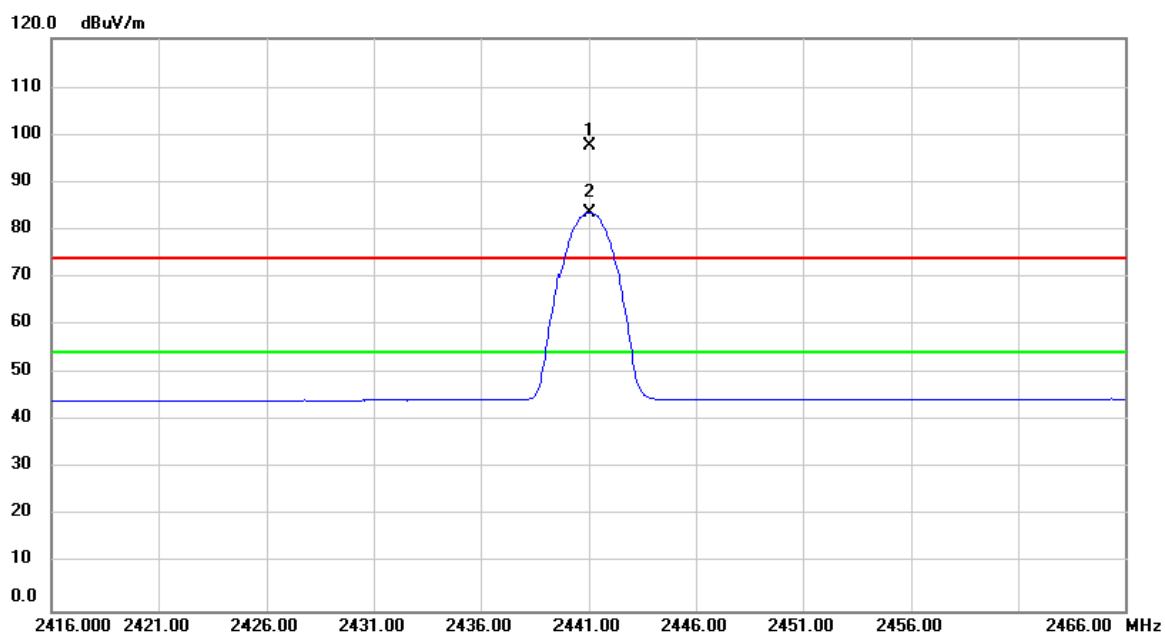
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	54.44	-10.39	44.05	74.00	-29.95	peak	
2	*	4882.000	43.14	-10.39	32.75	54.00	-21.25	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_3Mbps

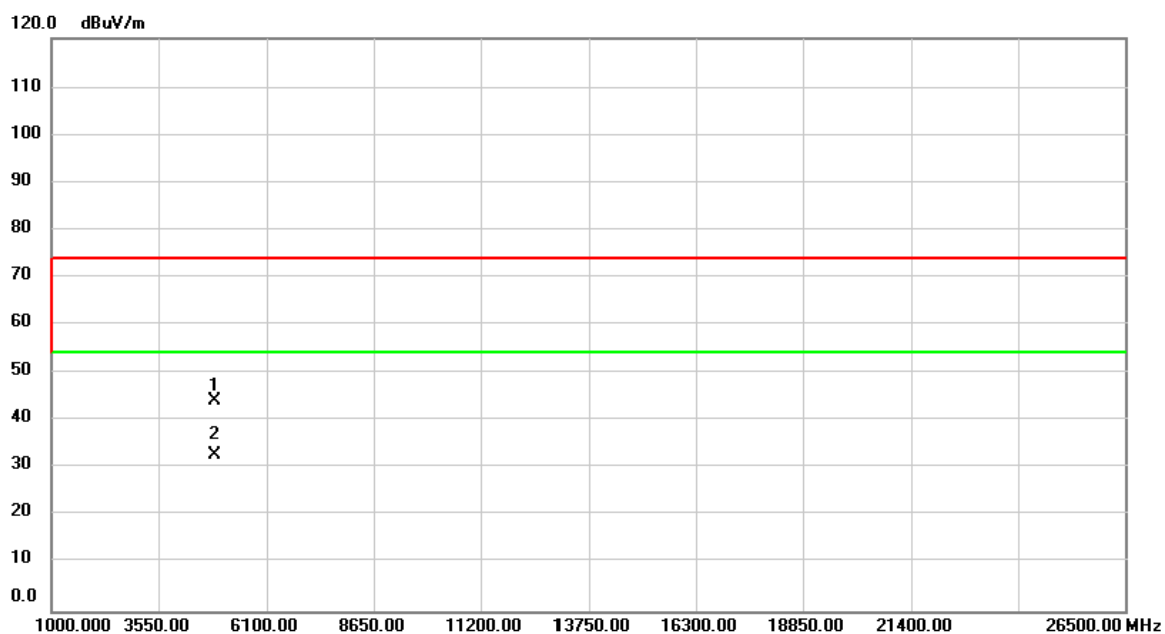
### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2441.000	65.70	31.90	97.60	74.00	23.60	peak	No Limit
2	*	2441.000	51.73	31.90	83.63	54.00	29.63	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2441MHz _CH39_3Mbps

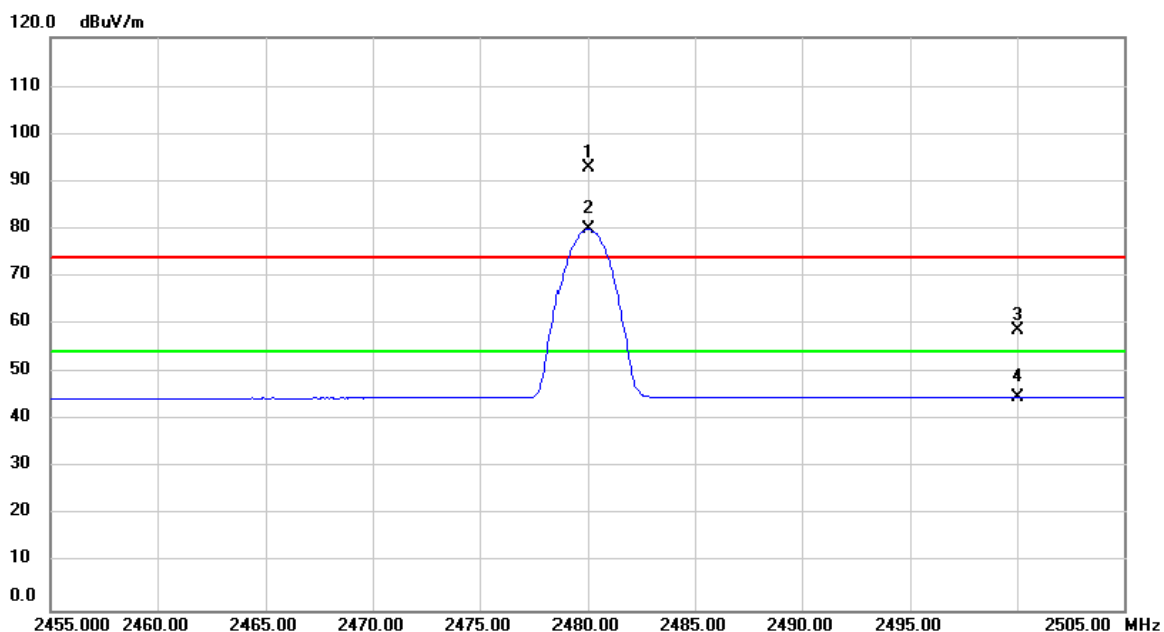
### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	54.51	-10.39	44.12	74.00	-29.88	peak	
2	*	4882.000	43.25	-10.39	32.86	54.00	-21.14	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_3Mbps

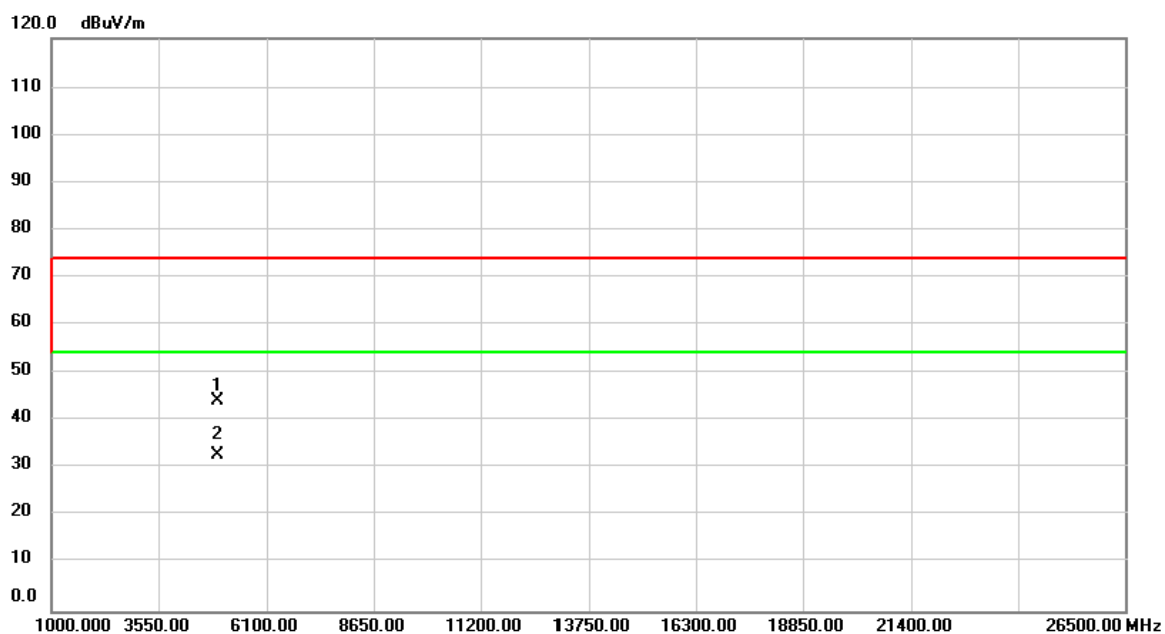
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2480.000	60.76	32.05	92.81	74.00	18.81	peak	No Limit
2	*	2480.000	47.84	32.05	79.89	54.00	25.89	AVG	No Limit
3		2500.000	26.56	32.13	58.69	74.00	-15.31	peak	
4		2500.000	12.81	32.13	44.94	54.00	-9.06	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_3Mbps

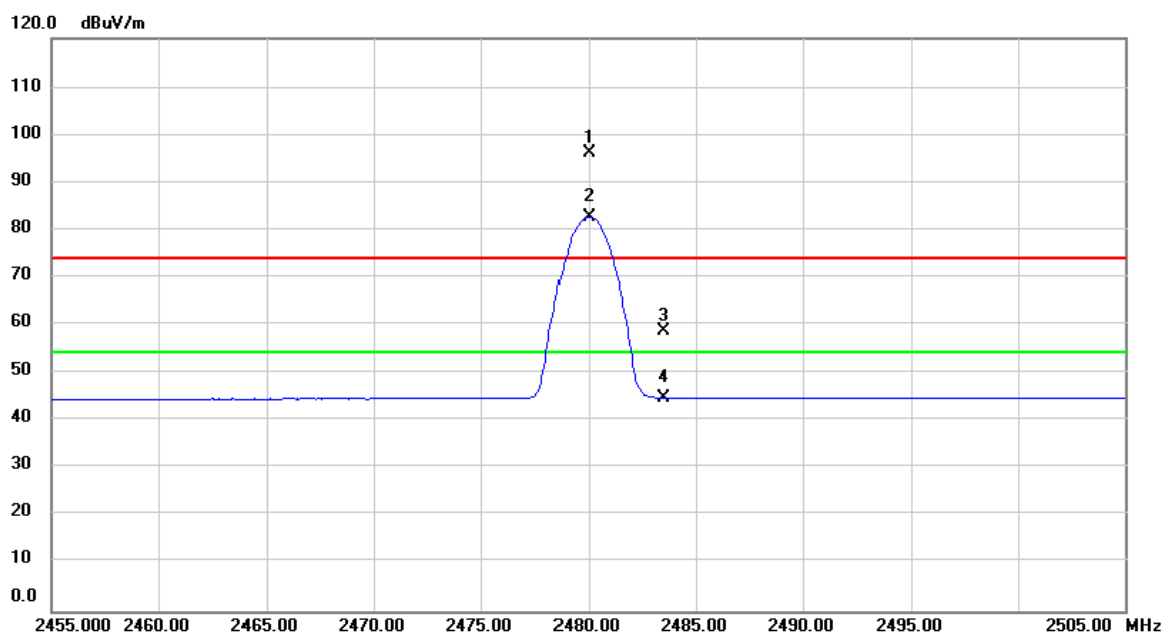
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	54.37	-10.26	44.11	74.00	-29.89	peak	
2	*	4960.000	43.17	-10.26	32.91	54.00	-21.09	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_3Mbps

### Horizontal

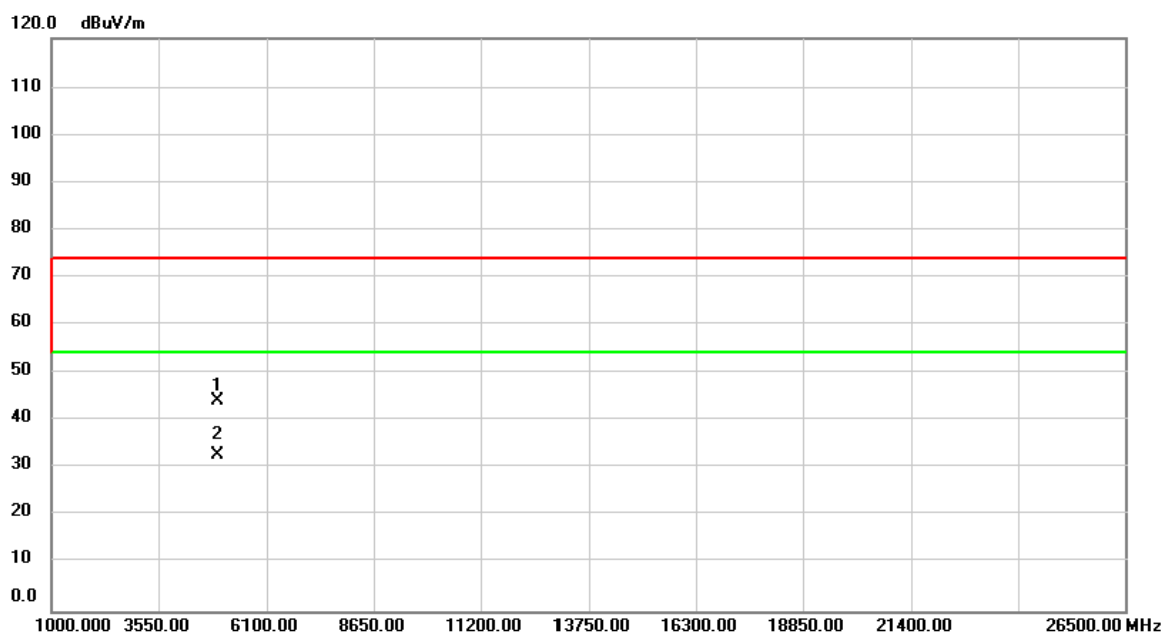


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	64.20	32.05	96.25	74.00	22.25	peak	No Limit
2	*	2480.000	50.67	32.05	82.72	54.00	28.72	AVG	No Limit
3		2483.500	26.54	32.06	58.60	74.00	-15.40	peak	
4		2483.500	12.89	32.06	44.95	54.00	-9.05	AVG	



Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH78_3Mbps

### Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	54.43	-10.26	44.17	74.00	-29.83	peak	
2	*	4960.000	43.23	-10.26	32.97	54.00	-21.03	AVG	

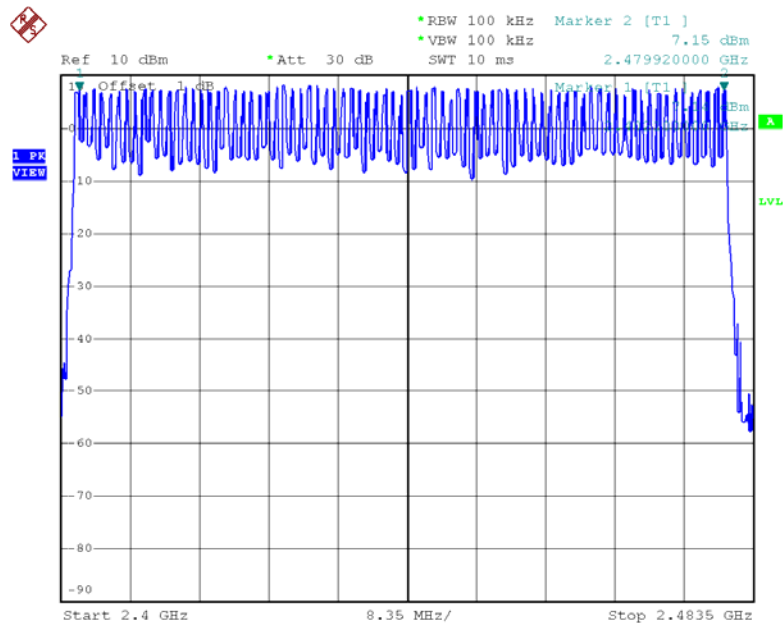
## **ATTACHMENT E - NUMBER OF HOPPING CHANNEL**

# Test Mode

# Hopping Mode\_1Mbps

Number of Hopping Channel

79



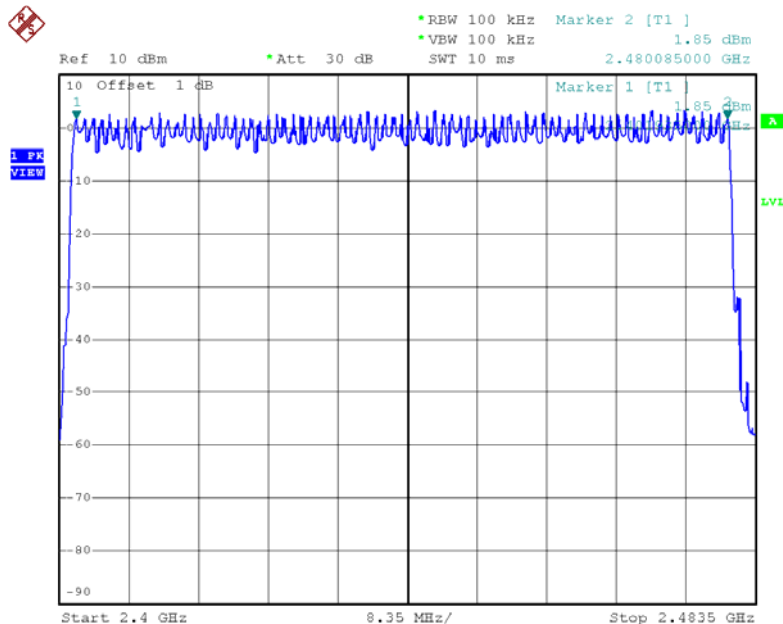
Date: 29.MAR.2016 13:51:13

# Test Mode

# Hopping Mode\_3Mbps

Number of Hopping Channel

79



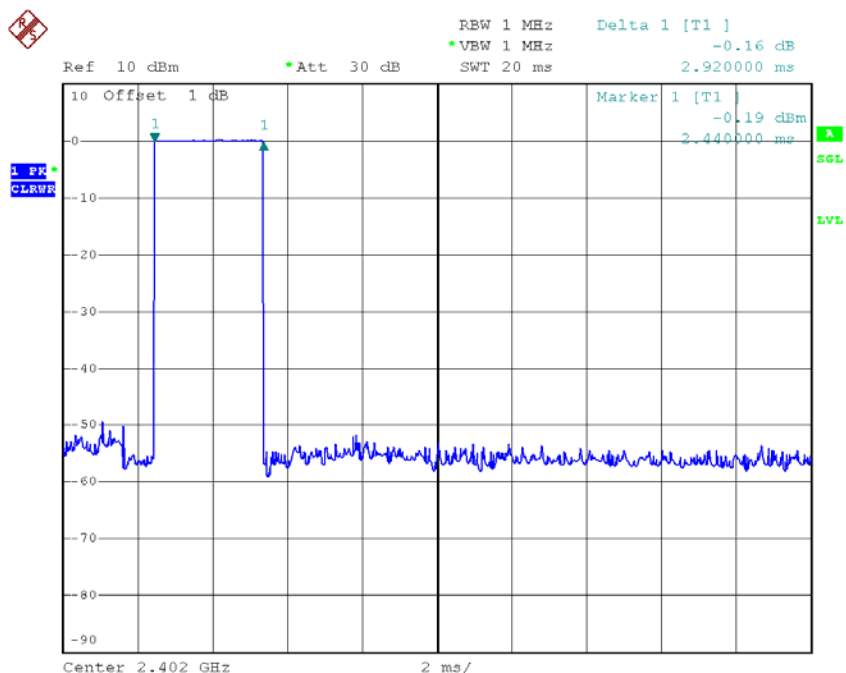
Date: 29.MAR.2016 14:23:09

## **ATTACHMENT F - AVERAGE TIME OF OCCUPANCY**

Test Mode :	TX Mode_1Mbps
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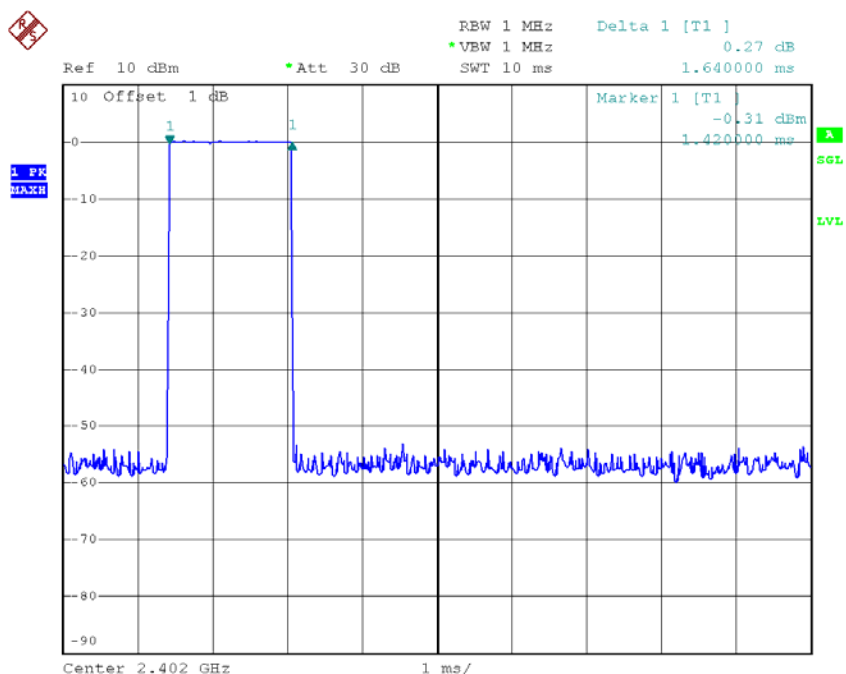
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.9200	0.3115	0.4000	Complies
DH3	2402	1.6400	0.2624	0.4000	Complies
DH1	2402	0.3850	0.1232	0.4000	Complies
DH5	2441	2.8800	0.3072	0.4000	Complies
DH3	2441	1.6400	0.2624	0.4000	Complies
DH1	2441	0.3850	0.1232	0.4000	Complies
DH5	2480	2.9200	0.3115	0.4000	Complies
DH3	2480	1.6400	0.2624	0.4000	Complies
DH1	2480	0.3850	0.1232	0.4000	Complies

### CH00-DH5



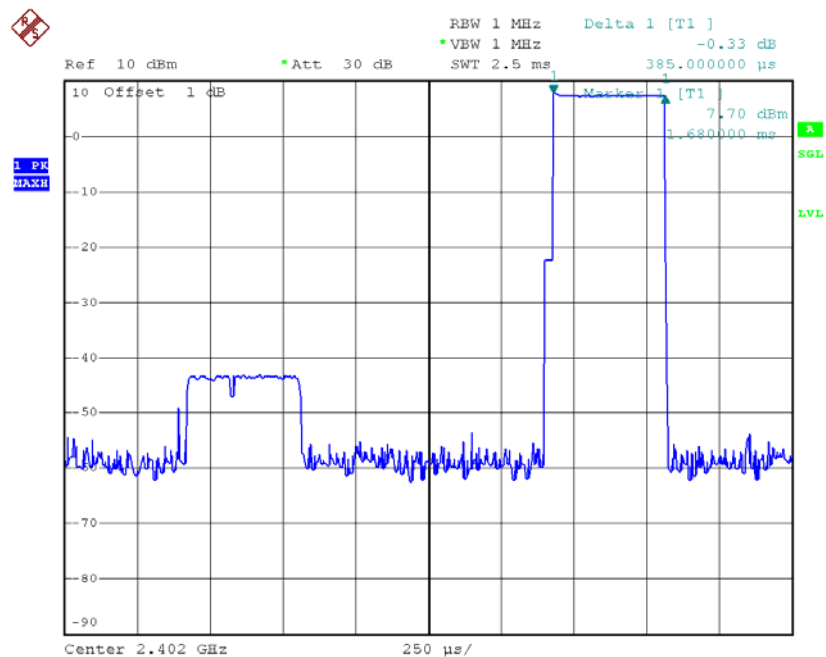
Date: 29.MAR.2016 14:04:23

### CH00-DH3



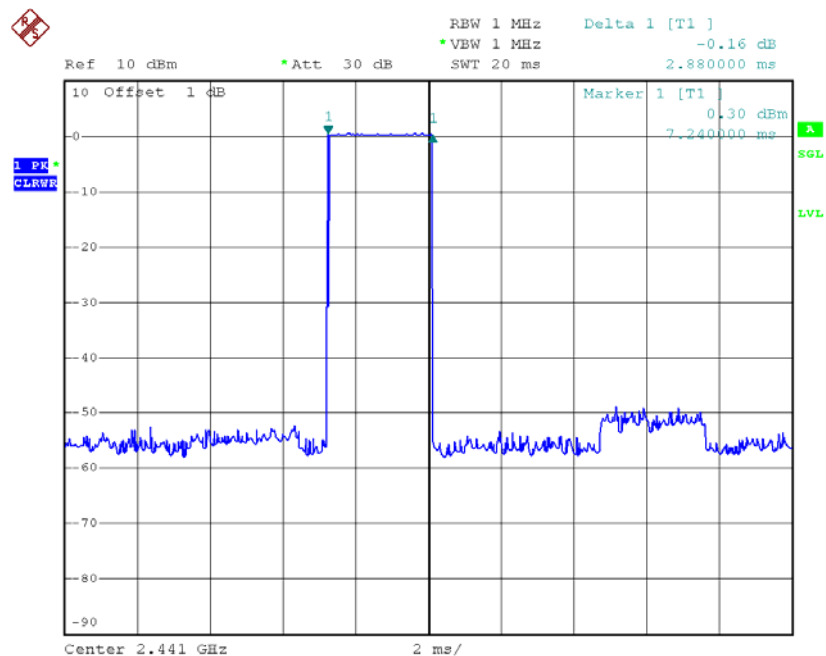
Date: 29.MAR.2016 14:03:43

# CH00-DH1



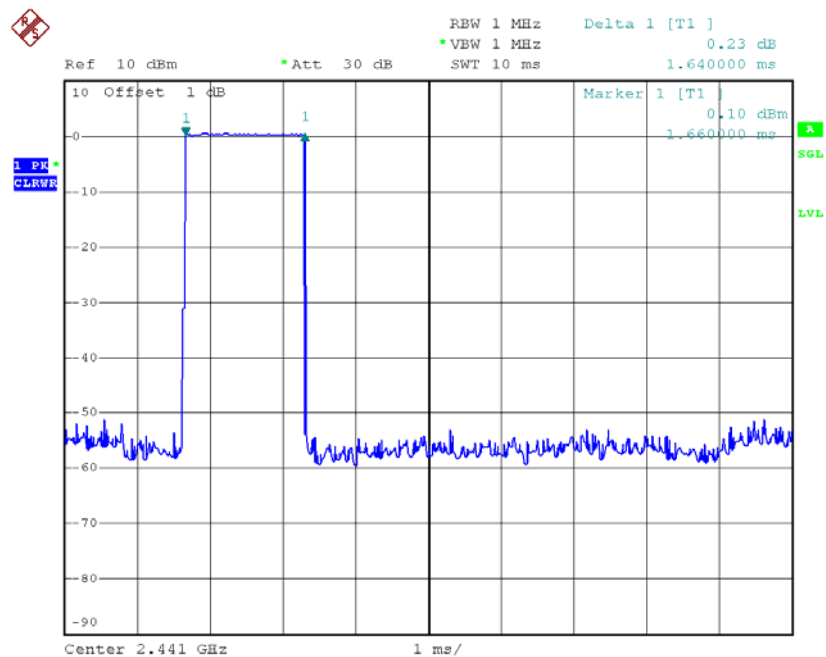
Date: 29.MAR.2016 13:38:45

# CH39-DH5



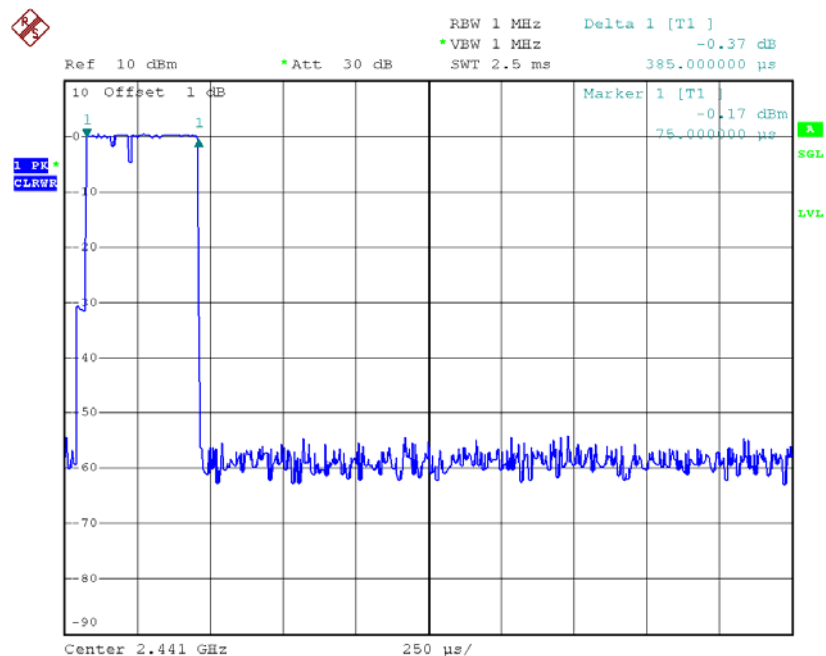
Date: 29.MAR.2016 14:04:26

### CH39-DH3



Date: 29.MAR.2016 14:03:46

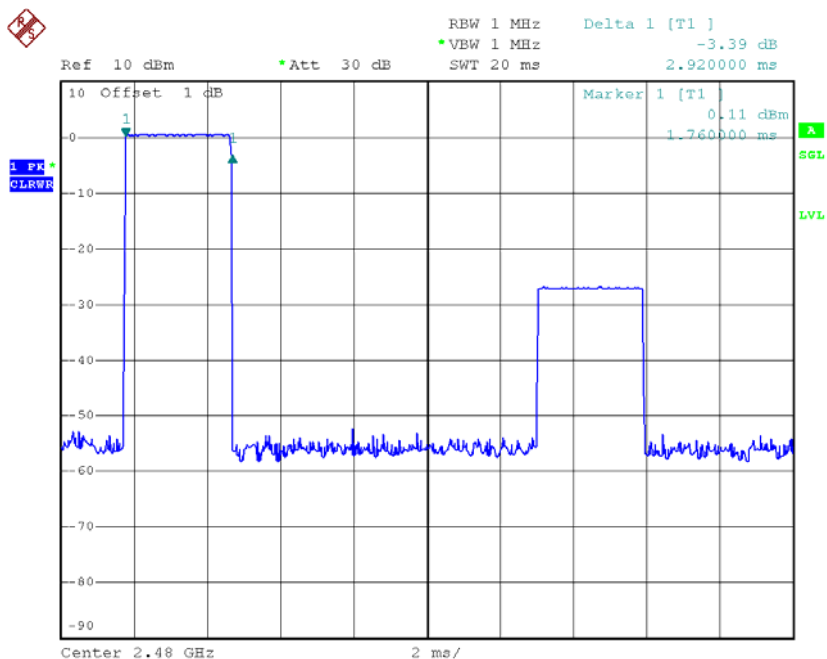
### CH39-DH



Date: 29.MAR.2016 13:38:49

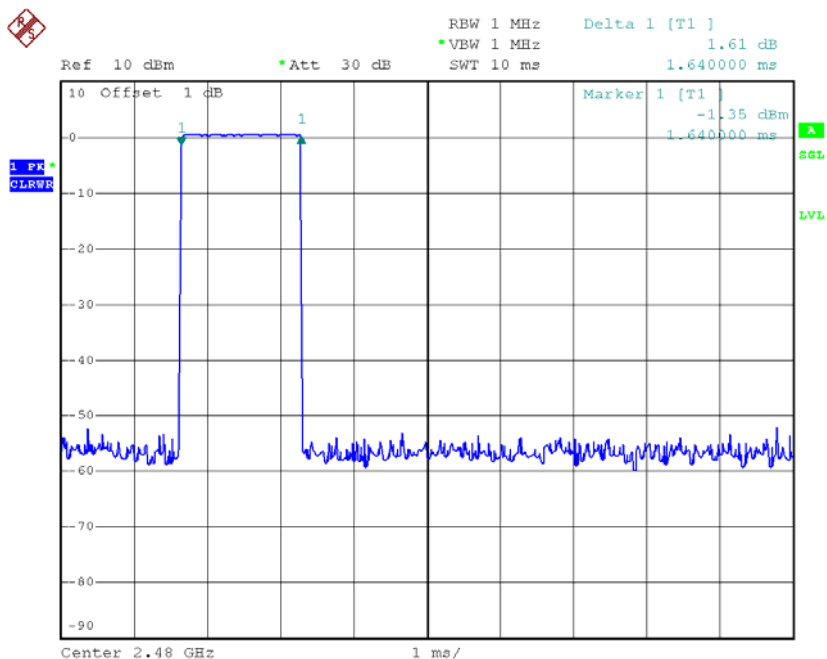


### CH78-DH5



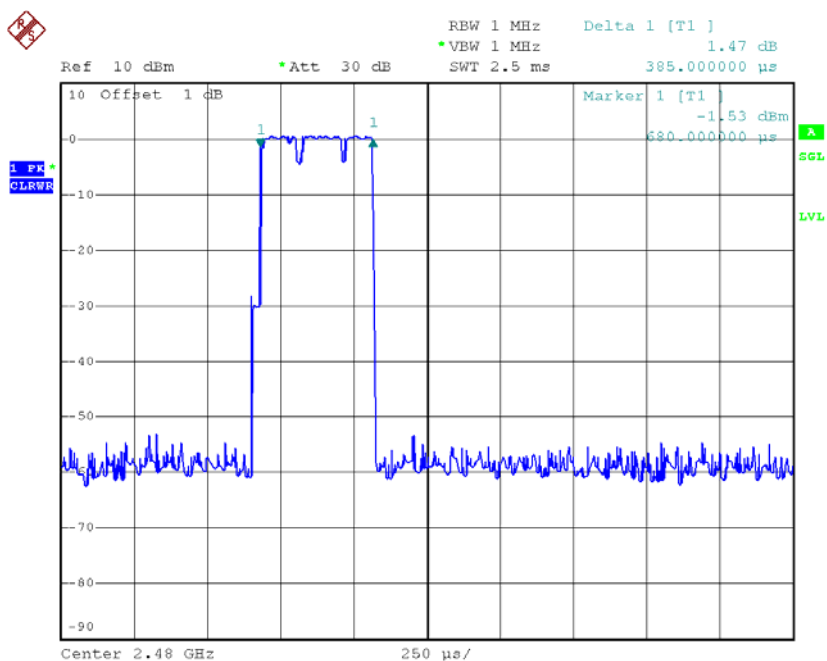
Date: 29.MAR.2016 14:04:30

### CH78-DH3



Date: 29.MAR.2016 14:03:52

# CH78-DH1

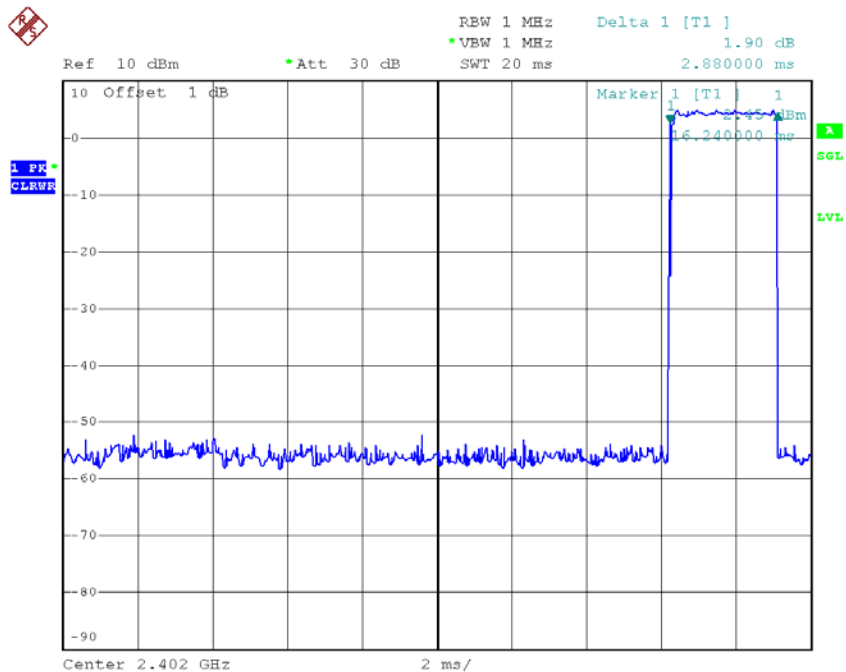


Date: 29.MAR.2016 13:38:52

Test Mode :	TX Mode_3Mbps
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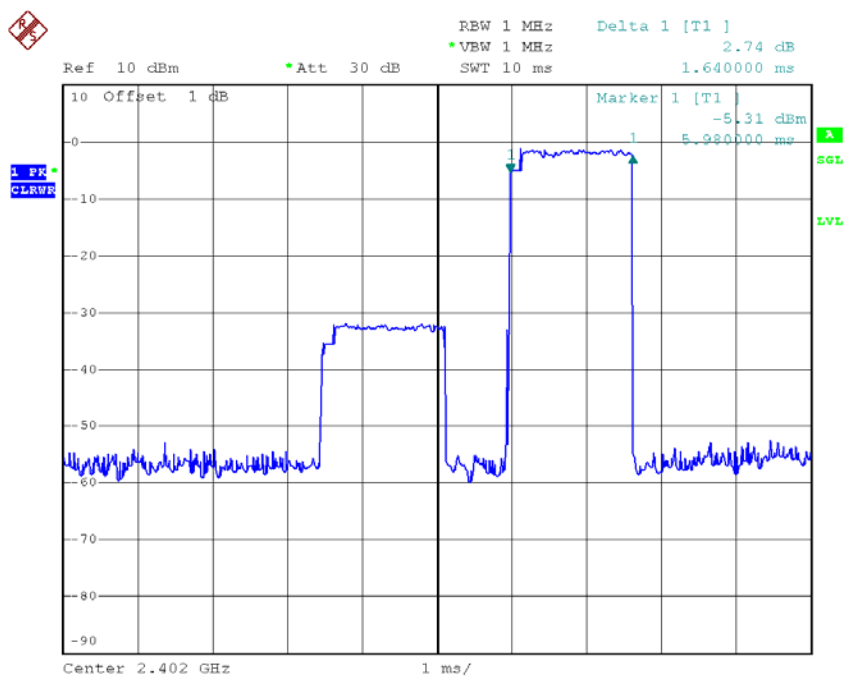
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.8800	0.3072	0.4000	Complies
DH3	2402	1.6400	0.2624	0.4000	Complies
DH1	2402	0.3850	0.1232	0.4000	Complies
DH5	2441	2.9200	0.3115	0.4000	Complies
DH3	2441	1.6400	0.2624	0.4000	Complies
DH1	2441	0.3900	0.1248	0.4000	Complies
DH5	2480	2.8800	0.3072	0.4000	Complies
DH3	2480	1.6600	0.2656	0.4000	Complies
DH1	2480	0.3900	0.1248	0.4000	Complies

### CH00-DH5



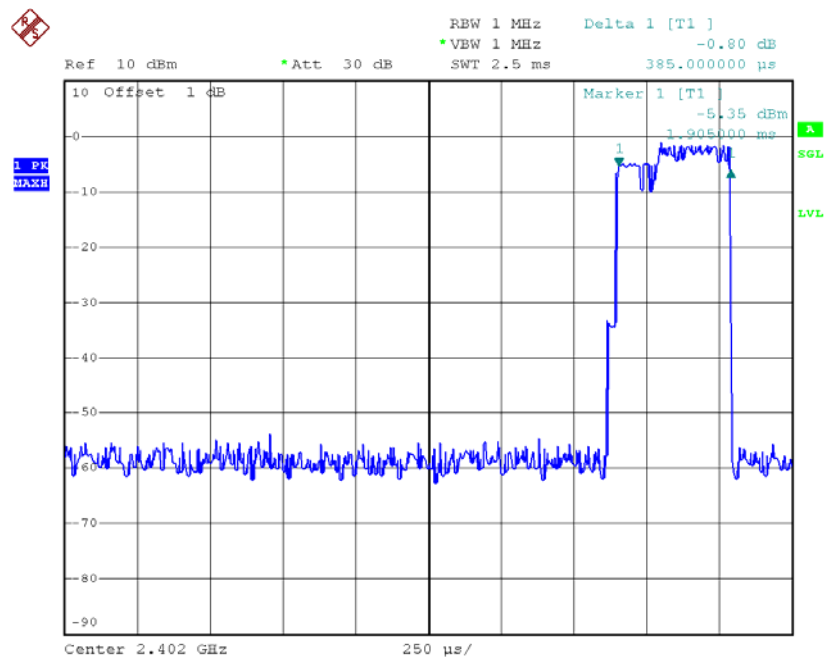
Date: 29.MAR.2016 15:02:21

### CH00-DH3



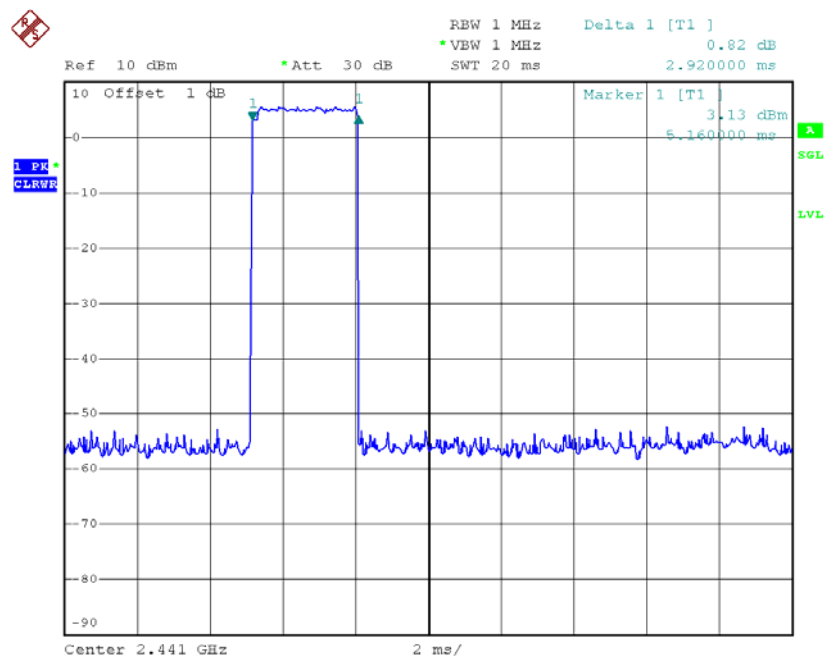
Date: 29.MAR.2016 15:08:48

# CH00-DH1



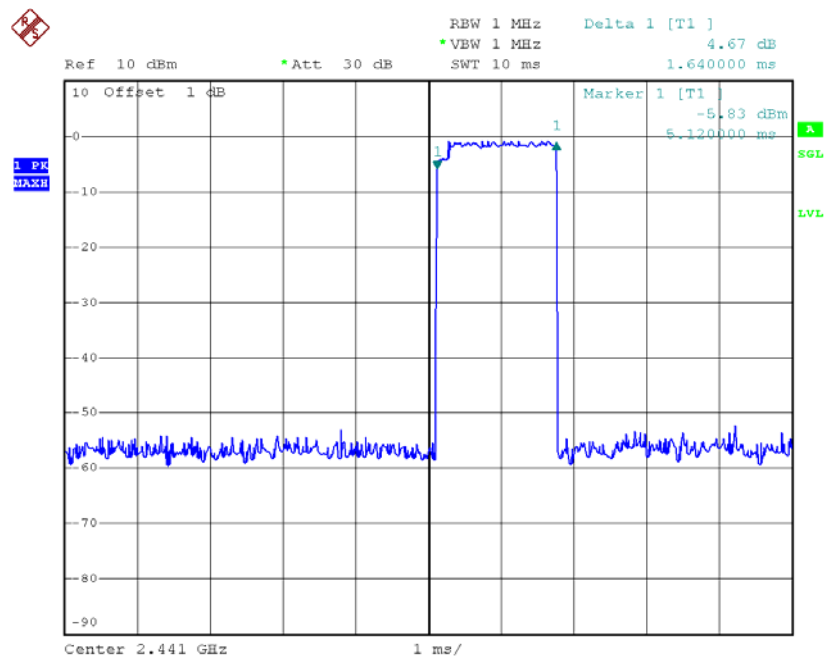
Date: 29.MAR.2016 14:17:58

# CH39-DH5



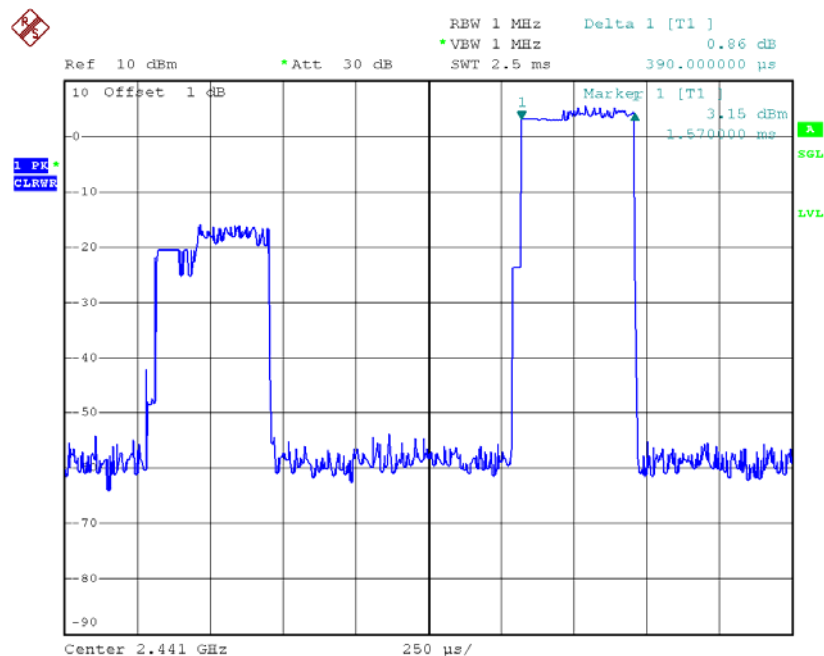
Date: 29.MAR.2016 15:02:24

### CH39-DH3



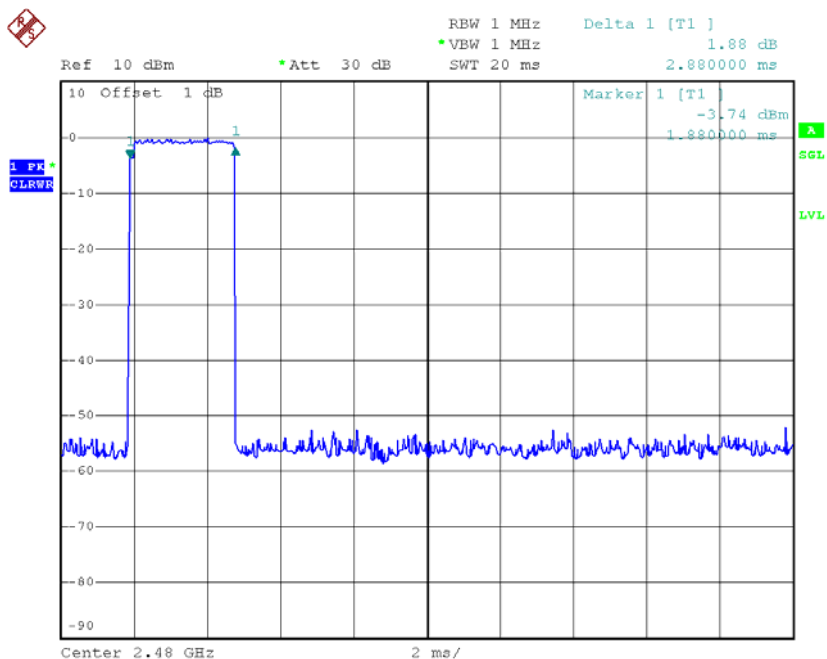
Date: 29.MAR.2016 14:56:41

### CH39-DH1



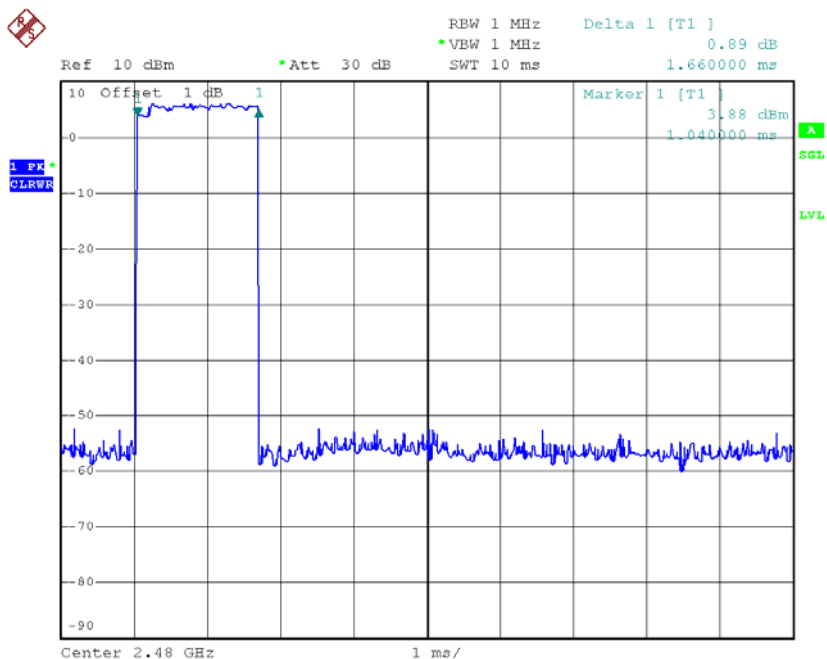
Date: 29.MAR.2016 14:18:03

# CH78-DH5



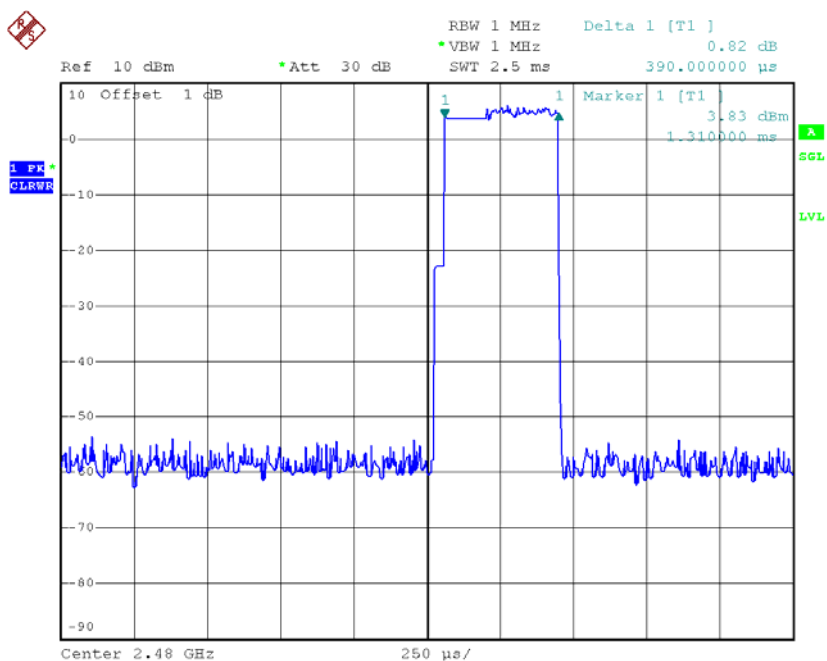
Date: 29.MAR.2016 15:02:27

# CH78-DH3



Date: 29.MAR.2016 14:56:45

# CH78-DH1



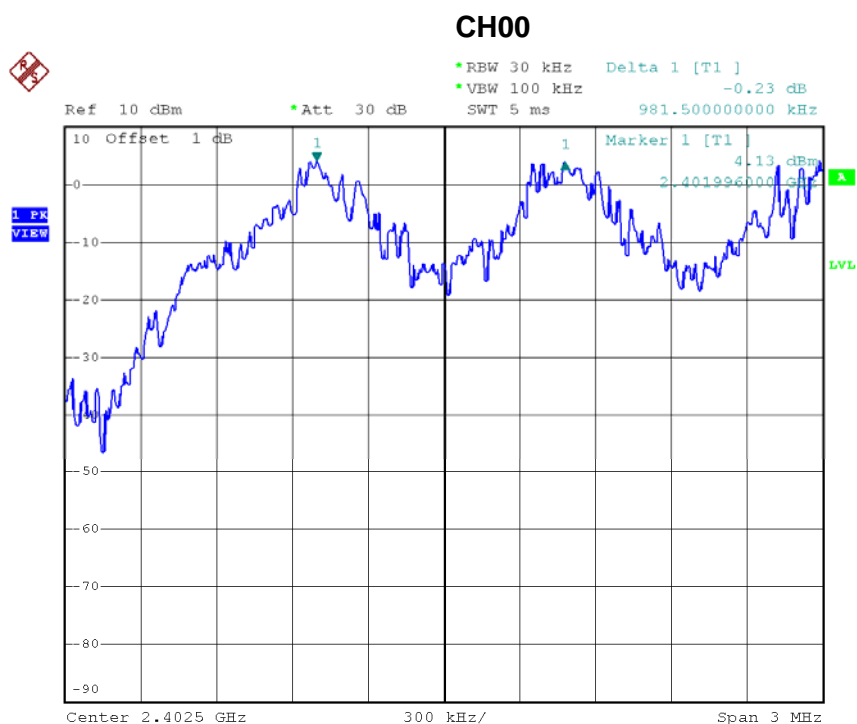
Date: 29.MAR.2016 14:18:11



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

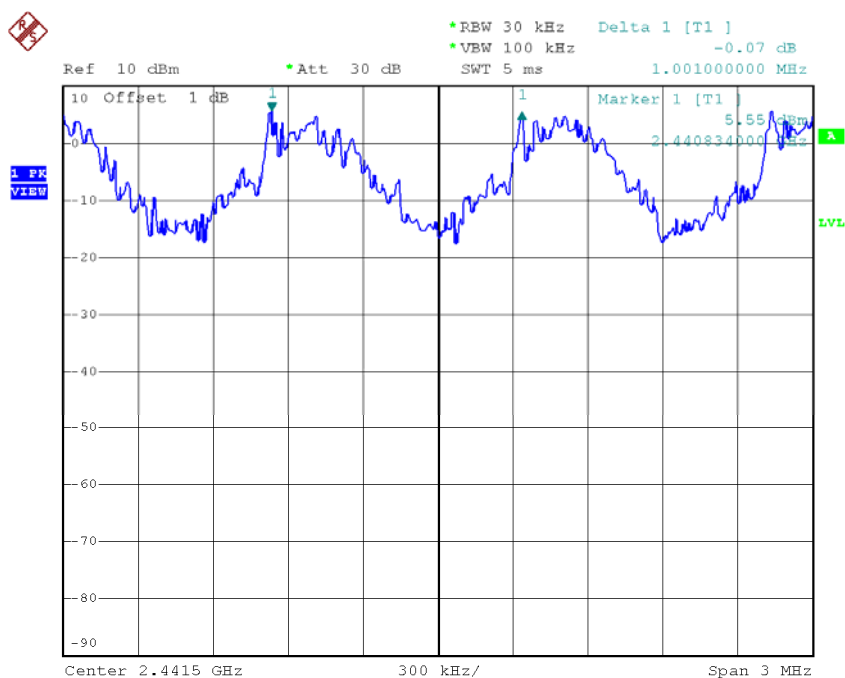
Test Mode :	Hopping on _1Mbps
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Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	0.982	0.636	Complies
2441	1.001	0.665	Complies
2480	0.996	0.663	Complies



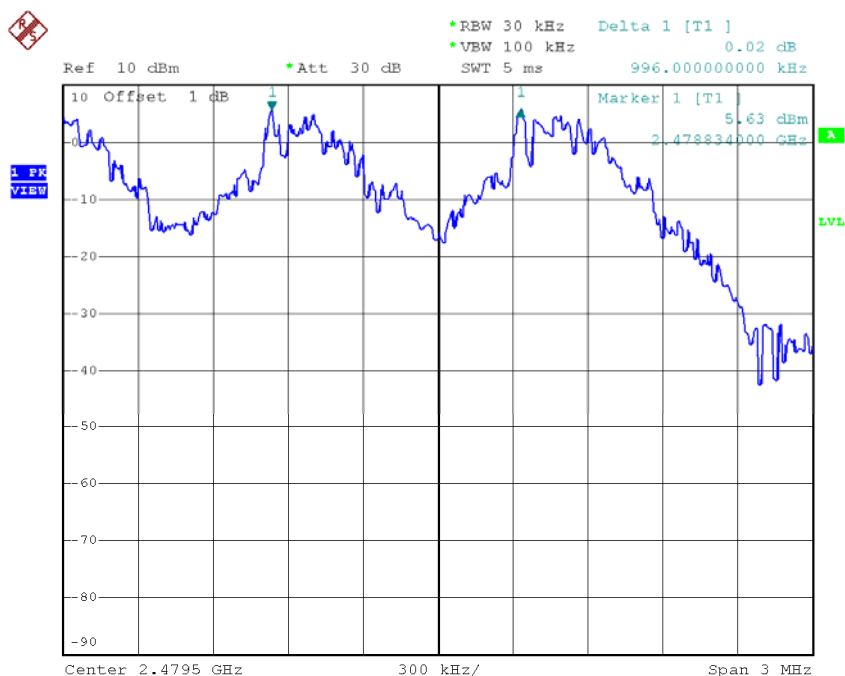
Date: 29.MAR.2016 13:47:13

### CH39



Date: 29.MAR.2016 13:48:22

### CH78

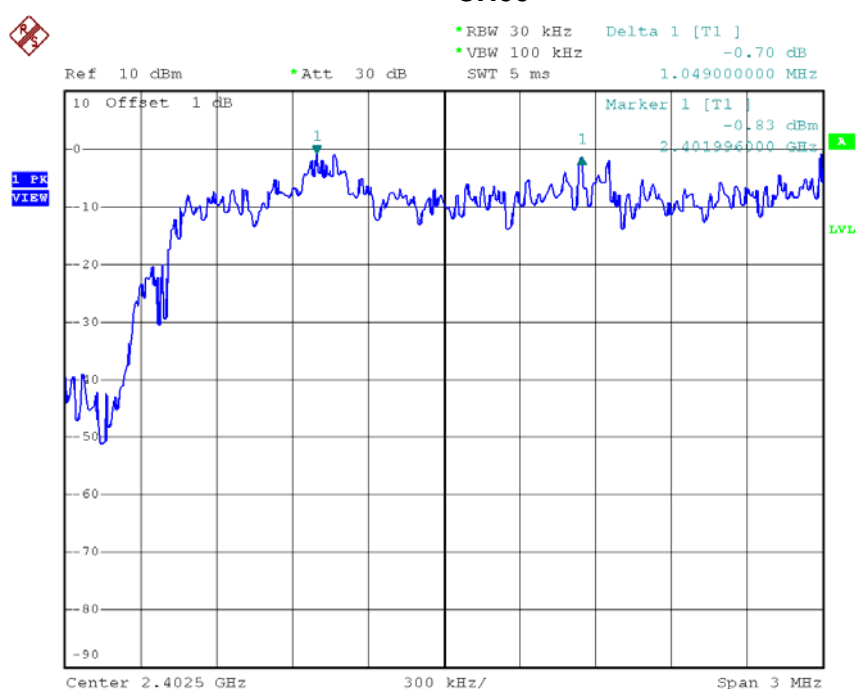


Date: 29.MAR.2016 13:49:25

Test Mode :	Hopping on _3Mbps
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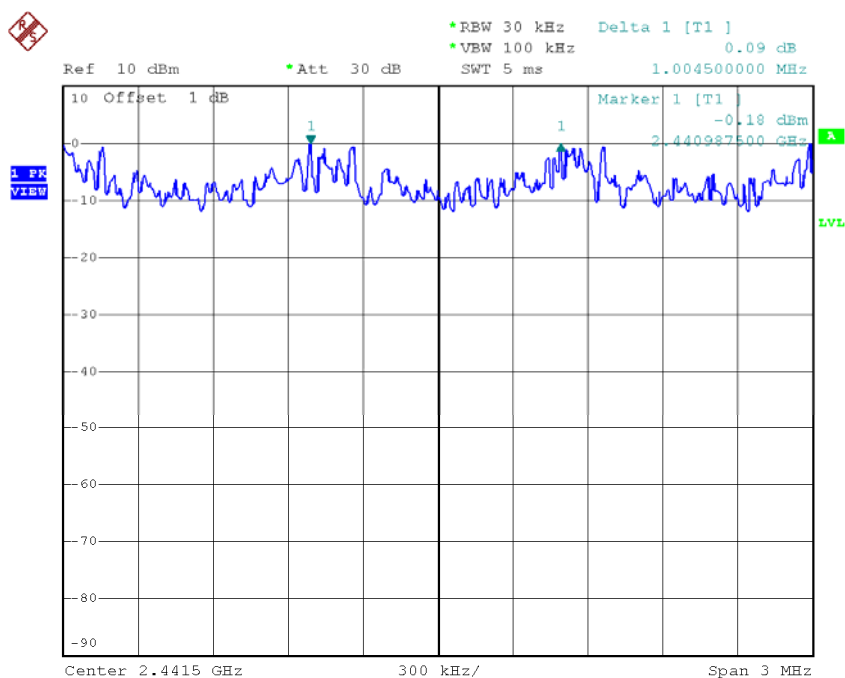
Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	1.049	0.891	Complies
2441	1.005	0.901	Complies
2480	1.002	0.897	Complies

### CH00



Date: 29.MAR.2016 14:47:36

### CH39



Date: 29.MAR.2016 14:48:43

### CH78

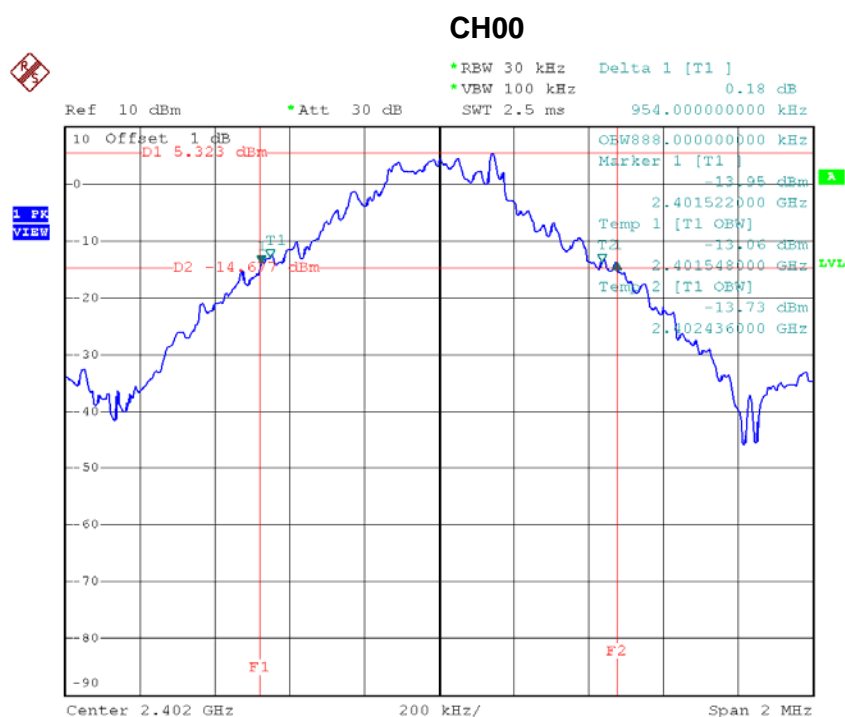


Date: 29.MAR.2016 14:55:22

## **ATTACHMENT H - BANDWIDTH**

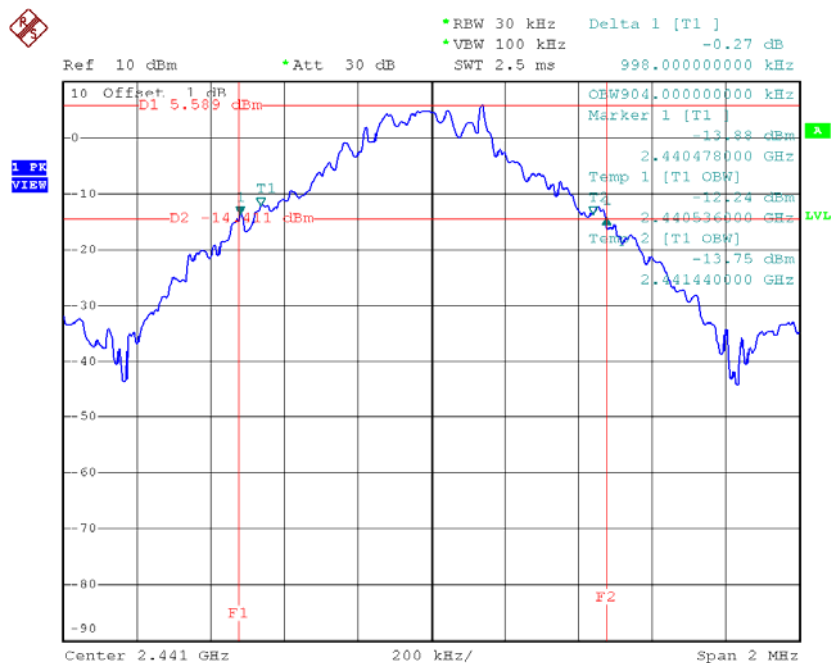
Test Mode :	TX Mode _1Mbps
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	0.954	0.888	Complies
2441	0.998	0.904	Complies
2480	0.995	0.908	Complies



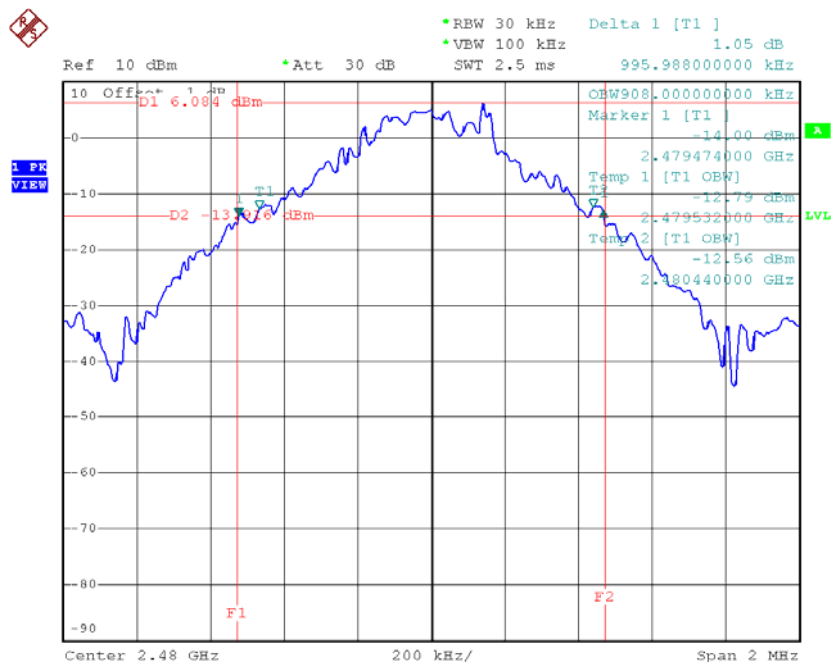
Date: 29.MAR.2016 13:31:52

### CH39



Date: 29.MAR.2016 13:33:31

### CH78

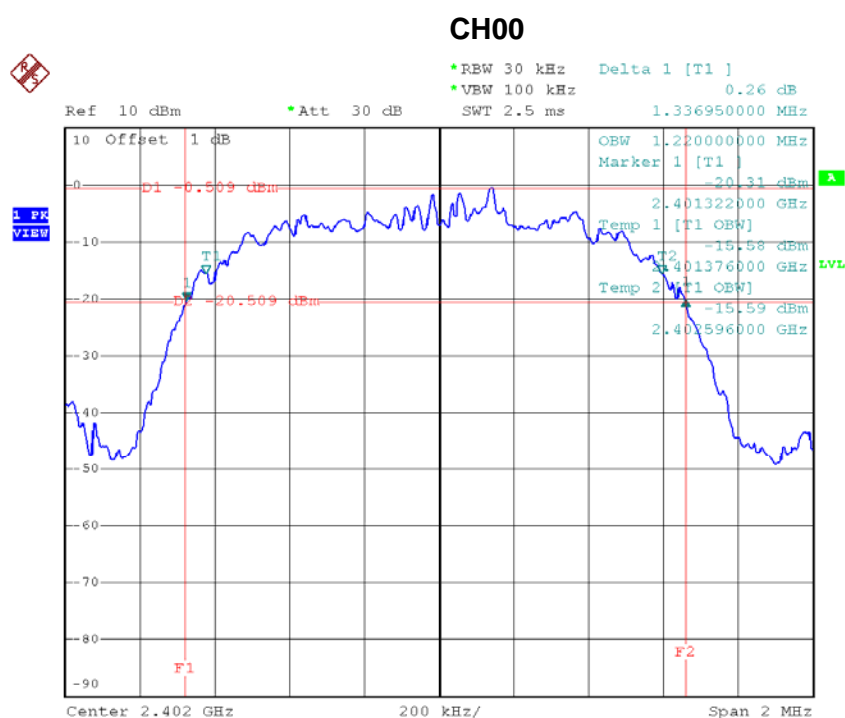


Date: 29.MAR.2016 13:35:01



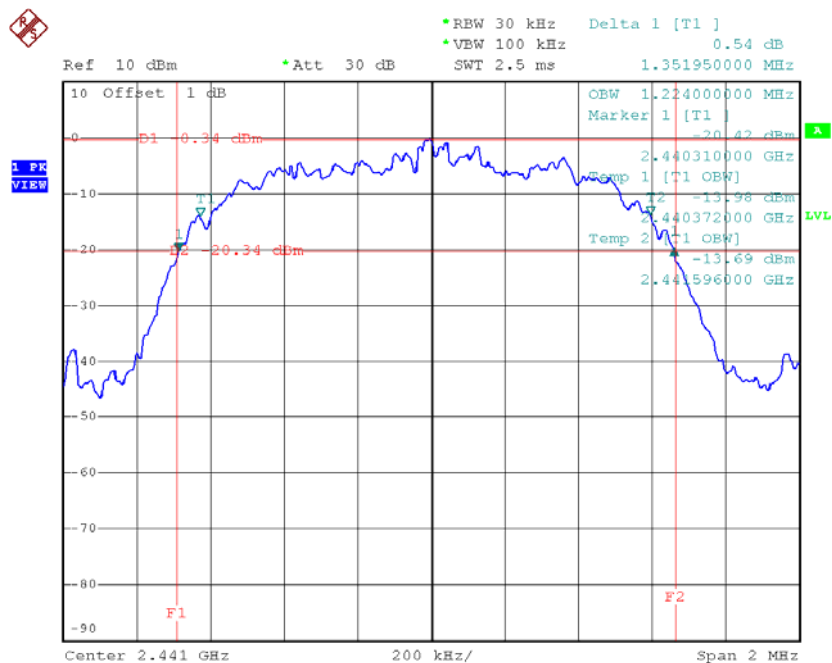
Test Mode :	TX Mode _3Mbps
-------------	----------------

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.337	1.220	Complies
2441	1.352	1.224	Complies
2480	1.346	1.224	Complies



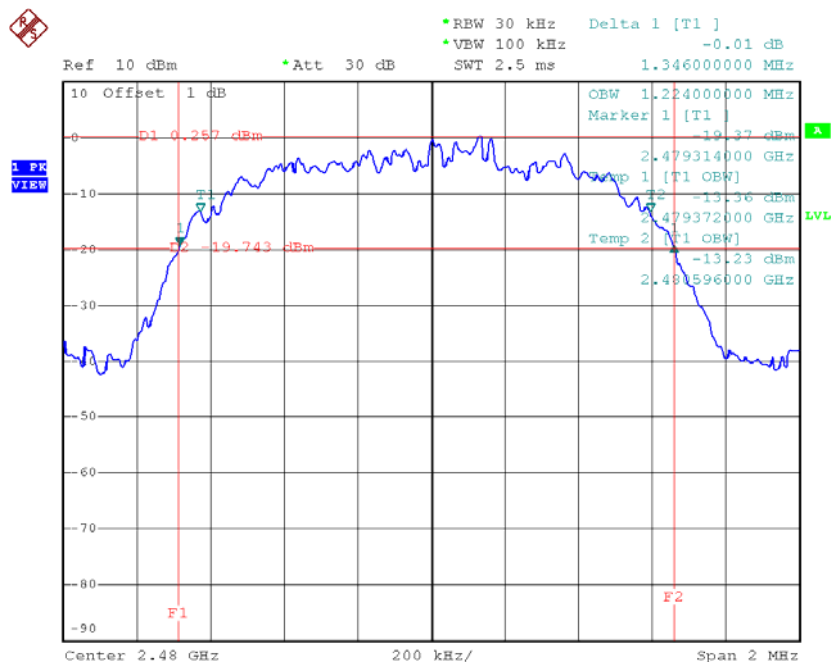
Date: 29.MAR.2016 14:13:47

### CH39



Date: 29.MAR.2016 14:14:58

### CH78

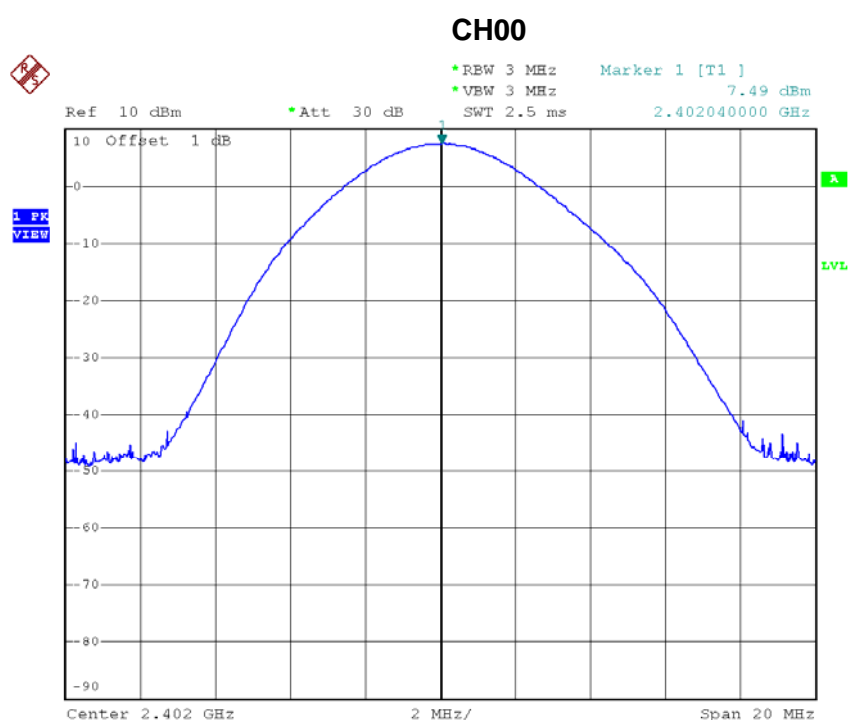


Date: 29.MAR.2016 14:16:39

## **ATTACHMENT I - PEAK OUTPUT POWER**

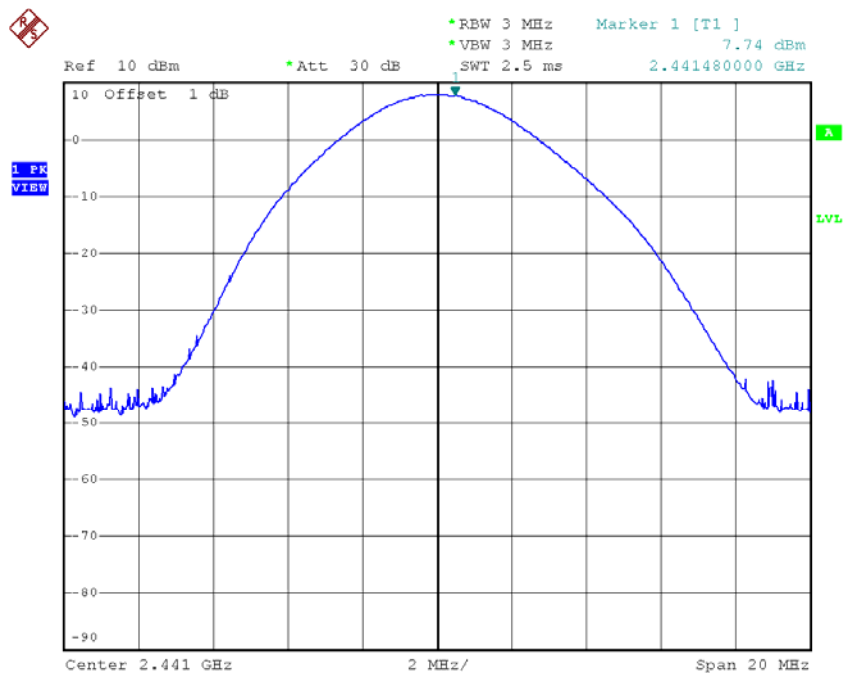
Test Mode :	TX Mode _1Mbps
-------------	----------------

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watt)	Max. Limit (dBm)	Max. Limit (Watt)	Test Result
2402	7.49	0.0056	30.00	1.0000	Complies
2441	7.74	0.0059	30.00	1.0000	Complies
2480	8.23	0.0067	30.00	1.0000	Complies



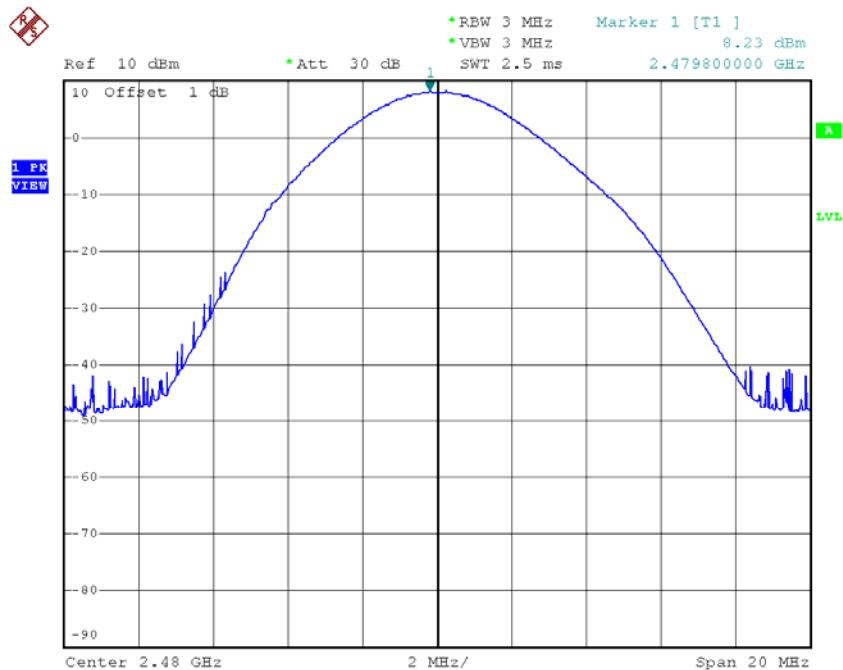
Date: 29.MAR.2016 13:32:09

### CH39



Date: 29.MAR.2016 13:33:37

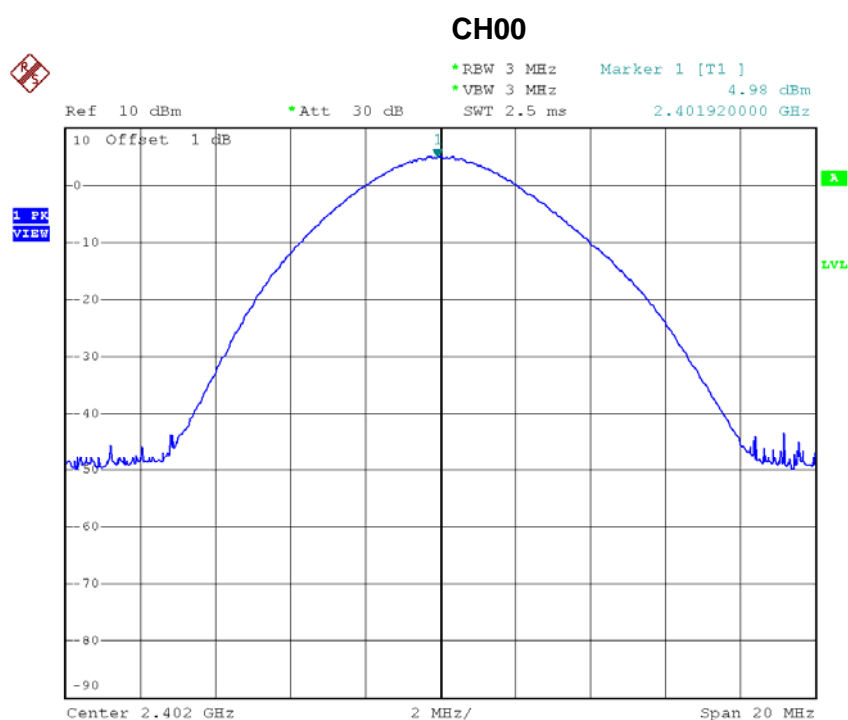
### CH78



Date: 29.MAR.2016 13:35:18

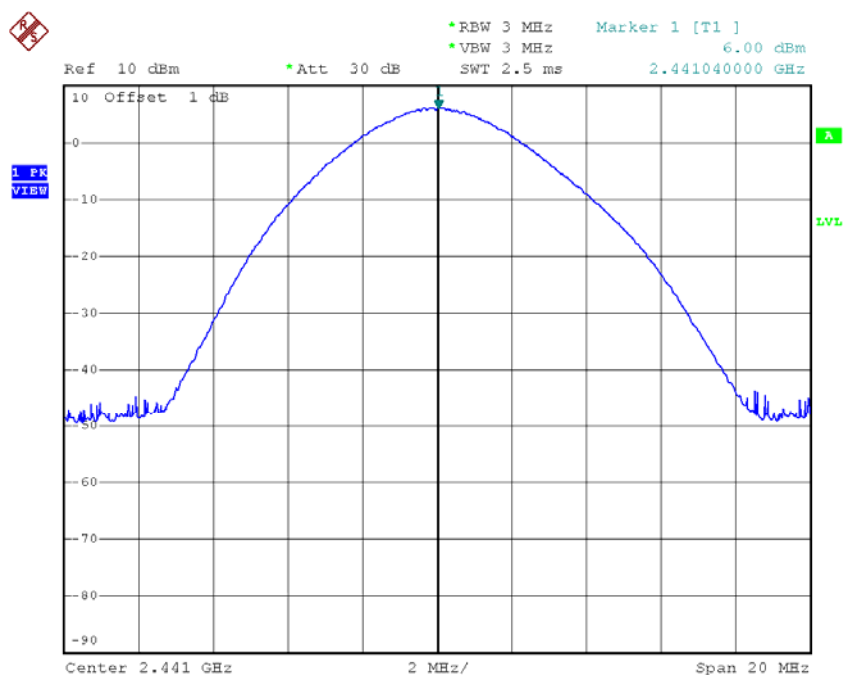
Test Mode :	TX Mode _3Mbps
-------------	----------------

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watt)	Max. Limit (dBm)	Max. Limit (Watt)	Test Result
2402	4.98	0.0031	30.00	1.0000	Complies
2441	6.00	0.0040	30.00	1.0000	Complies
2480	6.46	0.0044	30.00	1.0000	Complies



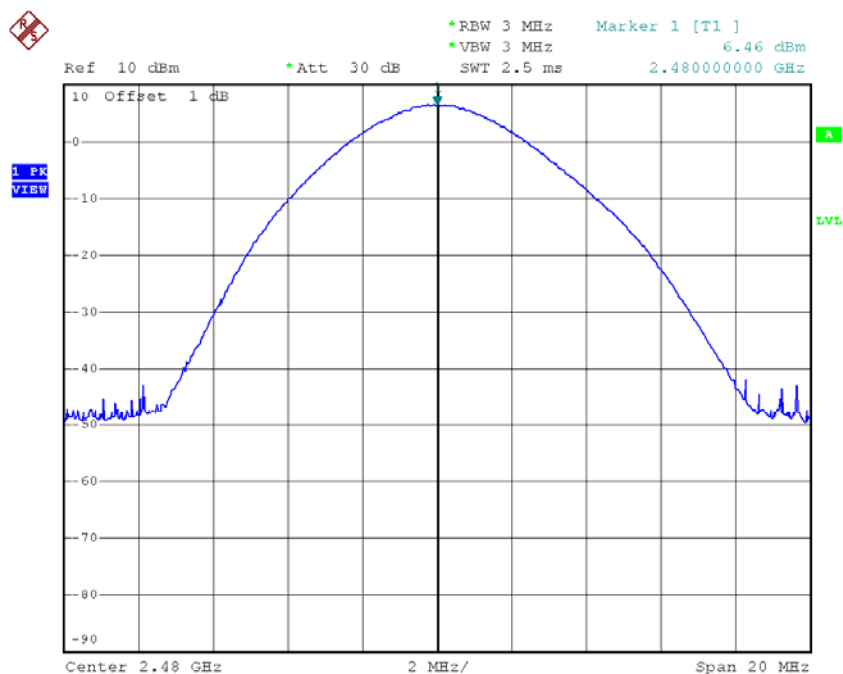
Date: 29.MAR.2016 14:14:04

### CH39



Date: 29.MAR.2016 14:15:03

### CH78

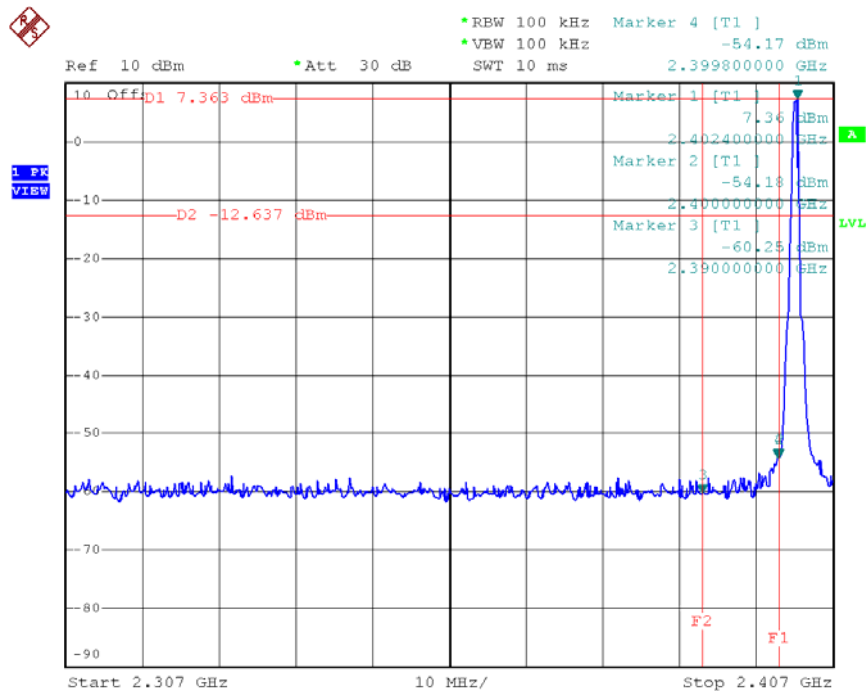


Date: 29.MAR.2016 14:16:56

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

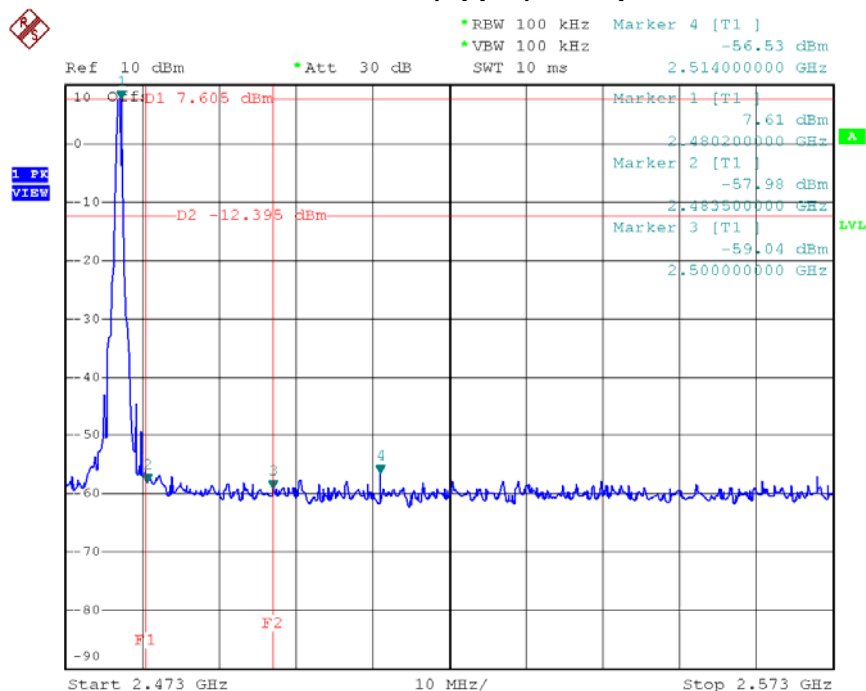


### CH00 (Lower)\_1Mbps



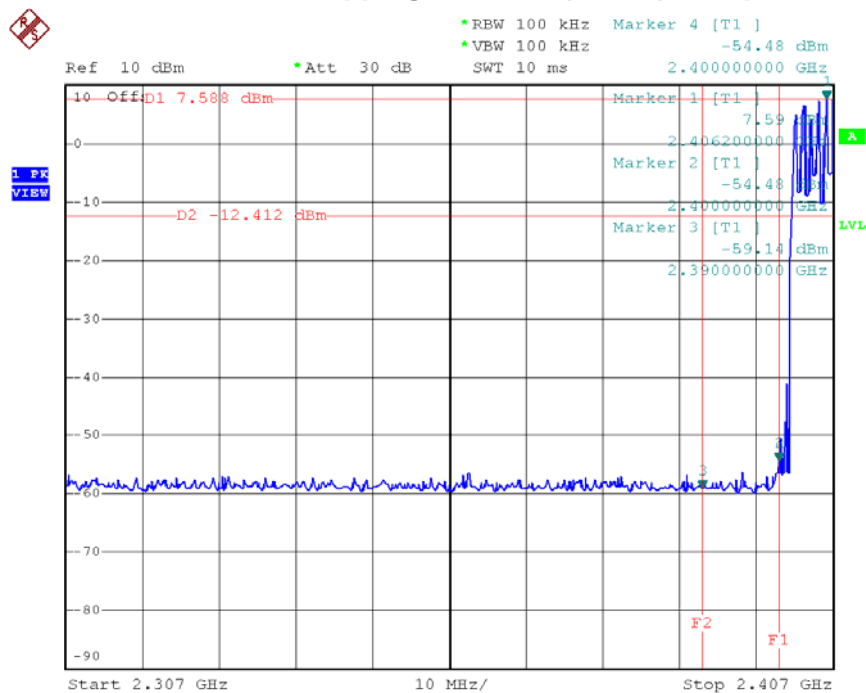
Date: 29.MAR.2016 13:31:15

### CH78 (Upper)\_1Mbps



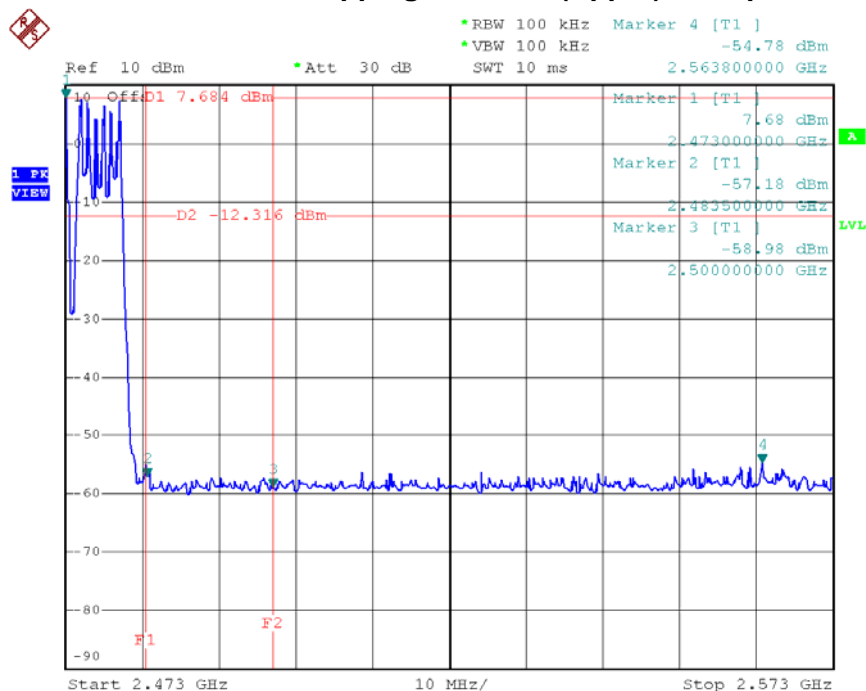
Date: 29.MAR.2016 13:34:30

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



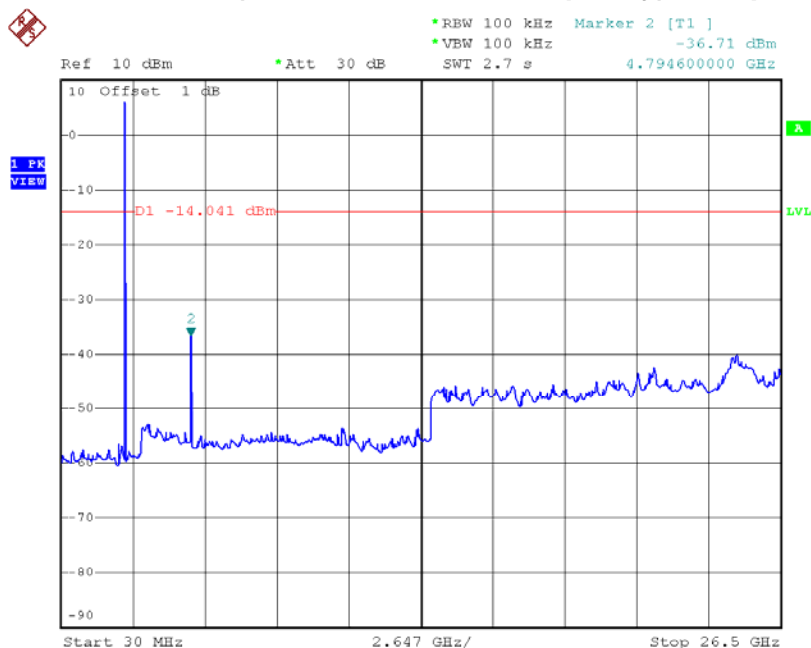
Date: 29.MAR.2016 13:52:04

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



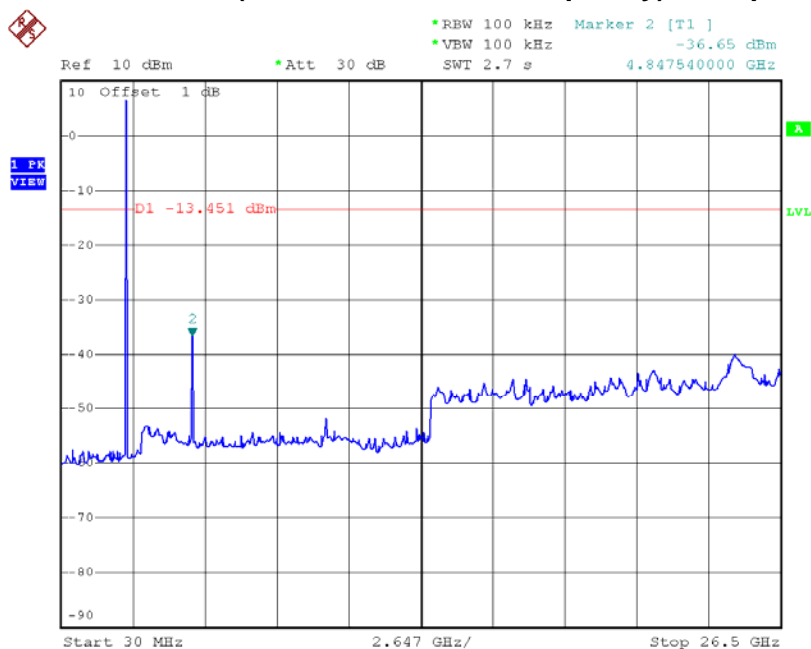
Date: 29.MAR.2016 13:52:54

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



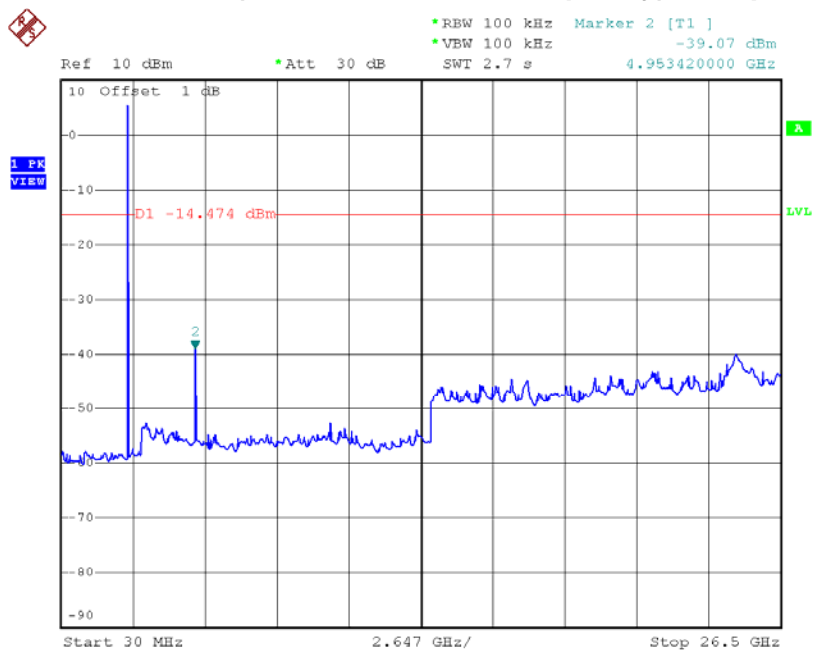
Date: 29.MAR.2016 13:32:04

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



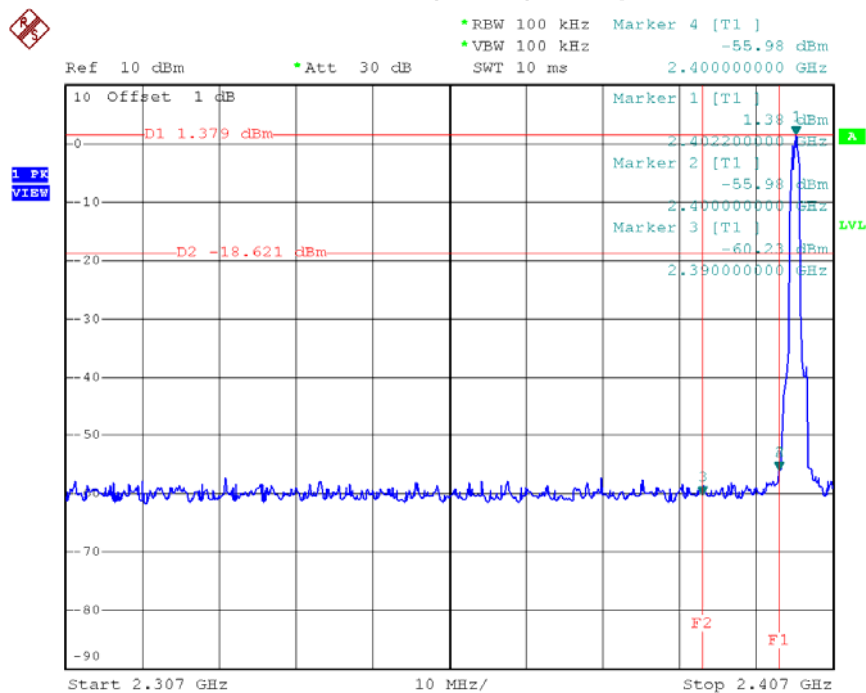
Date: 29.MAR.2016 13:32:59

# CH78 (10 Harmonic of the frequency) \_1Mbps



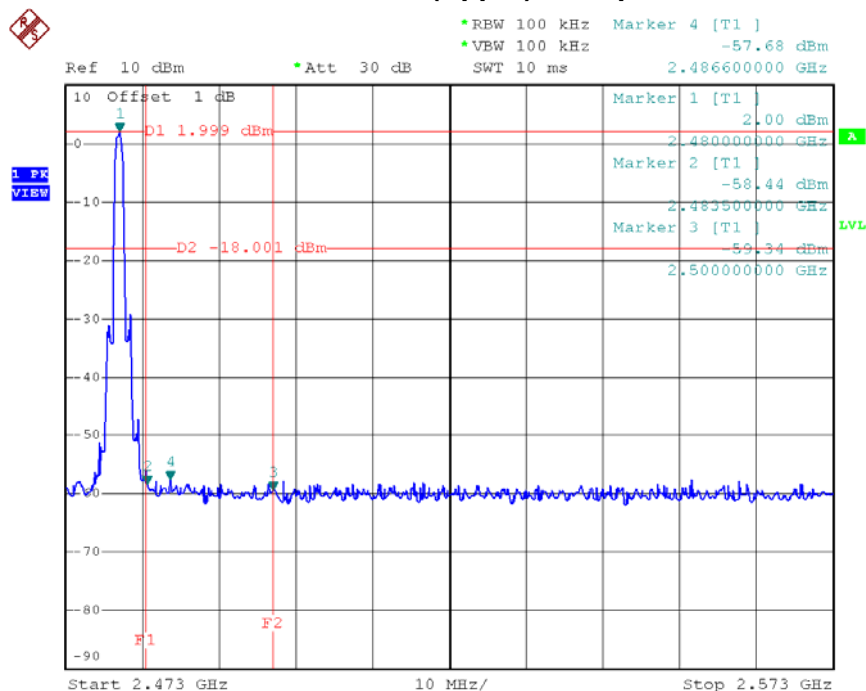
Date: 29.MAR.2016 13:35:13

### CH00 (Lower) \_3Mbps



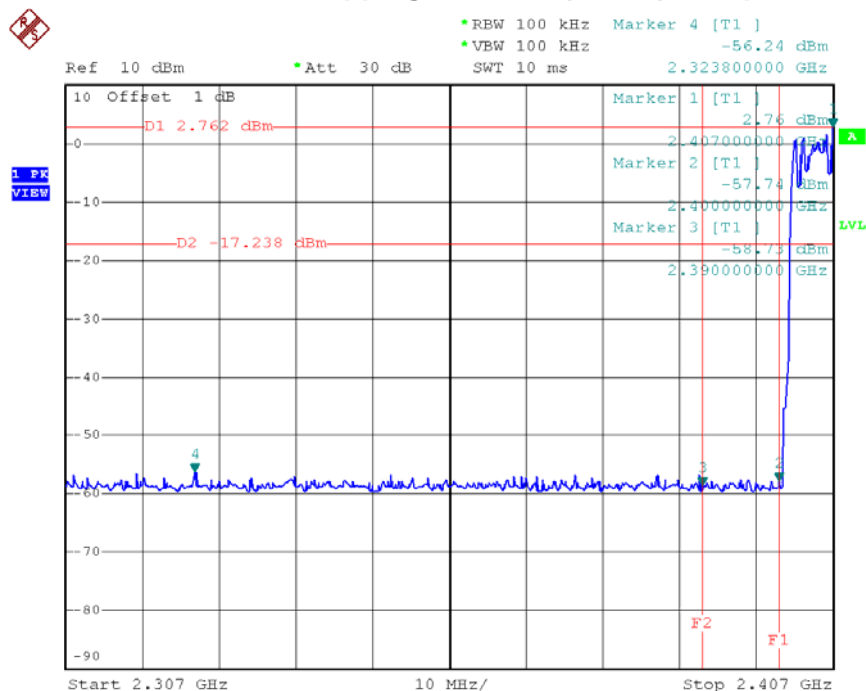
Date: 29.MAR.2016 14:13:24

### CH78 (Upper) \_3Mbps



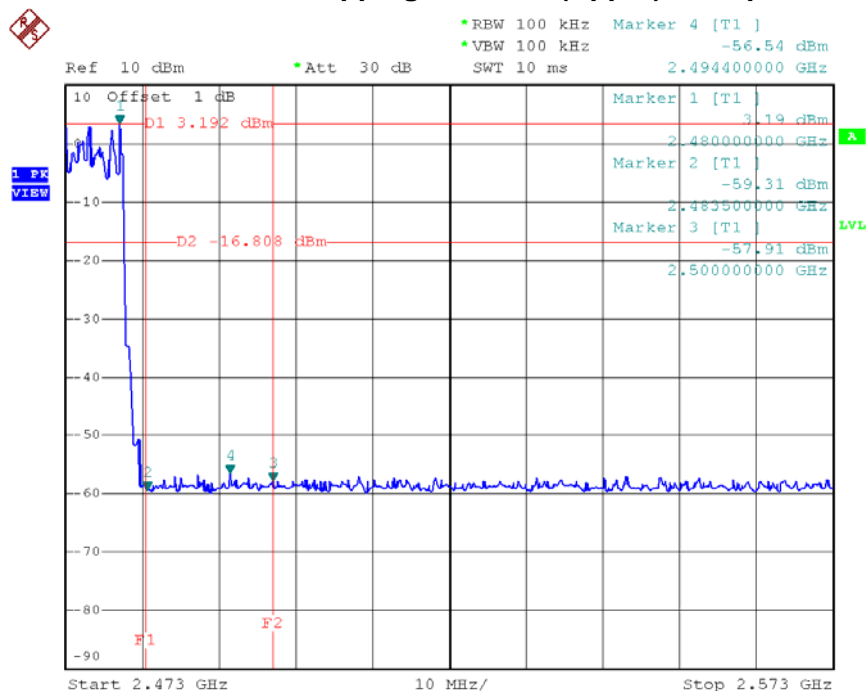
Date: 29.MAR.2016 14:16:14

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



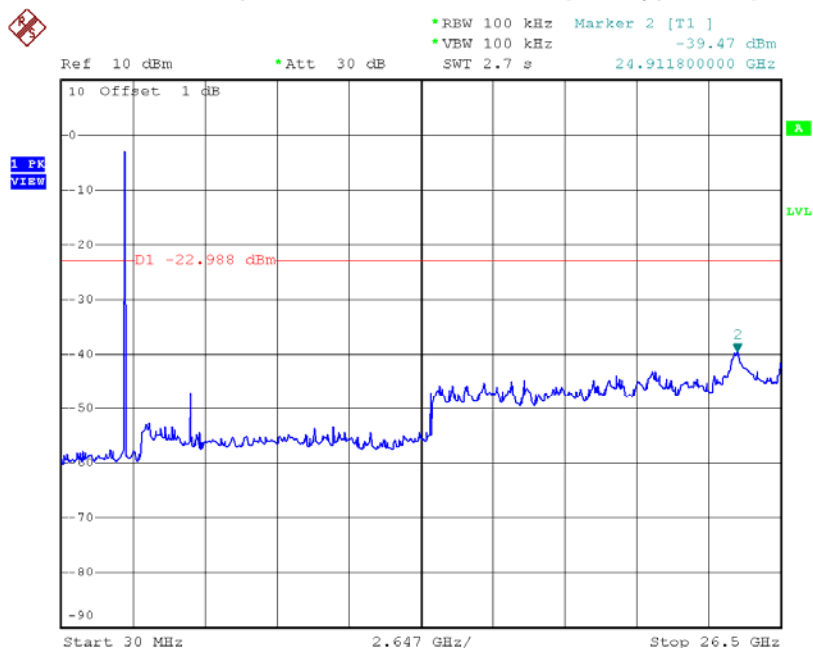
Date: 29.MAR.2016 14:23:59

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



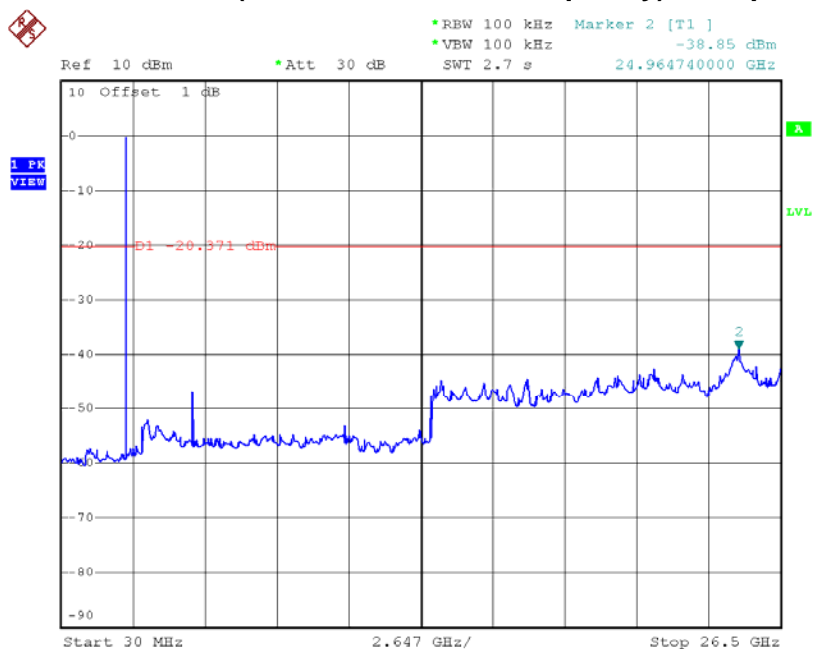
Date: 29.MAR.2016 14:24:49

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



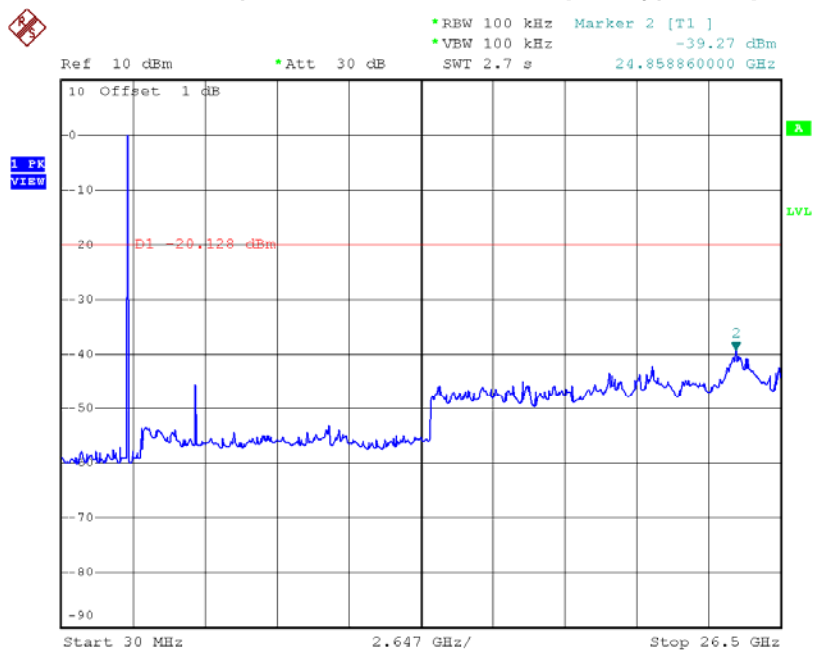
Date: 29.MAR.2016 14:13:59

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



Date: 29.MAR.2016 14:14:36

# CH78 (10 Harmonic of the frequency) \_3Mbps



Date: 29.MAR.2016 14:16:51