

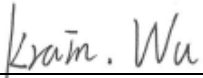
# FCC Radio Test Report

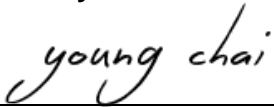
## FCC ID: 2AB7X-WISEPRO

This report concerns: **Original Grant**

**Project No.** : 1906H001  
**Equipment** : WisePOS Pro  
**Brand Name** : BBPOS  
**Test Model** : WSP71  
**Series Model** : WSP72, WSP73  
**Applicant** : BBPOS International Limited  
**Address** : Suite 1903-04, 19/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road,  
Tsuen Wan, N.T. HK  
**Manufacturer** : BBPOS International Limited  
**Address** : Suite 1903-04, 19/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road,  
Tsuen Wan, N.T. HK  
**Date of Receipt** : Jul. 12, 2019  
**Date of Test** : Jul. 12, 2019~Aug. 23, 2019  
**Issued Date** : Sep. 12, 2019  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: SH19070367  
**Standard(s)** : FCC Part15, Subpart C (15.247)  
ANSI C63.10-2013  
KDB 558074 D01 15.247 Meas Guidance V05r02

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

  
Prepared by : Krain Wu

  
Approved by : Young Chai



Certificate # 5123. 03

Add: No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210, China  
TEL: +86-021-61765666  
Web: [www.newbtl.com](http://www.newbtl.com)

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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.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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**REPORT ISSUED HISTORY**

Report Version	Description	Issued Date
R00	Original Issue.	Sep. 12, 2019

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.247)				
Standard(s) Section	Test Item	Test Result	Judgment	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	N/A	-----
15.247(d) 15.205(a) 15.209(a)	Radiated Emission	APPENDIX B APPENDIX C APPENDIX D	PASS	-----
15.247 (a)(1)(iii)	Number of Hopping Frequency	APPENDIX E	PASS	-----
15.247 (a)(1)(iii)	Average Time Of Occupancy	APPENDIX F	PASS	-----
15.247(a)(1)	Hopping Channel Separation	APPENDIX G	PASS	-----
15.247(a)(1)	Bandwidth	APPENDIX H	PASS	-----
15.247(a)(1)	Maximum Output Power & e.i.r.p.	APPENDIX I	PASS	-----
15.247(d)	Conducted Spurious Emission	APPENDIX J	PASS	-----
15.203	Antenna Requirement	-----	PASS	-----

Note:

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

### 1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210,China  
 BTL's Test Firm Registration Number for FCC: 476765  
 BTL's Designation Number for FCC: CN1241

### 1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

The BTL measurement uncertainty as below table:

#### A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
SH-C01	CISPR	150 kHz ~ 30 MHz	± 2.26

#### B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
SH-CB01	CISPR	9 KHz~30 MHz	V	3.79
		9 KHz~30 MHz	H	3.57
		30 MHz~200 MHz	V	4.04
		30 MHz~200 MHz	H	3.76
		200 MHz~1,000 MHz	V	4.24
		200 MHz~1,000 MHz	H	3.84
		1 GHz~18 GHz	V	4.46
		1 GHz~18 GHz	H	4.40
		18 GHz~40 GHz	V	3.95
		18 GHz~40 GHz	H	3.95

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

### 1.3 MEASUREMENT UNCERTAINTY

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	22°C	55%	AC 120V	Summer Xu
Radiated Emissions-9K-30MHz	22°C	59%	AC 120V	Summer Xu
Radiated Emissions-30 MHz to 1GHz	22°C	59%	AC 120V	Summer Xu
Radiated Emissions-Above 1000 MHz	22°C	59%	AC 120V	Summer Xu
Number of Hopping Frequency	22°C	55%	AC 120V	Summer Xu
Average Time Of Occupancy	22°C	55%	AC 120V	Summer Xu
Hopping Channel Separation	22°C	55%	AC 120V	Summer Xu
Bandwidth	22°C	55%	AC 120V	Summer Xu
Maximum Output Power & e.i.r.p.	22°C	55%	AC 120V	Summer Xu
Conducted Spurious Emission	22°C	59%	AC 120V	Summer Xu



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	WisePOS Pro
Brand Name	BBPOS
Test Model	WSP71
Series Model	WSP72, WSP73
Model Difference(s)	WSP71: WisePOS Pro device only; WSP72: WisePOS Pro device with hand strap; WSP73: WisePOS Pro device with pistol grip.
Software Version	970ADGAAK2_BB_V009
Hardware Version	7MD_V01
Power Source	1. DC Voltage supplied from AC/DC adapter 2. Supplied from Li-ion battery pack
Power Rating	1. I/P: 100-240V ~ 50/60Hz 1.0A O/P: 5V---3A/9V---3A 2. 6400mAH 3.8V
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Technology	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Bit Rate of Transmitter	1/2/3Mbps
Max. Output Power	10.71 dBm (0.0118 W) For 1Mbps 10.14 dBm (0.0103 W) For 3Mbps

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

## 2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

## 3 Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PIFA	N/A	3.2

## 2.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>
Mode 2	TX Mode Channel 78 _1Mbps

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

<b>AC power line conducted emissions test</b>	
Final Test Mode	Description
Mode 1	TX Mode

<b>Radiated emissions test - Below 1GHz</b>	
Final Test Mode	Description
Mode 2	TX Mode Channel 78 _1Mbps

<b>Radiated emissions test - Above 1GHz</b>	
Final Test Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>

<b>Conducted test</b>	
Final Test Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>

Note:

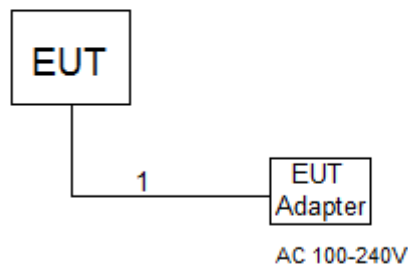
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Maximum Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.
- (3) For radiated emission above 1 GHz test, 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

### 2.3 PARAMETERS OF TEST SOFTWARE

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	N/A		
Frequency (MHz)	2402	2441	2480
Parameters(1Mbps)	N/A	N/A	N/A
Parameters(3Mbps)	N/A	N/A	N/A

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



### 2.5 SUPPORT UNITS

Item	Equipment	Brand	Model/Type No.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	N/A	N/A	1m

### 3. AC POWER LINE CONDUCTED EMISSIONS TEST

#### 3.1 LIMIT

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

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

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

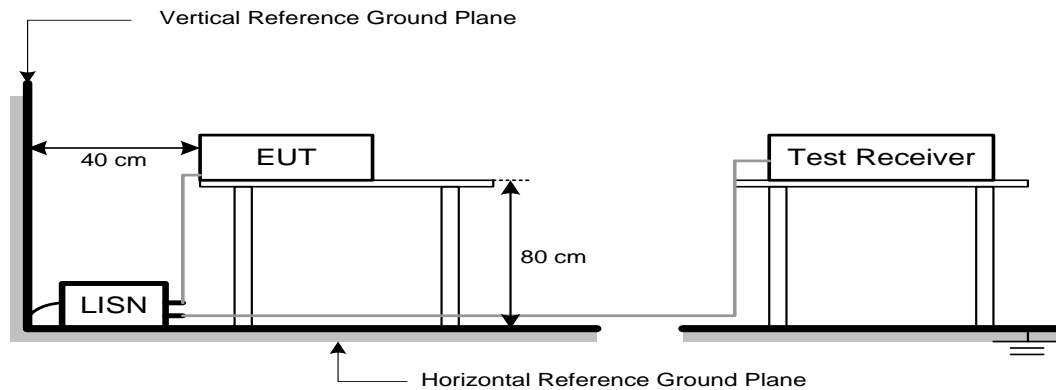
#### 3.2 TEST PROCEDURE

- 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.

#### 3.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.4 TEST SETUP



### 3.5 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 data or hopping on mode.

### 3.6 TEST RESULTS

Please refer to the APPENDIX A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform in this case, a "\*" marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150 kHz to 30 MHz.

## 4. RADIATED EMISSION TEST

### 4.1 LIMIT

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.

#### LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

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
Above 960	500	3

#### LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-30 MHz)

Frequency (MHz)	Magnetic field strength (H-Field) ( $\mu\text{A/m}$ )	Measurement Distance (meters)
0.009-0.490	6.37/F(kHz)	300
0.490-1.705	6.37/F(kHz)	30
1.705-30.0	0.08	30

#### LIMITS OF RADIATED EMISSION MEASUREMENT (30 MHz-1000 MHz)

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ at 3m)
30-88	100
88-216	150
216-960	200
Above 960	500

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Band edge/ Harmonic at 3m (dB $\mu\text{V/m}$ )		Harmonic at 1.5m (dB $\mu\text{V/m}$ )	
	Peak	Average	Peak	Average
Above 1000	74	54	80 (Note 5)	60 (Note 5)

**Note:**

- (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

$$(5) \quad FS_{\text{limit}} = FS_{\text{max}} - 20 \log \left( \frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

20log d limit/d measure=20log 3/1.5=6 dB.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	RBW 1 MHz VBW 3 MHz peak detector for Pk value RMS detector for AV value

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector

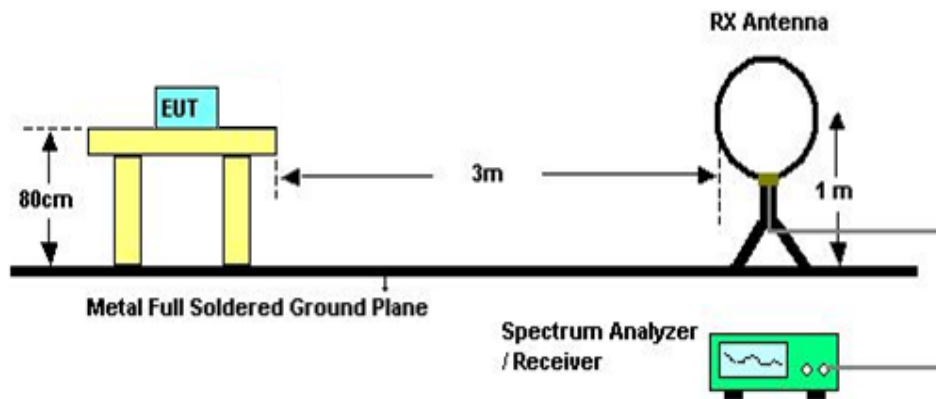
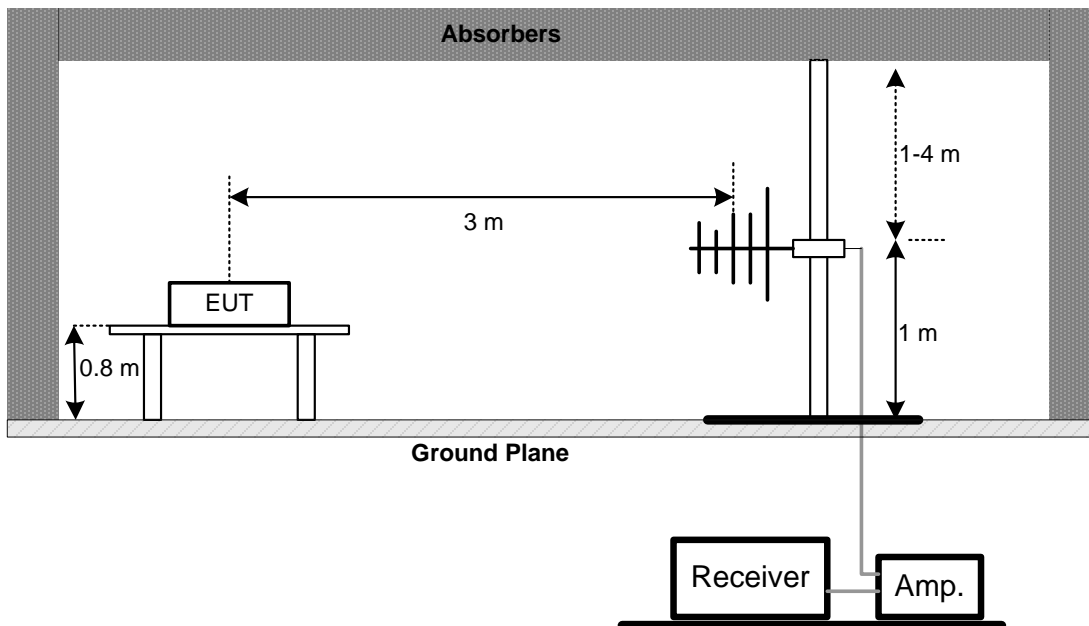


#### **4.2 TEST PROCEDURE**

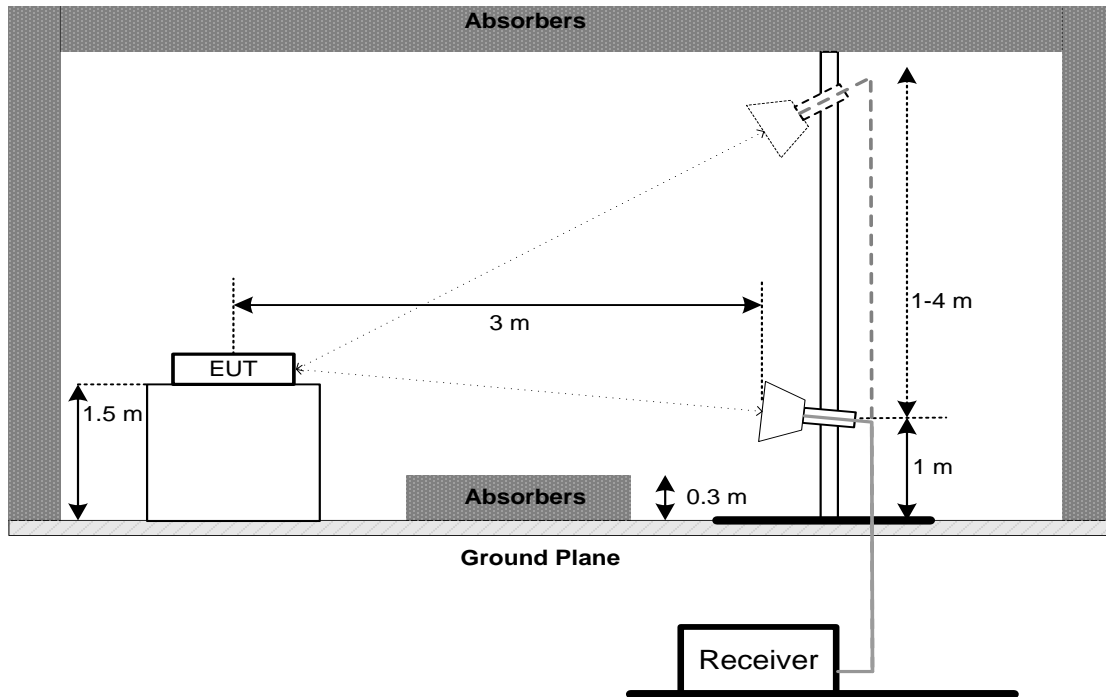
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The measuring distance of 3 m or 1.5m 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 1 GHz.
- 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 1 GHz)
- 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 1 GHz)
- i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### **4.3 DEVIATION FROM TEST STANDARD**

No deviation

**4.4 TEST SETUP****9 kHz-30 MHz****30 MHz to 1 GHz**

### Above 1 GHz



#### 4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 4.6 TEST RESULTS - 9 kHz TO 30 MHz

Please refer to the APPENDIX B

Remark:

- (1) Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB).
- (2) Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 4.7 TEST RESULTS - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

#### 4.8 TEST RESULTS - ABOVE 1000 MHz

Please refer to the APPENDIX D.

Remark:

- (1) No limit: This is fundamental signal, the judgment is not applicable.  
For fundamental signal judgment was referred to Peak output test.

## 5. NUMBER OF HOPPING FREQUENCY

### 5.1 LIMIT

FCC Part15, Subpart C (15.247)	
Section	Test Item
15.247(a)(1)(iii)	Number of Hopping Frequency

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

### 5.2 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=100 kHz, VBW=100 kHz, Sweep time = Auto.

### 5.3 DEVIATION FROM STANDARD

No deviation.

### 5.4 TEST SETUP



### 5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 5.6 TEST RESULTS

Please refer to the APPENDIX E

## 6. AVERAGE TIME OF OCCUPANCY

### 6.1 LIMIT

FCC Part15, Subpart C (15.247)		
Section	Test Item	Limit
15.247(a)(1)(iii)	Average Time of Occupancy	0.4sec

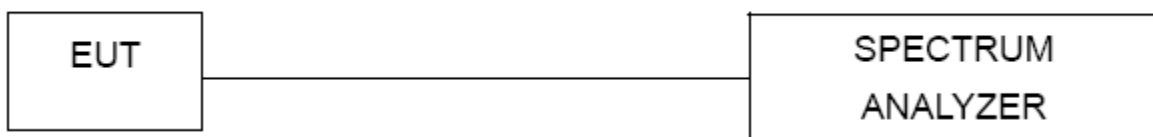
### 6.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz
- 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 DH1, DH3 and DH5 packet transmitting
- Measure the maximum time duration of one single pulse
- 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
- 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
- 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

### 6.3 DEVIATION FROM STANDARD

No deviation.

### 6.4 TEST SETUP



### 6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 6.6 TEST RESULTS

Please refer to the APPENDIX F

## 7. HOPPING CHANNEL SEPARATION MEASUREMENT

### 7.1 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, provided the systems operate with an output power no greater than 125 mW.

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

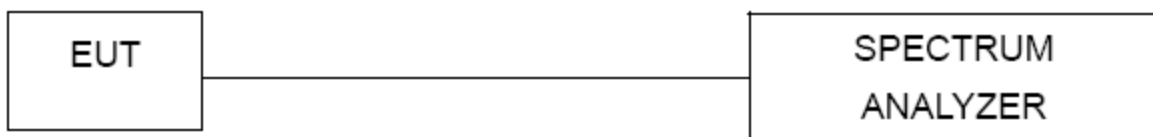
### 7.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Span = wide enough to capture the peaks of two adjacent channels  
 Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span  
 Video (or Average) Bandwidth (VBW)  $\geq$  RBW  
 Sweep = Auto  
 Detector function = Peak  
 Trace = Max Hold

### 7.3 DEVIATION FROM STANDARD

No deviation.

### 7.4 TEST SETUP



### 7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 7.6 TEST RESULTS

Please refer to the APPENDIX G

## 8. BANDWIDTH TEST

### 8.1 LIMIT

FCC Part15, Subpart C (15.247)	
Section	Test Item
15.247(a)(1)	Bandwidth

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

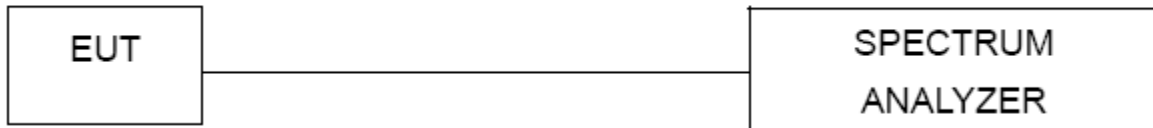
### 8.2 TEST PROCEDURE

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

### 8.3 DEVIATION FROM STANDARD

No deviation.

### 8.4 TEST SETUP



### 8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 8.6 TEST RESULTS

Please refer to the APPENDIX H

## 9. MAXIMUM OUTPUT POWER & E.I.R.P. TEST

### 9.1 LIMIT

FCC Part15 , Subpart C (15.247)		
Section	Test Item	Limit
15.247(a)(1)	Maximum Output Power	0.125 Watt or 21 dBm

Note: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### 9.2 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= 1 MHz/3 MHz, VBW= 1 MHz/3 MHz, Sweep time = Auto.

### 9.3 DEVIATION FROM STANDARD

No deviation.

### 9.4 TEST SETUP



### 9.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 9.6 TEST RESULTS

Please refer to the APPENDIX I



## 10. CONDUCTED SPURIOUS EMISSION

### 10.1 LIMIT

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

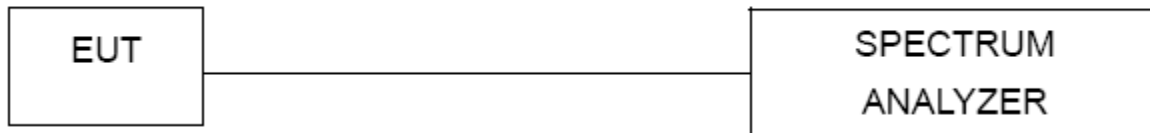
### 10.2 TEST PROCEDURE

- 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= 100 kHz, VBW=100 kHz, Sweep time = Auto.

### 10.3 DEVIATION FROM STANDARD

No deviation.

### 10.4 TEST SETUP



### 10.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 10.6 TEST RESULTS

Please refer to the APPENDIX J

**11. MEASUREMENT INSTRUMENTS LIST**

AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Line Impedance Stabilisation Network	Schwarzbeck	NNLK 8121	8121-822	Mar. 29, 2020
2	TWO-LINE V-NETWORK	R&S	ENV216	101340	Nov. 20, 2019
3	Test Cable	emci	EMCRG400-BM-NM-10000	170628	Apr. 17, 2020
4	EMI Test Receiver	R&S	ESCI	100082	Mar. 29, 2020
5	50Ω Terminator	SHX	TF2-1G-A	17051602	Mar. 29, 2020
6	50Ω coaxial switch	Anritsu	MP59B	6201750902	Mar. 29, 2020
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EMCI	EMCI LPA600	275	Mar. 29, 2020
2	EMI Test Receiver	R&S	ESCI	100082	Mar. 29, 2020
3	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	719	Mar. 29, 2020
2	Pre-Amplifier	emci	EMC9135	980400	Mar. 29, 2020
3	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 29, 2020
4	Test Cable	emci	EMC104-SM-SM-7000	170330	Apr. 17, 2020
5	Test Cable	emci	EMC104-SM-SM-1000	170331	Apr. 17, 2020
6	Test Cable	emci	EMC104-SM-NM-3500	170621	Apr. 17, 2020
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	9120D	00206960	Mar. 29, 2020
2	Pre-Amplifier	emci	EMC012645SE	980421	Mar. 29, 2020
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480545	Mar. 29, 2020
4	Test Cable	emci	EMC104-SM-SM-7000	170330	Apr. 17, 2020
5	Test Cable	emci	EMC104-SM-SM-1000	170331	Apr. 17, 2020
6	Test Cable	emci	EMC104-SM-NM-3500	170621	Apr. 17, 2020
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
8	MXE EMI Receiver	Keysight	N9038A	MY57150106	Mar. 29, 2020

Number of Hopping Frequency					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

Average Time of Occupancy					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

Hopping Channel Separation Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

Maximum Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100626	Mar. 29, 2020

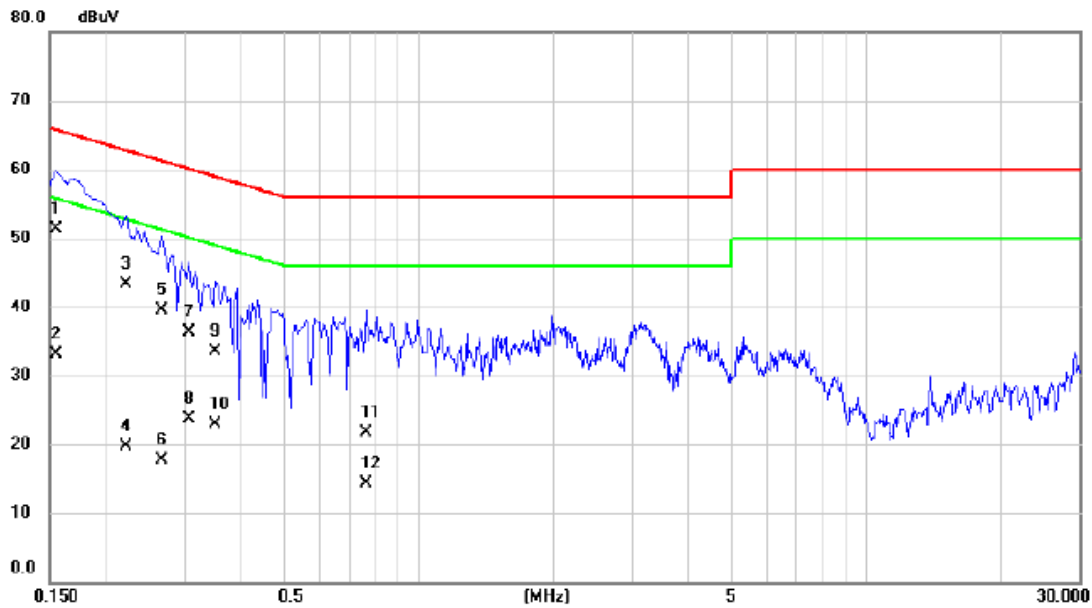
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

## **APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS**

Test Mode: TX Mode

### Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1544	41.60	9.76	51.36	65.76	-14.40	QP	
2		0.1544	23.30	9.76	33.06	55.76	-22.70	AVG	
3		0.2220	33.50	9.82	43.32	62.74	-19.42	QP	
4		0.2220	9.80	9.82	19.62	52.74	-33.12	AVG	
5		0.2670	29.70	9.82	39.52	61.21	-21.69	QP	
6		0.2670	7.80	9.82	17.62	51.21	-33.59	AVG	
7		0.3075	26.50	9.76	36.26	60.04	-23.78	QP	
8		0.3075	14.00	9.76	23.76	50.04	-26.28	AVG	
9		0.3525	23.60	9.83	33.43	58.90	-25.47	QP	
10		0.3525	13.00	9.83	22.83	48.90	-26.07	AVG	
11		0.7620	12.00	9.78	21.78	56.00	-34.22	QP	
12		0.7620	4.60	9.78	14.38	46.00	-31.62	AVG	

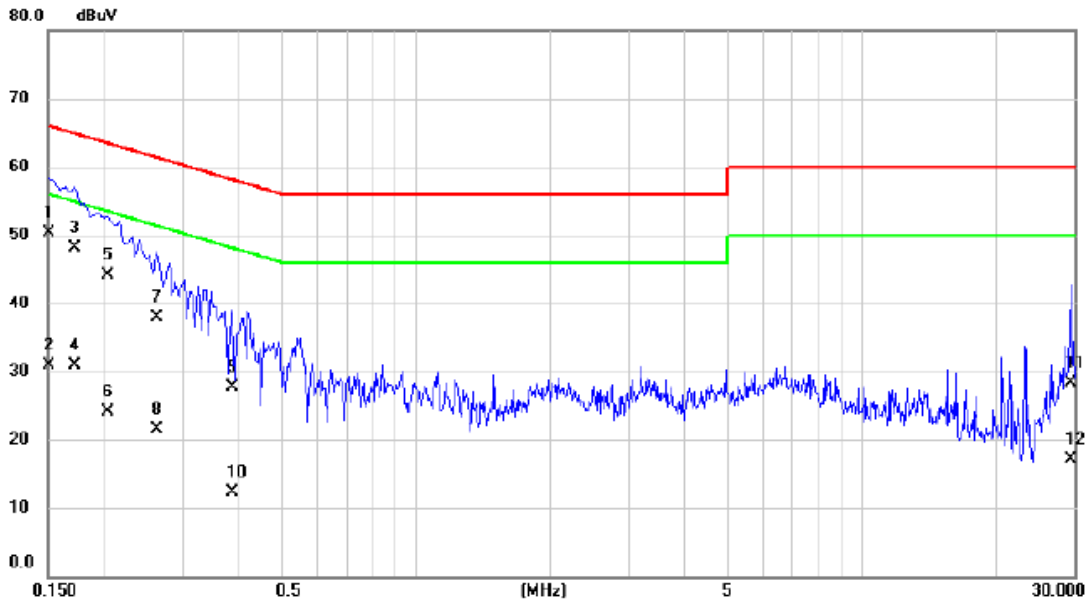
**REMARKS:**

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX Mode
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### Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	40.60	9.62	50.22	66.00	-15.78	QP	
2		0.1500	21.30	9.62	30.92	56.00	-25.08	AVG	
3		0.1725	38.50	9.57	48.07	64.84	-16.77	QP	
4		0.1725	21.30	9.57	30.87	54.84	-23.97	AVG	
5		0.2040	34.50	9.64	44.14	63.45	-19.31	QP	
6		0.2040	14.50	9.64	24.14	53.45	-29.31	AVG	
7		0.2625	28.20	9.71	37.91	61.35	-23.44	QP	
8		0.2625	11.80	9.71	21.51	51.35	-29.84	AVG	
9		0.3885	18.00	9.72	27.72	58.10	-30.38	QP	
10		0.3885	2.50	9.72	12.22	48.10	-35.88	AVG	
11		29.4180	18.60	9.63	28.23	60.00	-31.77	QP	
12		29.4180	7.50	9.63	17.13	50.00	-32.87	AVG	

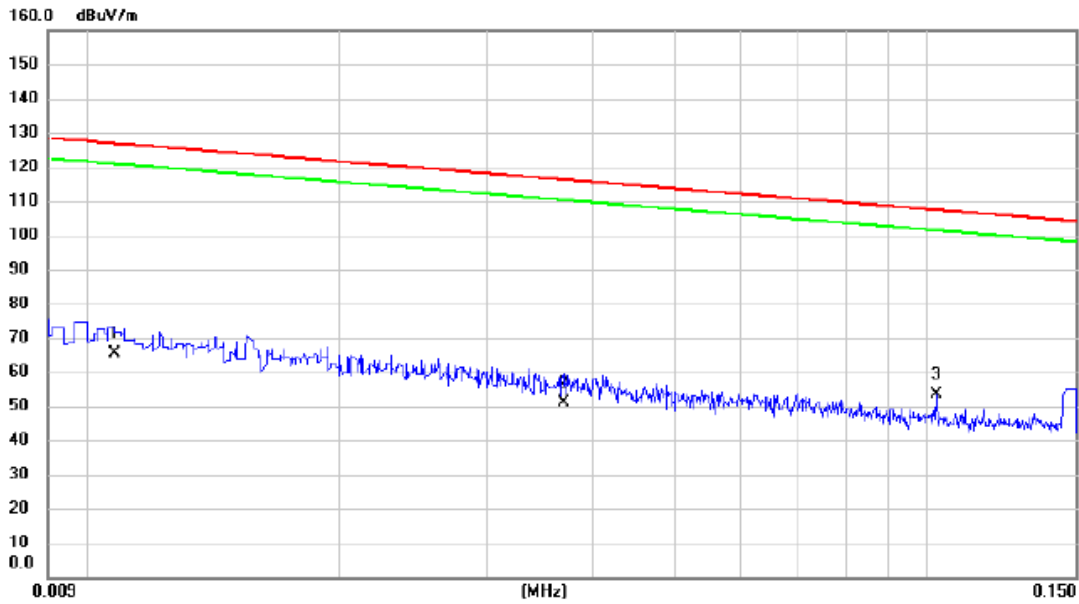
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

**APPENDIX B - RADIATED EMISSION - 9 KHZ-30 MHZ**

Test Mode: TX Mode

Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.0108	-12.70	77.91	65.21	126.94	-61.73	AVG	
2		0.0370	-16.67	67.60	50.93	116.24	-65.31	AVG	
3	*	0.1025	-4.56	57.85	53.29	107.39	-54.10	QP	

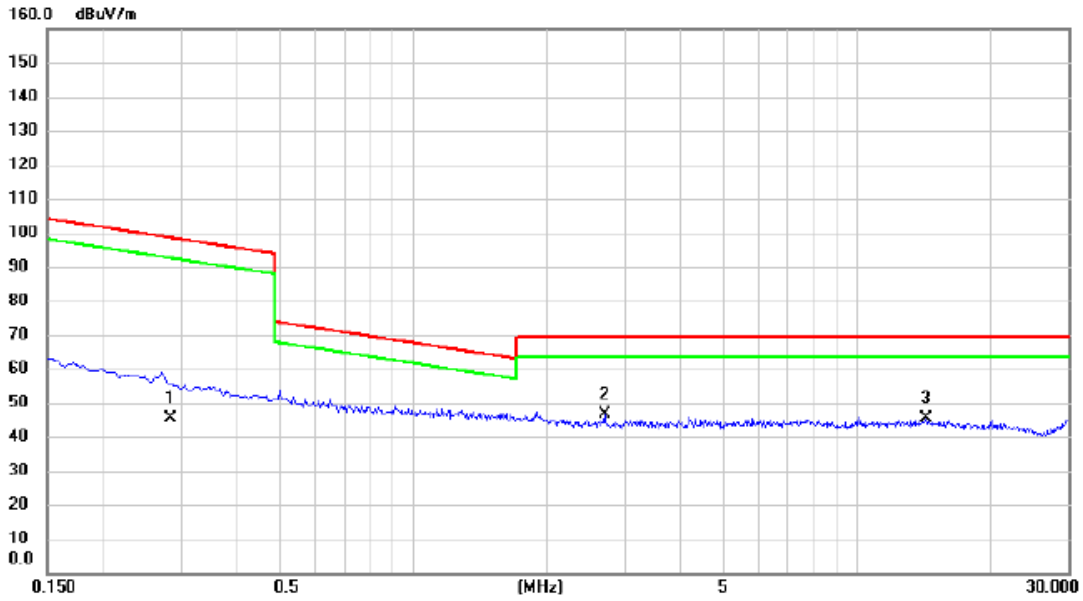
REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.



Test Mode: TX Mode

Ant 0°



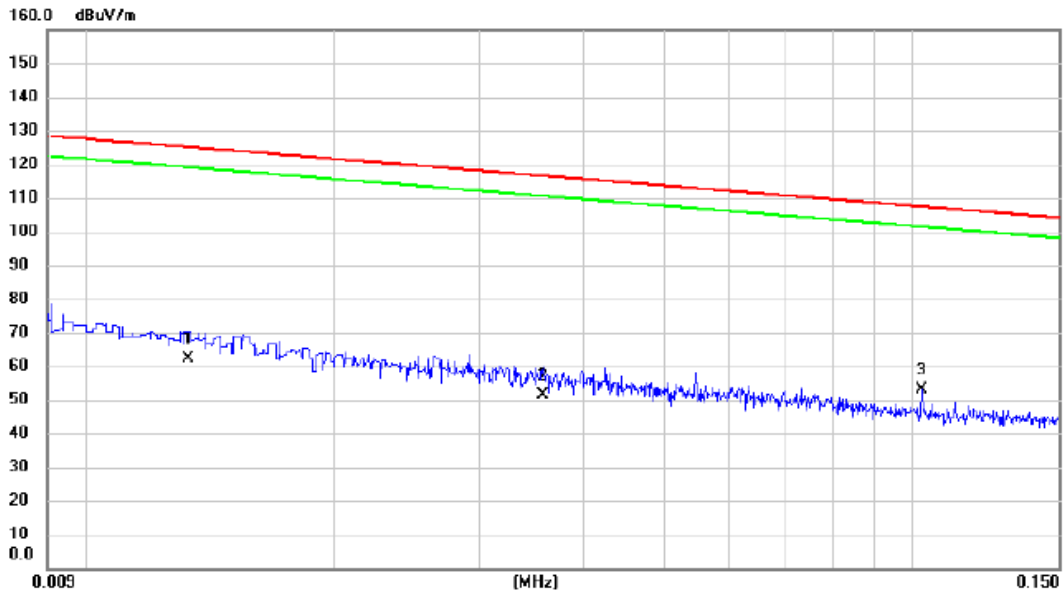
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.2850	-3.90	49.21	45.31	98.51	-53.20	AVG	
2	*	2.7015	8.23	38.24	46.47	69.54	-23.07	QP	
3		14.2980	7.35	38.14	45.49	69.54	-24.05	QP	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX Mode

**Ant 90°**



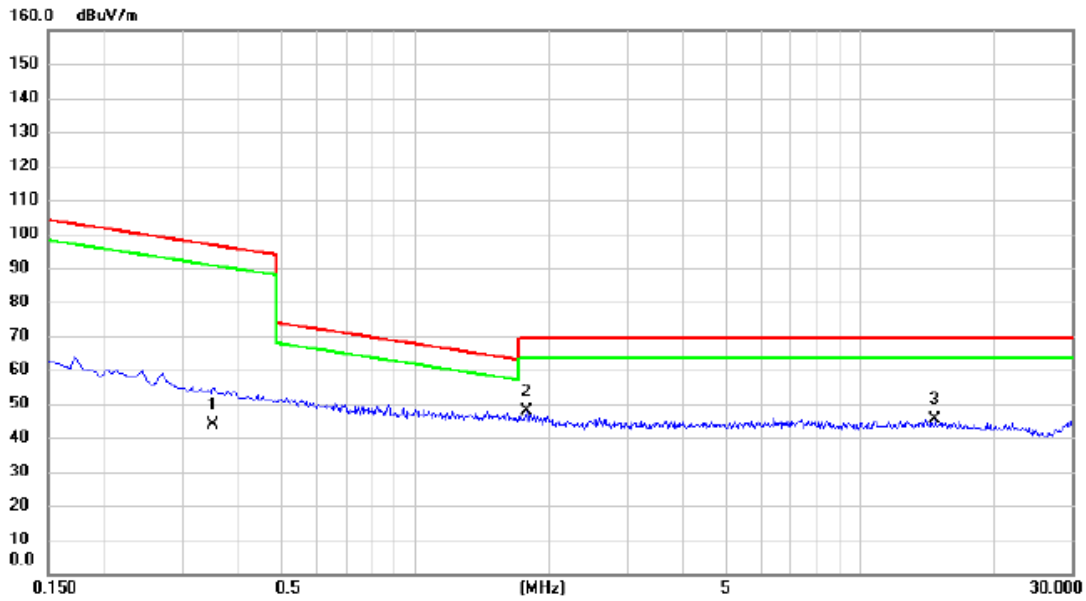
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0133	-14.30	76.39	62.09	125.13	-63.04	AVG	
2		0.0357	-16.40	67.99	51.59	116.55	-64.96	AVG	
3	*	0.1025	-4.90	57.85	52.95	107.39	-54.44	QP	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX Mode

### Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.3525	-3.80	47.55	43.75	96.66	-52.91	AVG	
2	*	1.7790	8.54	39.33	47.87	69.54	-21.67	QP	
3		14.7930	7.42	38.06	45.48	69.54	-24.06	QP	

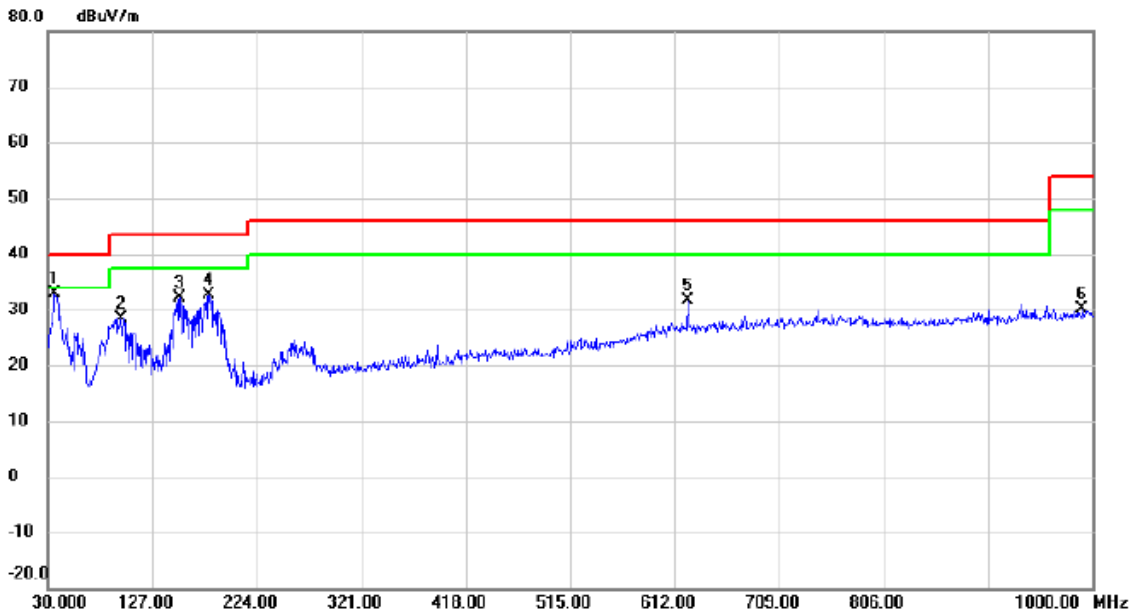
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

## **APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ**

Test Mode: TX Mode

### Vertical



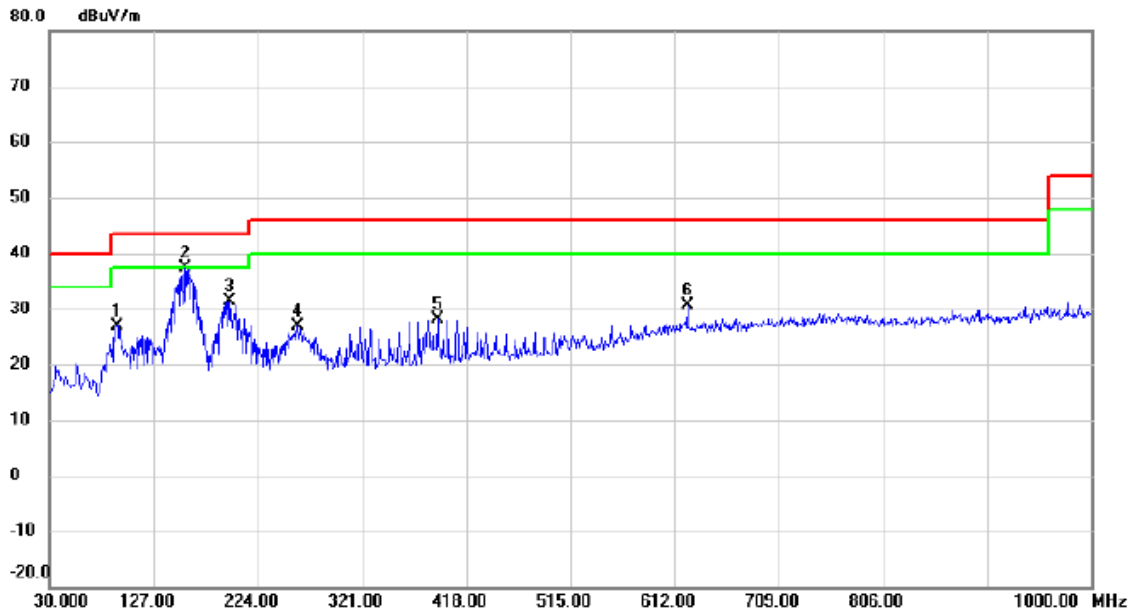
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	36.3050	48.47	-15.52	32.95	40.00	-7.05	peak	
2		98.3850	45.70	-17.31	28.39	43.50	-15.11	peak	
3		152.7050	44.25	-12.05	32.20	43.50	-11.30	peak	
4		179.8650	46.88	-14.37	32.51	43.50	-10.99	peak	
5		624.1250	37.17	-5.64	31.53	46.00	-14.47	peak	
6		990.3000	33.91	-3.82	30.09	54.00	-23.91	peak	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX Mode

### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		92.0800	45.01	-18.01	27.00	43.50	-16.50	peak	
2	*	155.6150	49.56	-12.19	37.37	43.50	-6.13	peak	
3		197.8100	47.59	-16.10	31.49	43.50	-12.01	peak	
4		261.3450	41.38	-14.52	26.86	46.00	-19.14	peak	
5		391.3250	39.37	-11.32	28.05	46.00	-17.95	peak	
6		624.1250	36.35	-5.64	30.71	46.00	-15.29	peak	

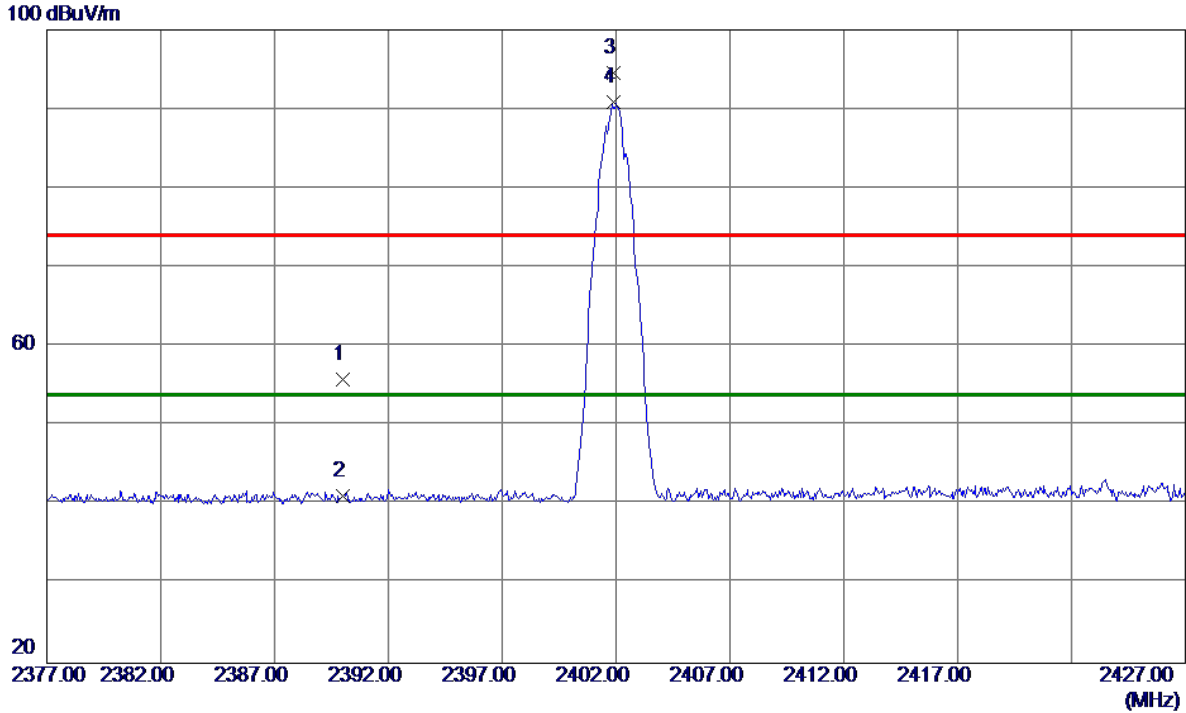
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

## APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

Test Mode: TX 2402 MHz \_CH00\_1Mbps

### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	22.63	33.25	55.88	74.00	-18.12	Peak	
2	2390.0000	7.85	33.25	41.10	54.00	-12.90	AVG	
3	2401.9000	61.31	33.28	94.59	74.00	20.59	Peak	No Limit
4 *	2401.9000	57.54	33.28	90.82	54.00	36.82	AVG	No Limit

**REMARKS:**

(1) Measurement Value = Reading Level + Correct Factor.

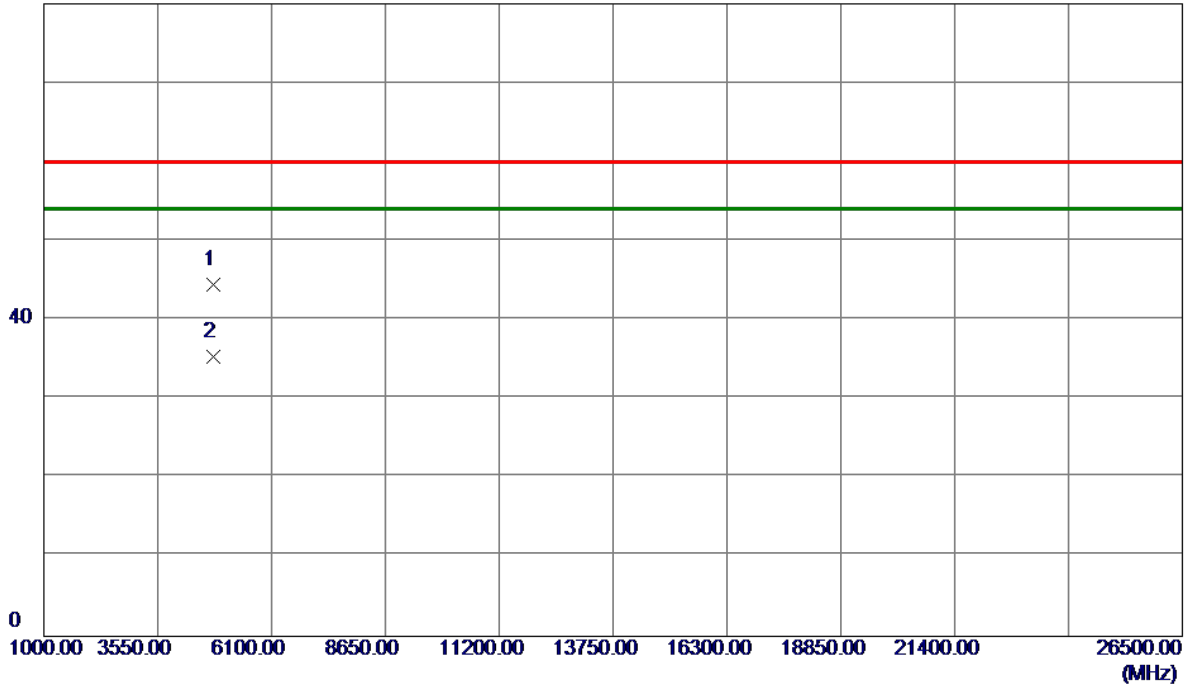
(2) Margin Level = Measurement Value - Limit Value.



Test Mode: TX 2402 MHz \_CH00\_1Mbps

### Vertical

80 dBuV/m



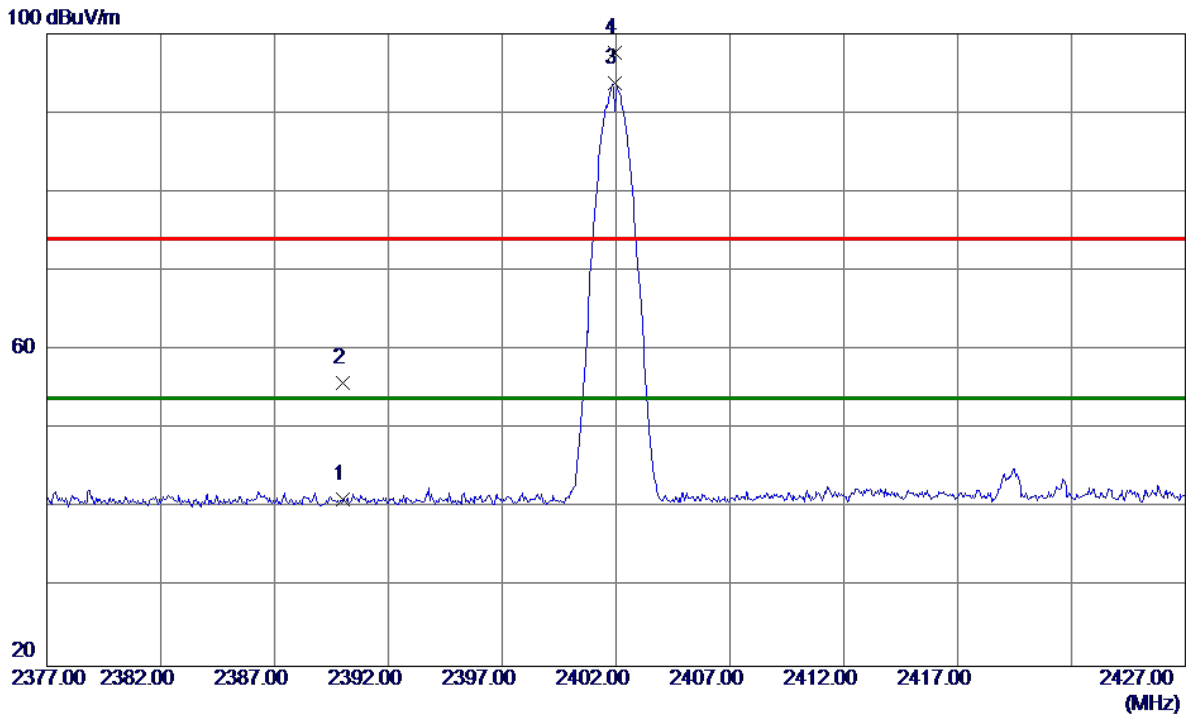
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4803.4500	53.50	-9.07	44.43	60.00	-15.57	Peak	
2	4803.5850	44.49	-9.07	35.42	54.00	-18.58	AVG	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

<b>Test Mode:</b>	TX 2402 MHz _CH00_1Mbps
-------------------	-------------------------

### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	7.80	33.25	41.05	54.00	-12.95	AVG	
2	2390.0000	22.57	33.25	55.82	74.00	-18.18	Peak	
3 *	2401.9500	60.44	33.28	93.72	54.00	39.72	AVG	No Limit
4	2401.9500	64.34	33.28	97.62	74.00	23.62	Peak	No Limit

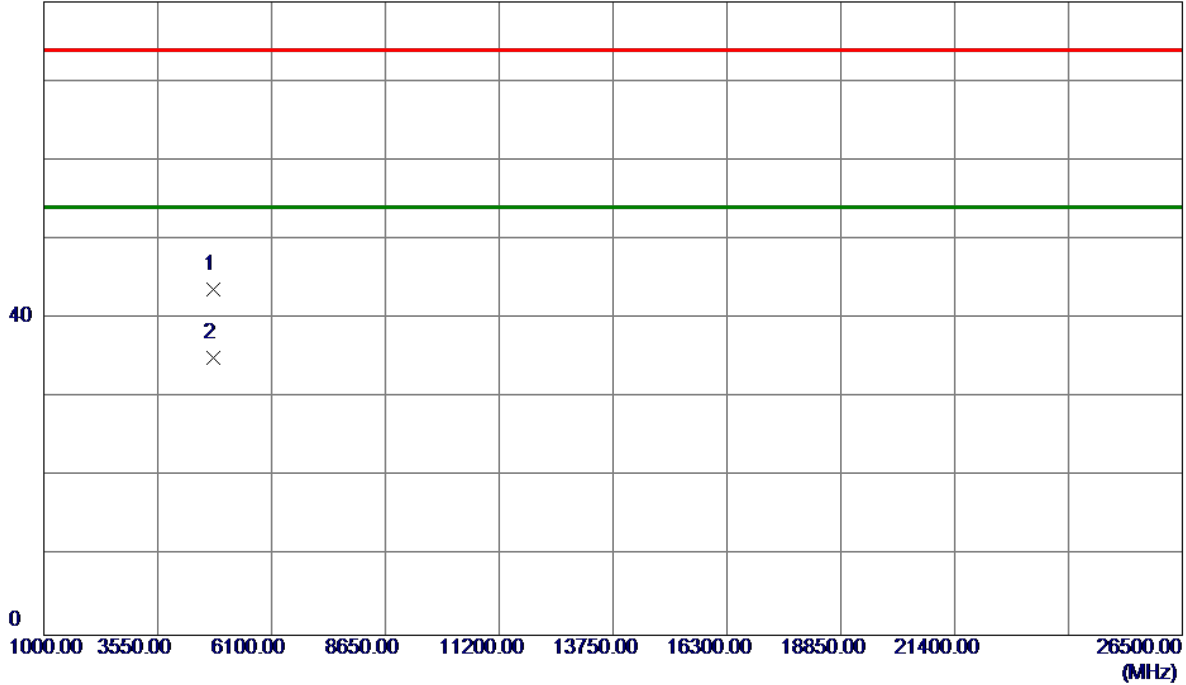
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2402 MHz \_CH00\_1Mbps

### Horizontal

80 dBuV/m



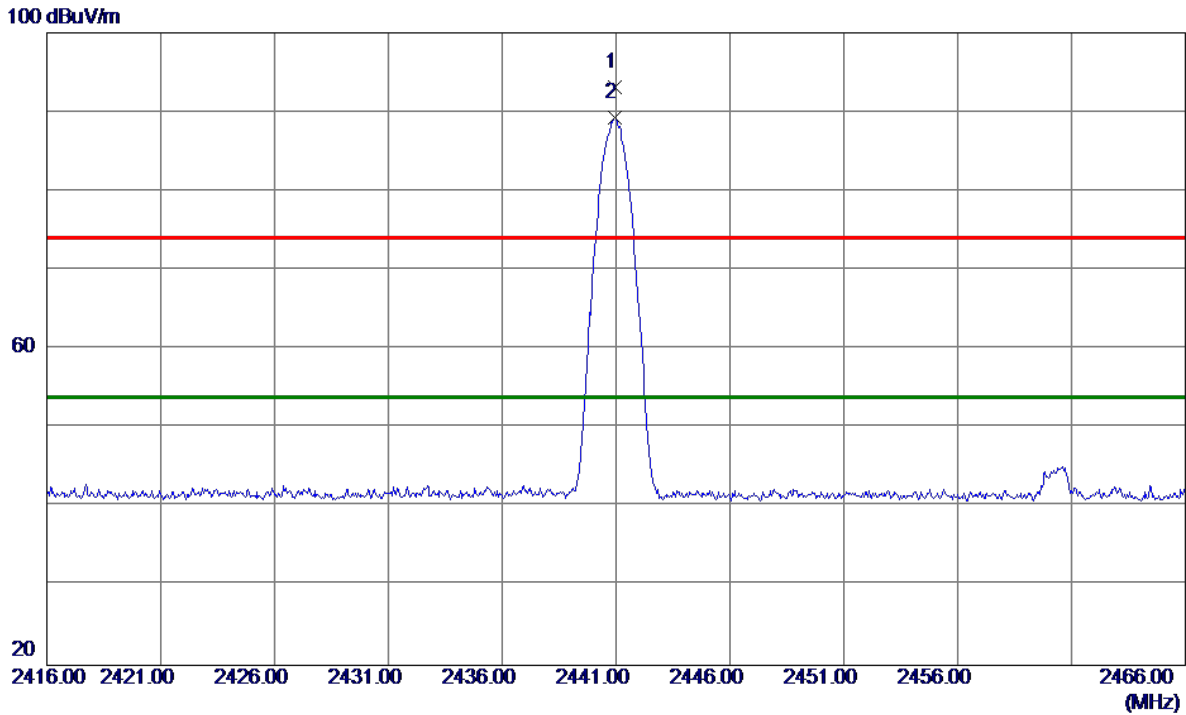
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4803.7830	52.77	-9.07	43.70	74.00	-30.30	Peak	
2 *	4806.0780	44.17	-9.06	35.11	54.00	-18.89	AVG	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_1Mbps

### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2440.9500	59.74	33.39	93.13	74.00	19.13	Peak	No Limit
2 *	2440.9500	55.89	33.39	89.28	54.00	35.28	AVG	No Limit

**REMARKS:**

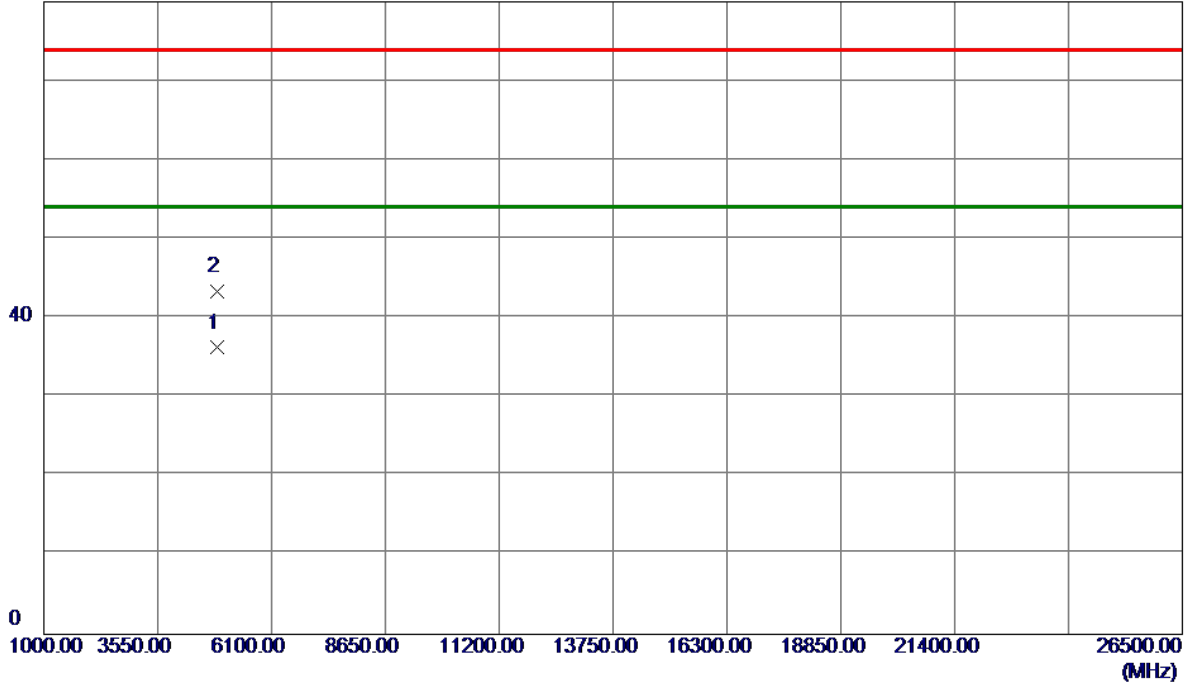
(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_1Mbps

### Vertical

80 dBuV/m



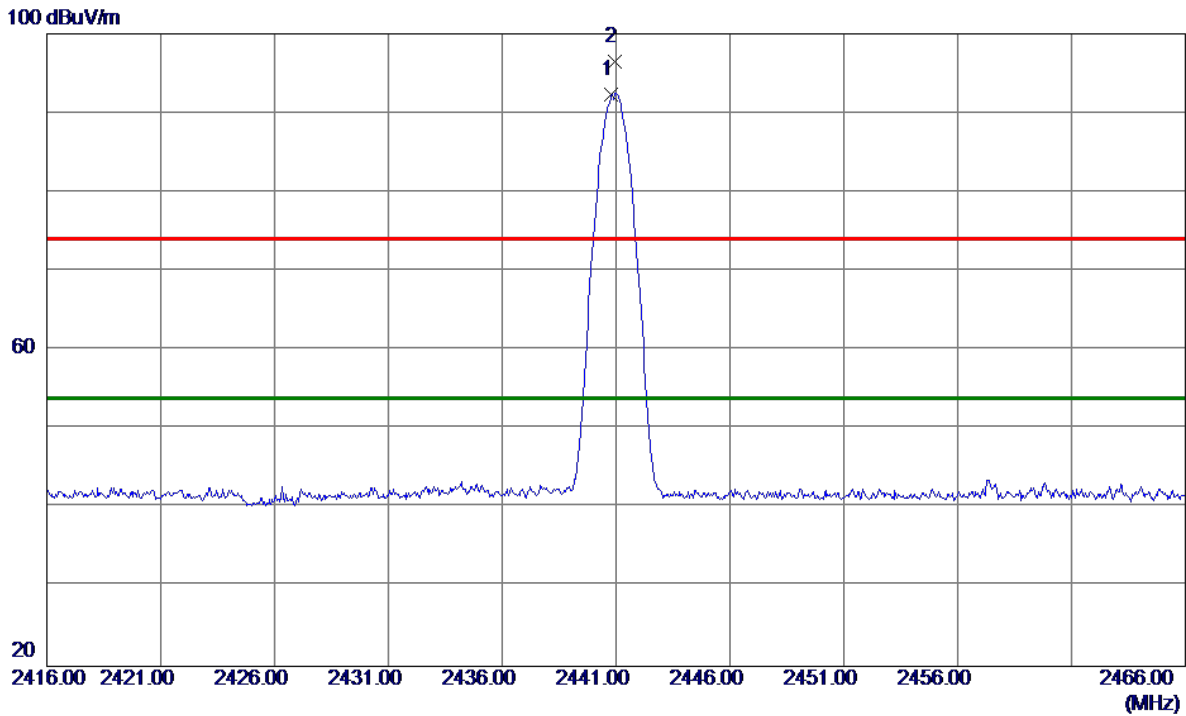
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4879.7780	45.02	-8.78	36.24	54.00	-17.76	AVG	
2	4882.4850	52.12	-8.77	43.35	74.00	-30.65	Peak	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_1Mbps

### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2440.8000	58.92	33.39	92.31	54.00	38.31	AVG	No Limit
2	2440.9500	63.15	33.39	96.54	74.00	22.54	Peak	No Limit

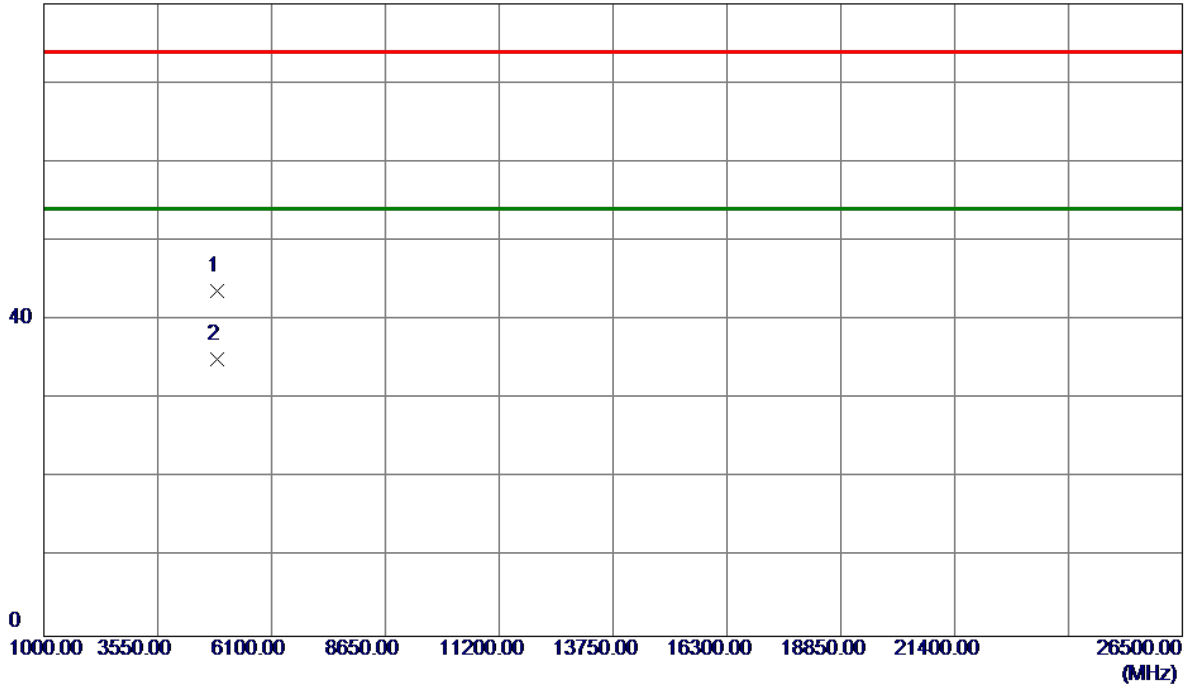
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_1Mbps

### Horizontal

80 dBuV/m



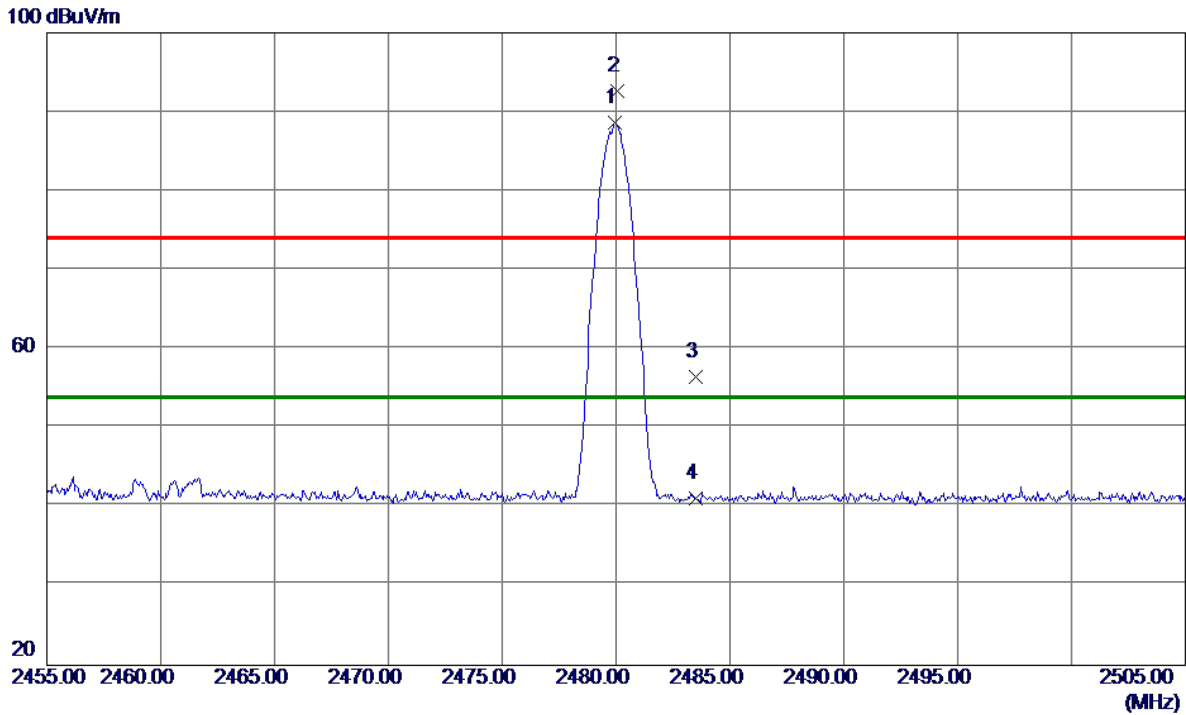
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4880.0050	52.40	-8.78	43.62	74.00	-30.38	Peak	
2 *	4881.8550	43.84	-8.77	35.07	54.00	-18.93	AVG	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_1Mbps

### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2479.9500	55.06	33.50	88.56	54.00	34.56	AVG	No Limit
2	2480.0500	59.10	33.50	92.60	74.00	18.60	Peak	No Limit
3	2483.5000	22.91	33.51	56.42	74.00	-17.58	Peak	
4	2483.5000	7.62	33.51	41.13	54.00	-12.87	AVG	

**REMARKS:**

(1) Measurement Value = Reading Level + Correct Factor.

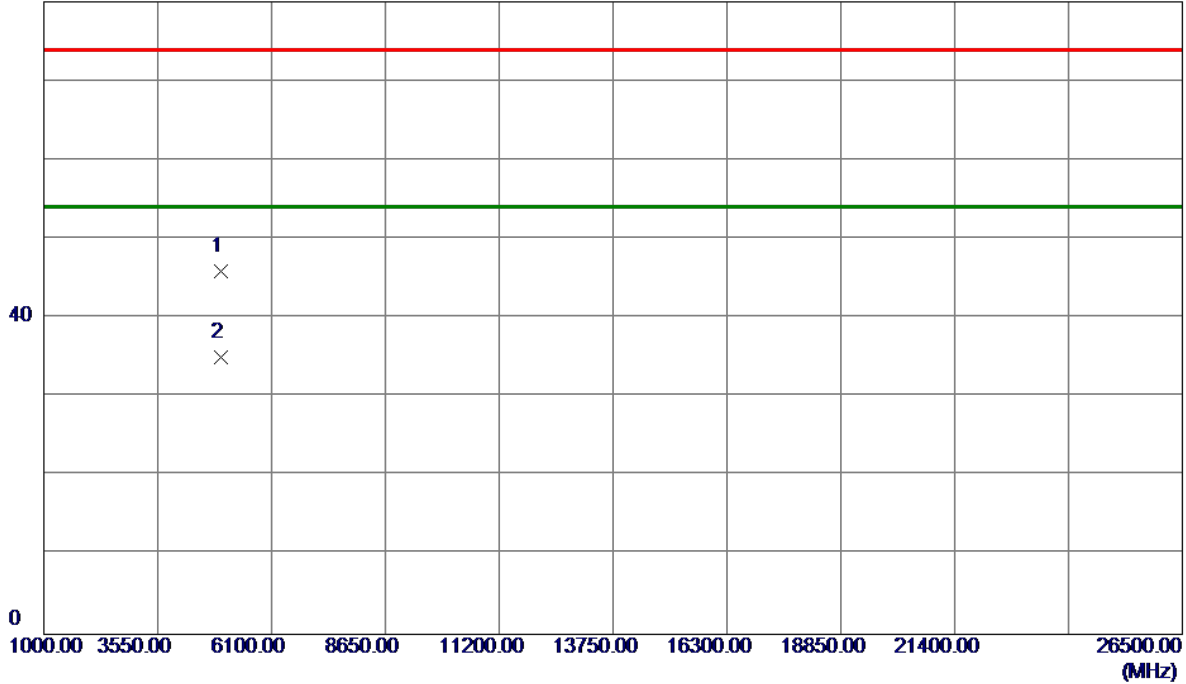
(2) Margin Level = Measurement Value - Limit Value.



Test Mode: TX 2480 MHz \_CH78\_1Mbps

### Vertical

80 dBuV/m



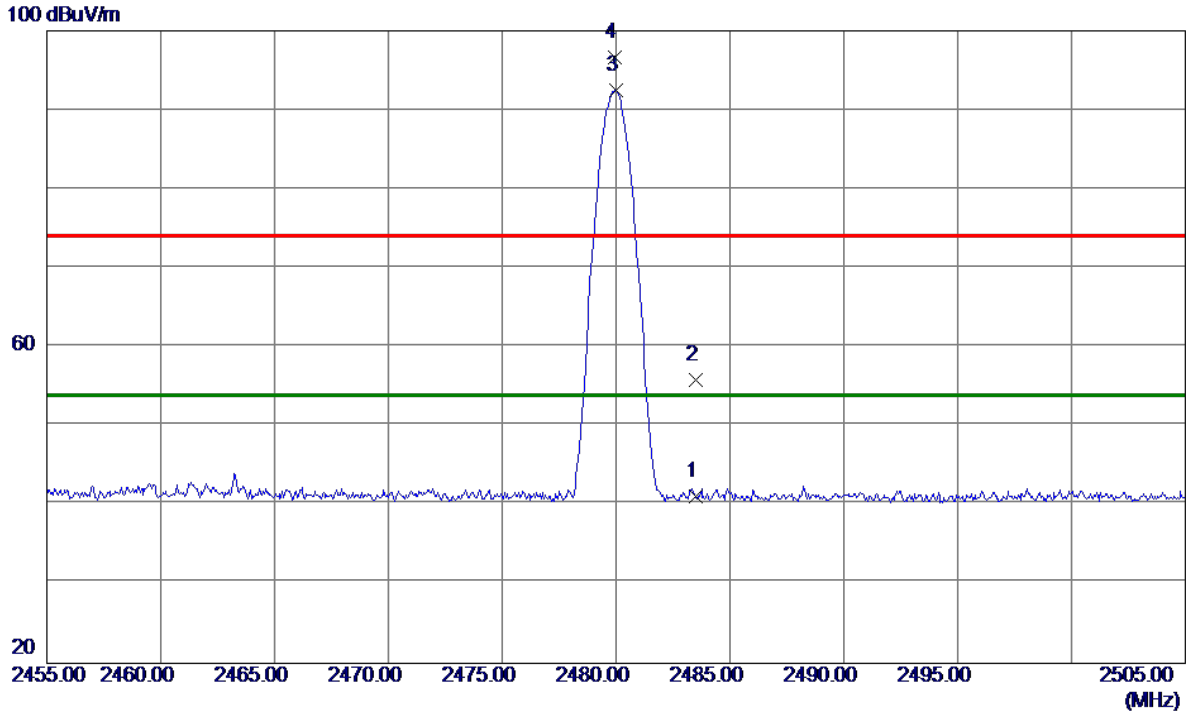
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4957.6900	54.45	-8.47	45.98	74.00	-28.02	Peak	
2 *	4958.3600	43.45	-8.47	34.98	54.00	-19.02	AVG	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_1Mbps

### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2483.5000	7.63	33.51	41.14	54.00	-12.86	AVG	
2	2483.5000	22.38	33.51	55.89	74.00	-18.11	Peak	
3 *	2480.0000	58.99	33.50	92.49	54.00	38.49	AVG	No Limit
4	2479.9500	63.17	33.50	96.67	74.00	22.67	Peak	No Limit

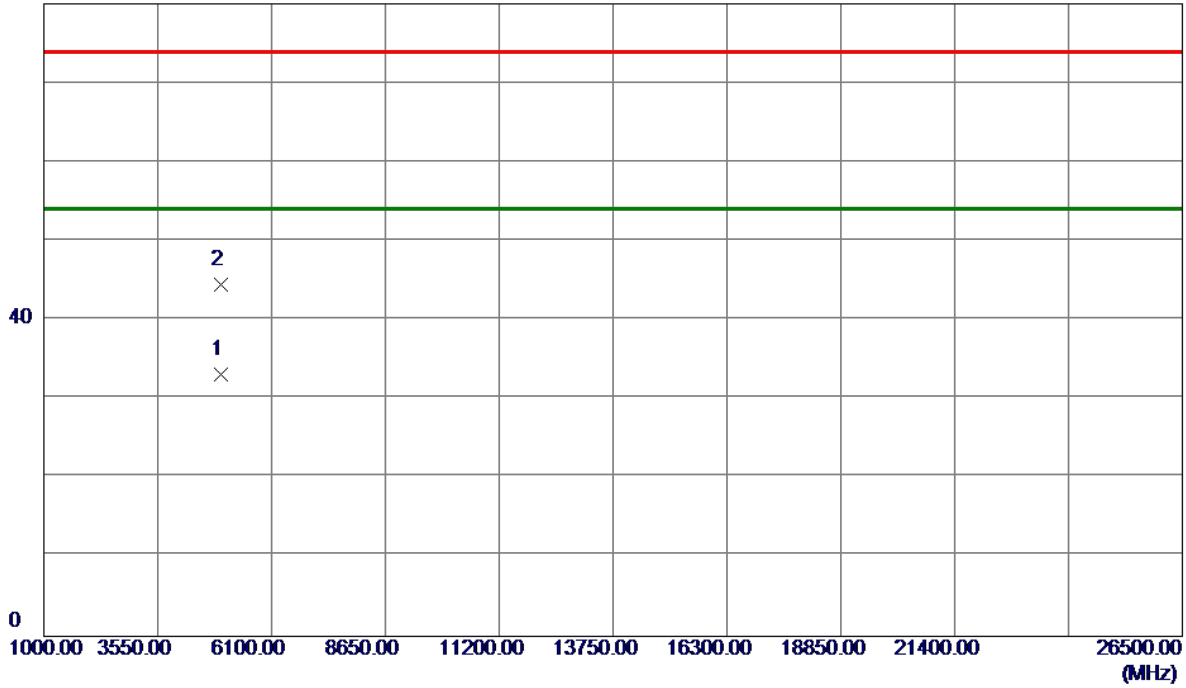
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_1Mbps

### Horizontal

80 dBuV/m



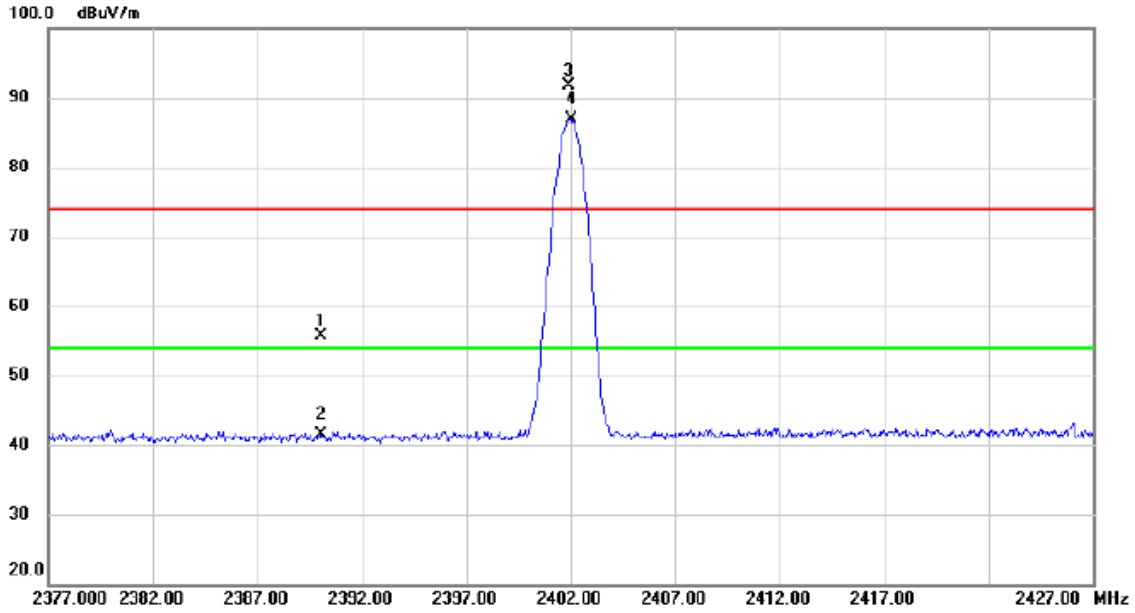
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4958.3600	41.52	-8.47	33.05	54.00	-20.95	AVG	
2	4960.0150	52.96	-8.47	44.49	74.00	-29.51	Peak	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX 2402 MHz _CH00_3Mbps
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### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	22.50	33.24	55.74	74.00	-18.26	peak	
2		2390.000	8.33	33.24	41.57	54.00	-12.43	AVG	
3	X	2401.900	58.36	33.28	91.64	74.00	17.64	peak	No Limit
4	*	2402.000	53.53	33.28	86.81	54.00	32.81	AVG	No Limit

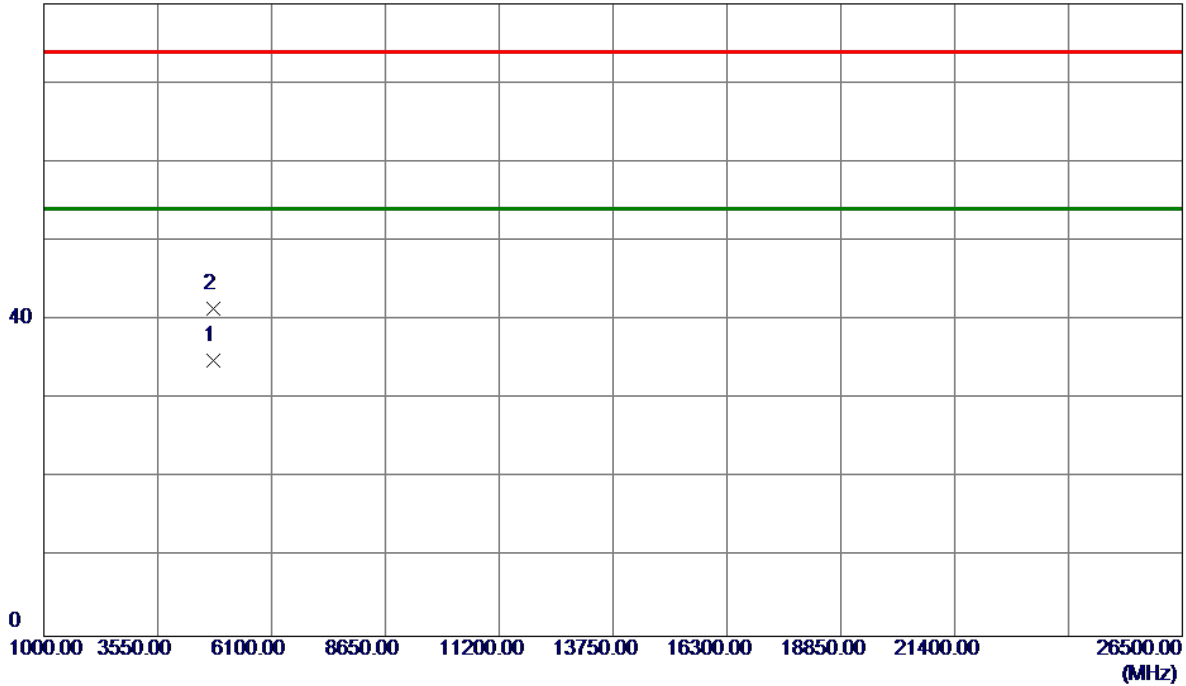
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2402 MHz \_CH00\_3Mbps

### Vertical

80 dBuV/m



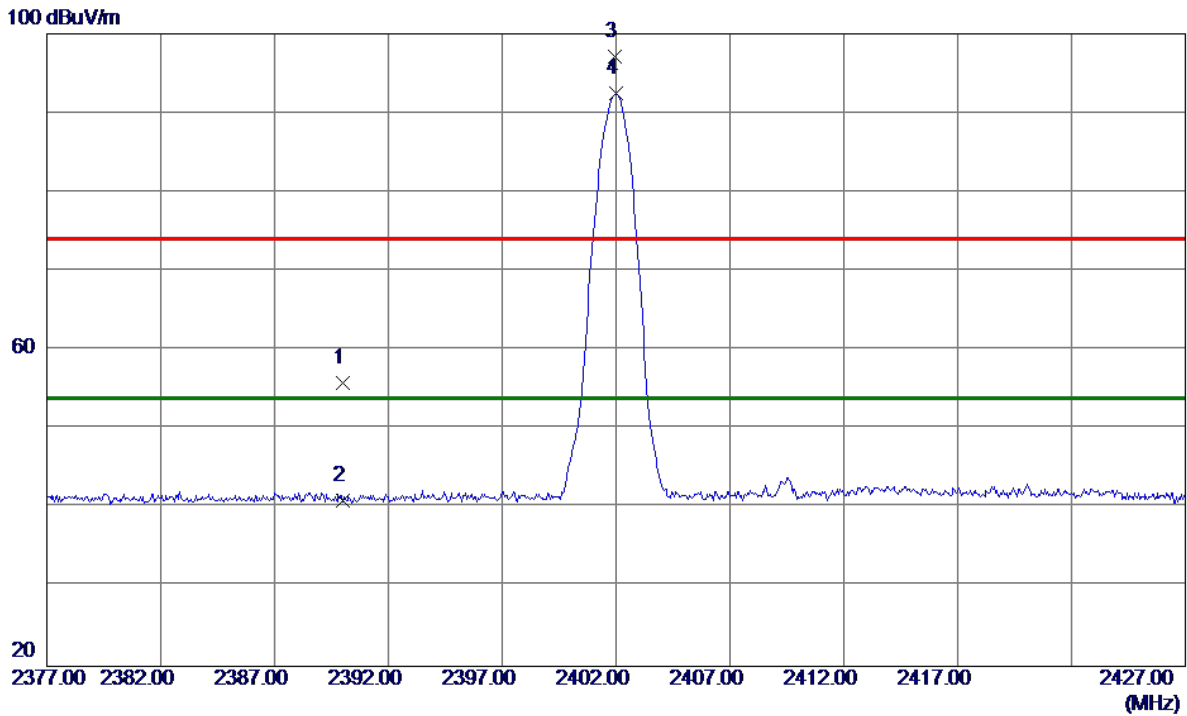
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4803.7050	44.01	-9.07	34.94	54.00	-19.06	AVG	
2	4805.5019	50.53	-9.06	41.47	74.00	-32.53	Peak	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

<b>Test Mode:</b>	TX 2402 MHz _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	2390.0000	22.55	33.25	55.80	74.00	-18.20	Peak	
2	2390.0000	7.67	33.25	40.92	54.00	-13.08	AVG	
3	2401.9500	63.79	33.28	97.07	74.00	23.07	Peak	No Limit
4 *	2402.0000	59.12	33.28	92.40	54.00	38.40	AVG	No Limit

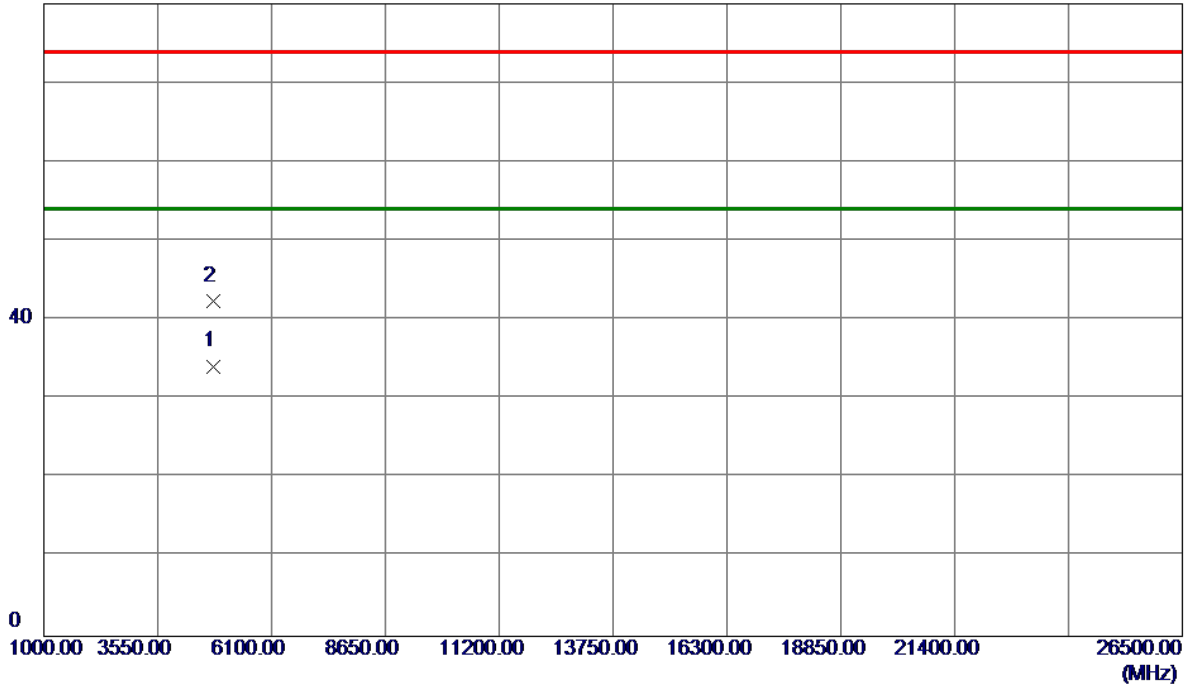
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2402 MHz \_CH00\_3Mbps

### Horizontal

80 dBuV/m



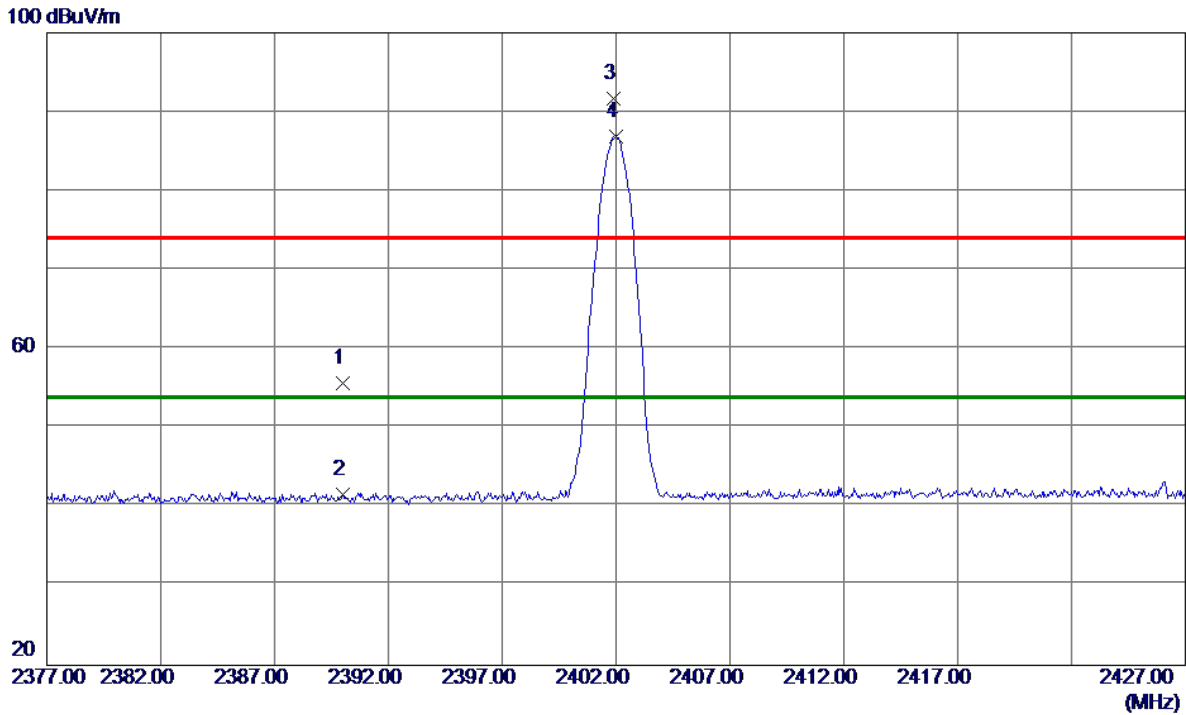
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4804.1700	43.23	-9.07	34.16	54.00	-19.84	AVG	
2	4804.5350	51.51	-9.07	42.44	74.00	-31.56	Peak	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_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	2390.0000	22.49	33.25	55.74	74.00	-18.26	Peak	
2	2390.0000	8.32	33.25	41.57	54.00	-12.43	AVG	
3	2401.9000	58.36	33.28	91.64	74.00	17.64	Peak	No Limit
4 *	2402.0000	53.53	33.28	86.81	54.00	32.81	AVG	No Limit

**REMARKS:**

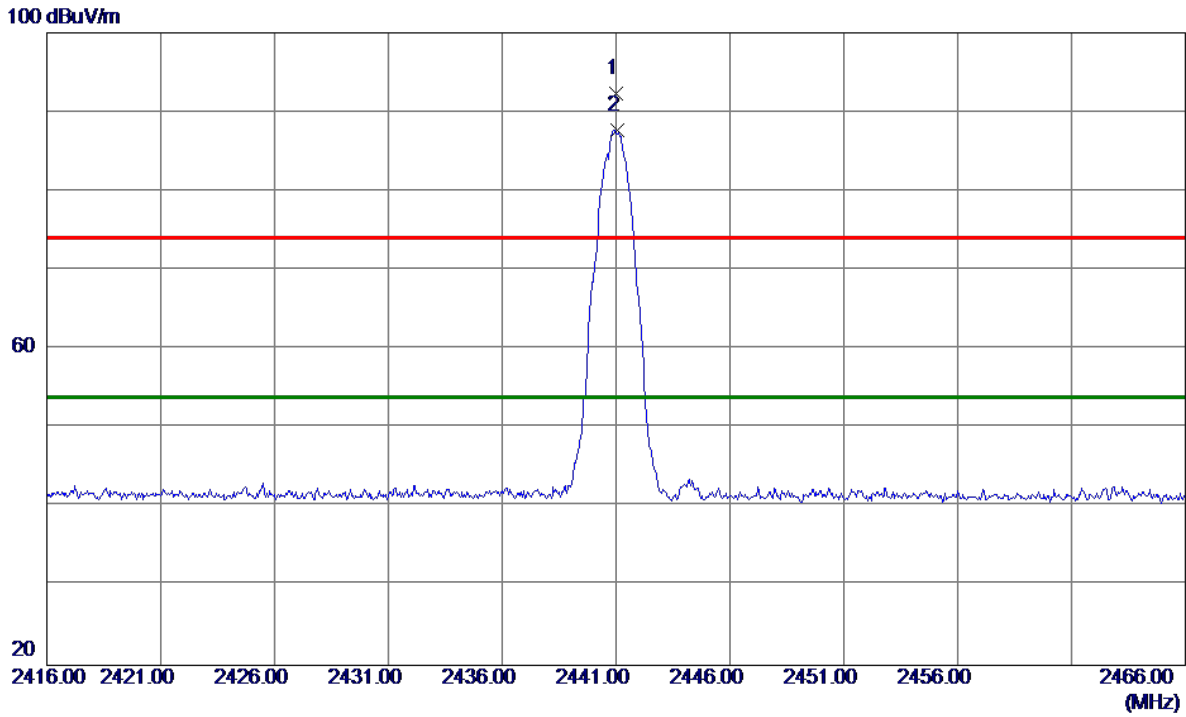
(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.



Test Mode: TX 2441 MHz \_CH39\_3Mbps

### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	58.90	33.39	92.29	74.00	18.29	Peak	No Limit
2 *	2441.0500	54.35	33.39	87.74	54.00	33.74	AVG	No Limit

**REMARKS:**

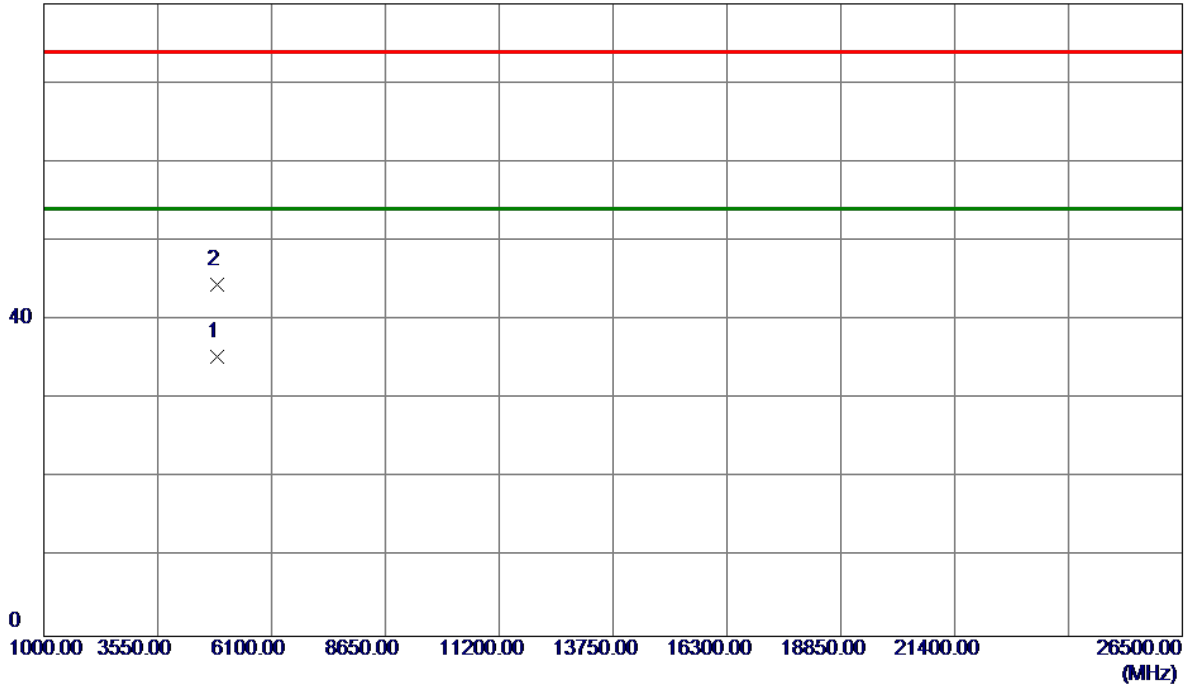
(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_3Mbps

### Vertical

80 dBuV/m



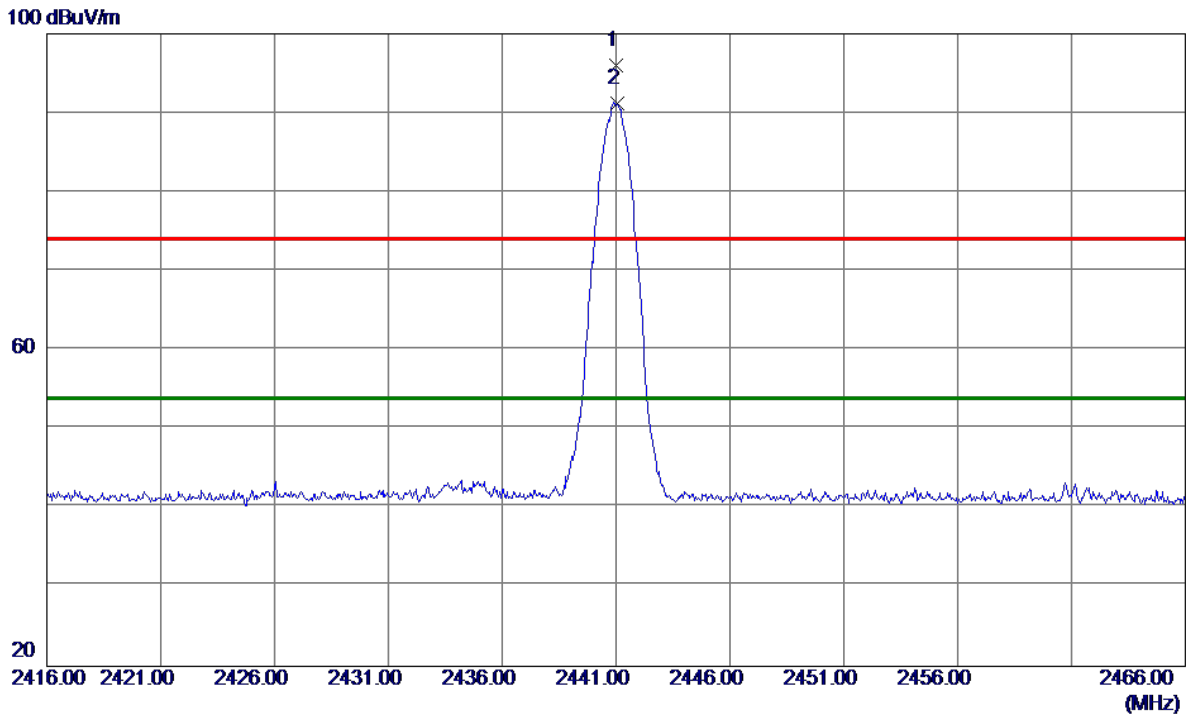
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4881.9920	44.10	-8.77	35.33	54.00	-18.67	AVG	
2	4882.4120	53.26	-8.77	44.49	74.00	-29.51	Peak	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_3Mbps

### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	62.55	33.39	95.94	74.00	21.94	Peak	No Limit
2 *	2441.0500	57.83	33.39	91.22	54.00	37.22	AVG	No Limit

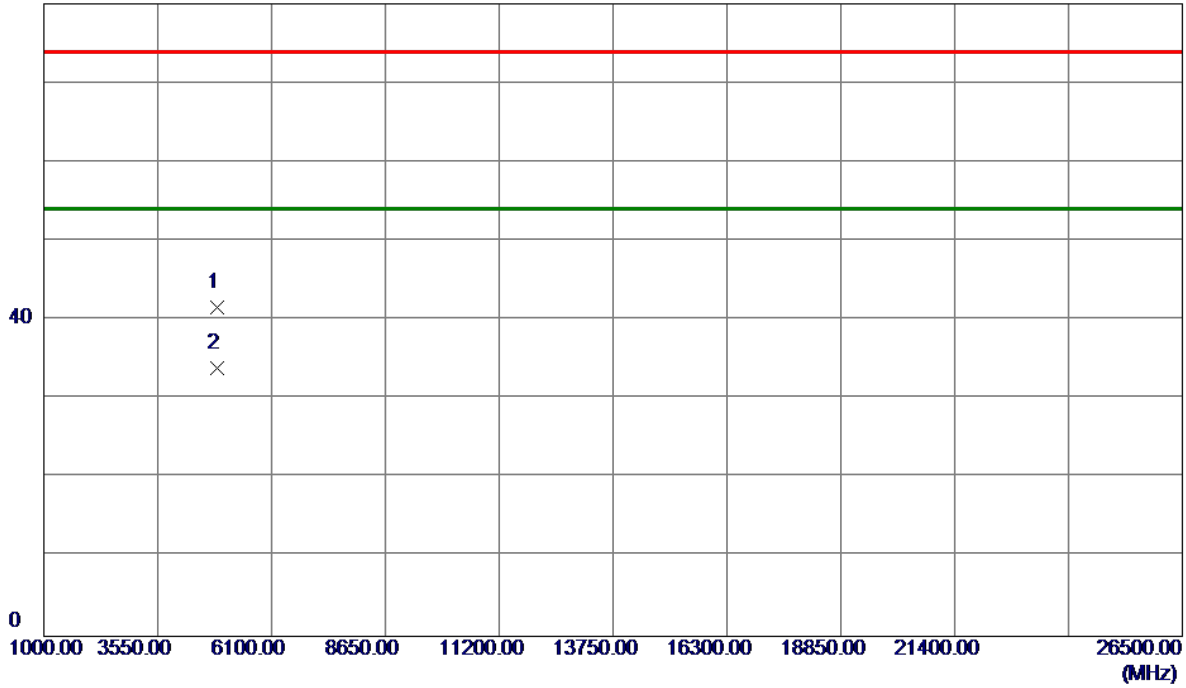
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2441 MHz \_CH39\_3Mbps

### Horizontal

80 dBuV/m



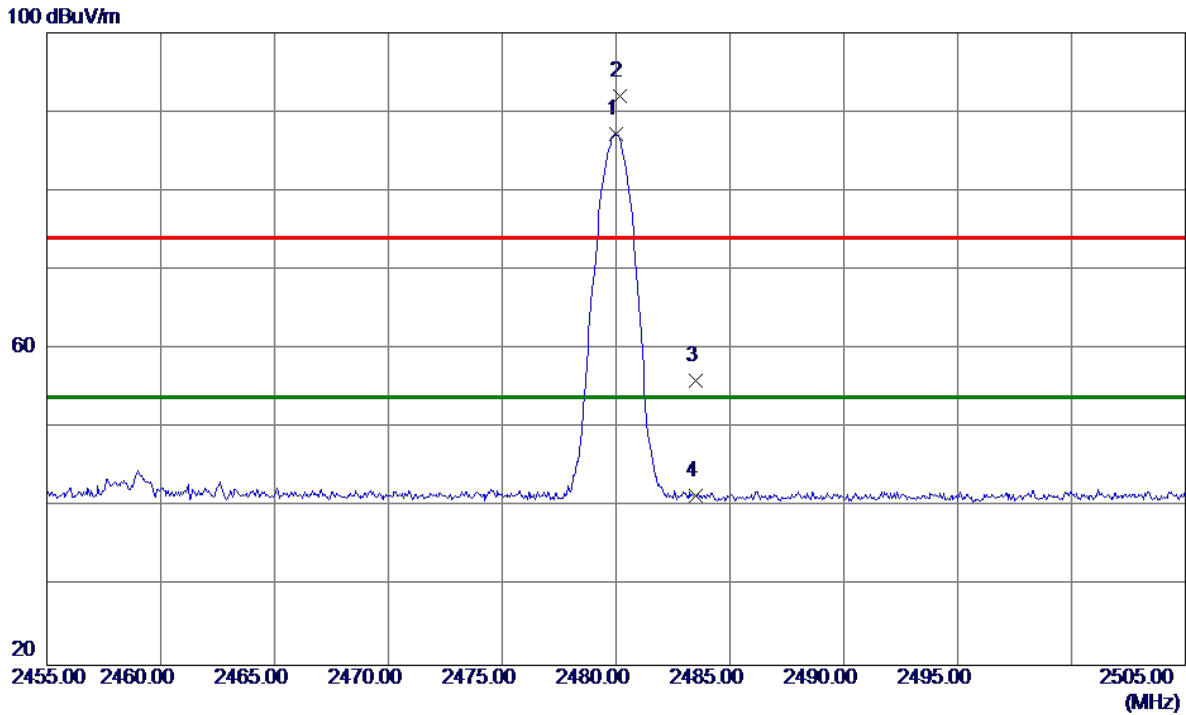
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4880.8370	50.40	-8.77	41.63	74.00	-32.37	Peak	
2 *	4883.9720	42.63	-8.76	33.87	54.00	-20.13	AVG	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_3Mbps

### Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2480.0000	53.69	33.50	87.19	54.00	33.19	AVG	No Limit
2	2480.1500	58.43	33.50	91.93	74.00	17.93	Peak	No Limit
3	2483.5000	22.45	33.51	55.96	74.00	-18.04	Peak	
4	2483.5000	7.88	33.51	41.39	54.00	-12.61	AVG	

**REMARKS:**

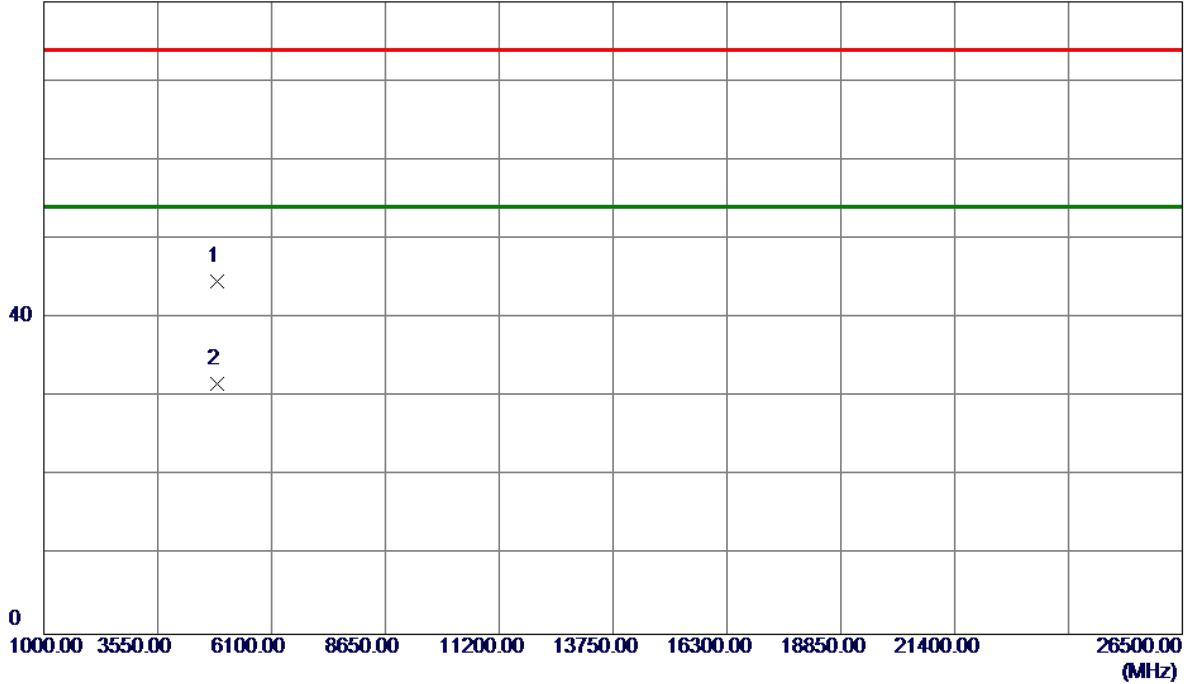
(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_3Mbps

### Vertical

80 dBuV/m



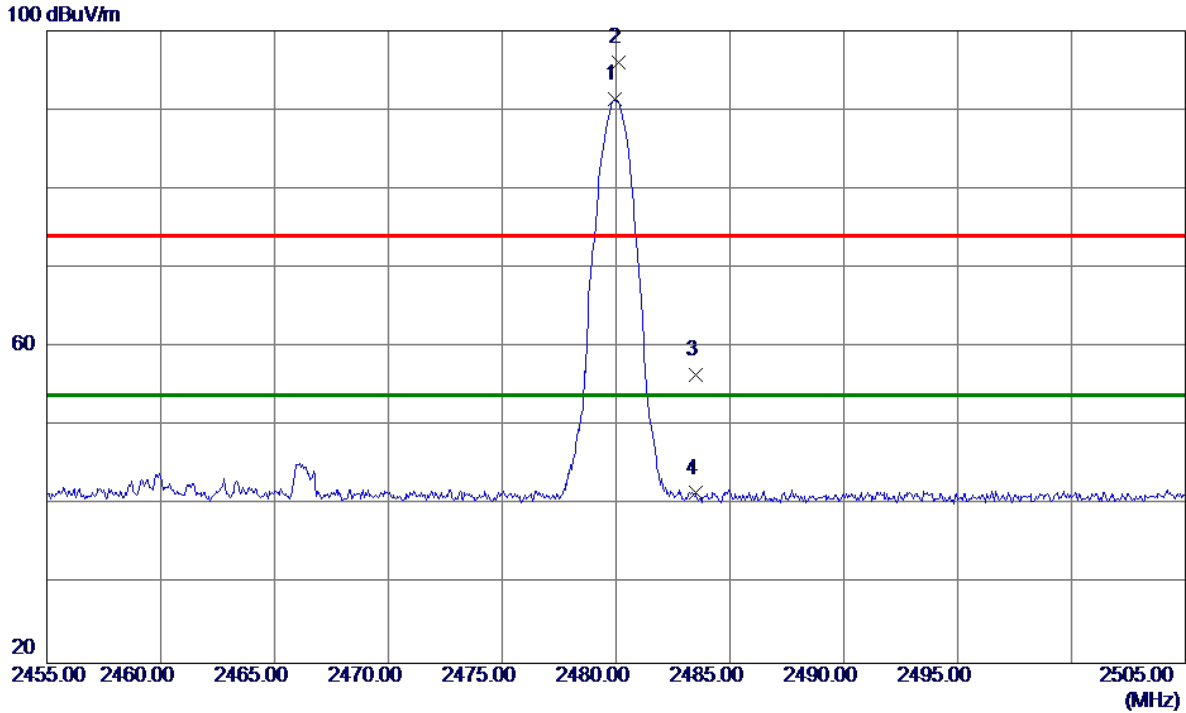
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4882.5700	53.39	-8.77	44.62	74.00	-29.38	Peak	
2 *	4882.6530	40.52	-8.77	31.75	54.00	-22.25	AVG	

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_3Mbps

### Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2479.9500	57.85	33.50	91.35	54.00	37.35	AVG	No Limit
2	2480.1000	62.46	33.50	95.96	74.00	21.96	Peak	No Limit
3	2483.5000	23.02	33.51	56.53	74.00	-17.47	Peak	
4	2483.5000	8.01	33.51	41.52	54.00	-12.48	AVG	

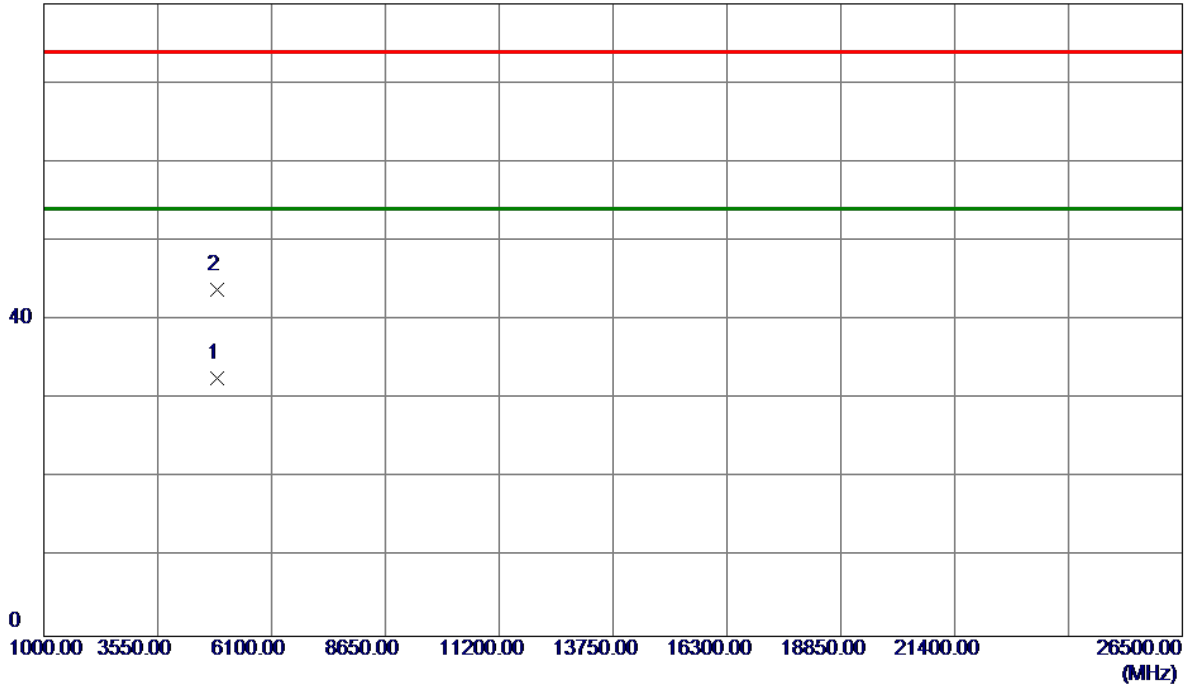
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode: TX 2480 MHz \_CH78\_3Mbps

### Horizontal

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4882.4650	41.42	-8.77	32.65	54.00	-21.35	AVG	
2	4883.7620	52.68	-8.76	43.92	74.00	-30.08	Peak	

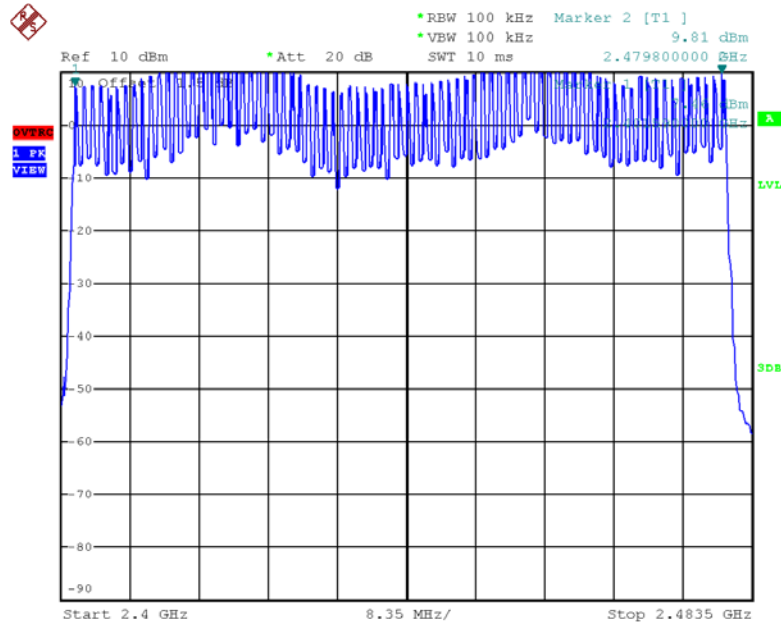
**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.



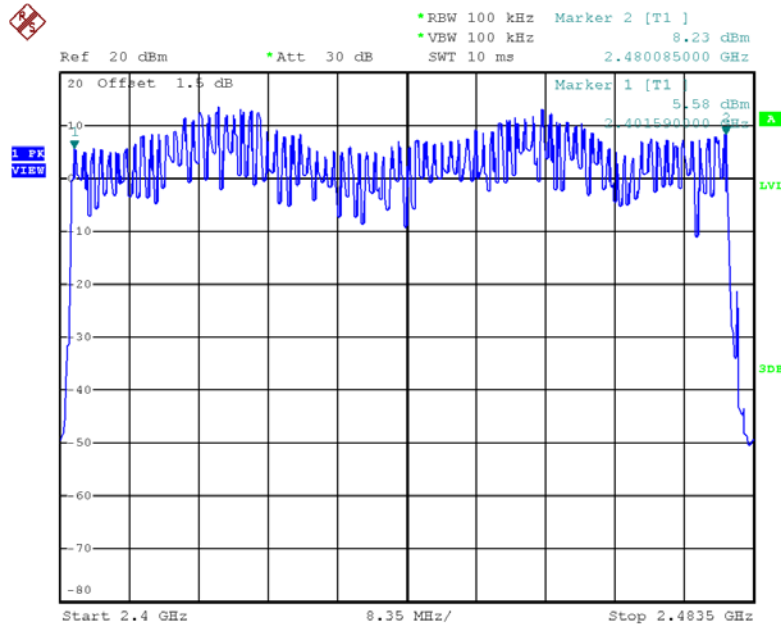
## APPENDIX E - NUMBER OF HOPPING FREQUENCY

Test Mode	Hopping Mode_1Mbps
Number of Hopping Frequency	79



Date: 3.SEP.2019 15:54:26

Test Mode	Hopping Mode_3Mbps
Number of Hopping Frequency	79



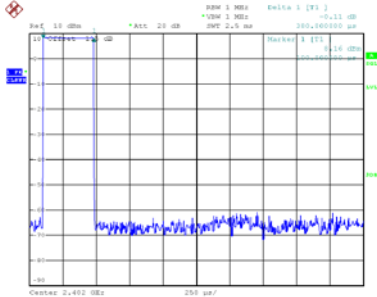
Date: 3.SEP.2019 16:19:13

## APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode:	TX Mode_1Mbps
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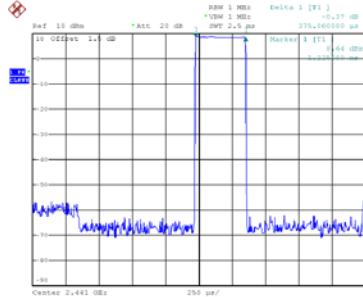
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH1	2402	0.3800	0.1216	0.4000	Pass
DH3	2402	1.6400	0.2624	0.4000	Pass
DH5	2402	2.8800	0.3072	0.4000	Pass
DH1	2441	0.3750	0.1200	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH5	2441	2.8800	0.3072	0.4000	Pass
DH1	2480	0.3800	0.1216	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass

### CH00-DH1



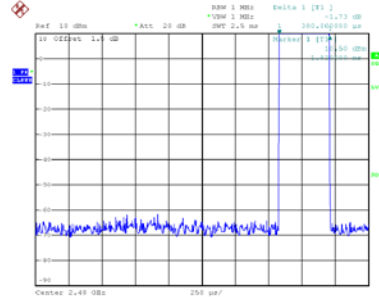
Date: 3.08P.2019 15:14:18

### CH39-DH1



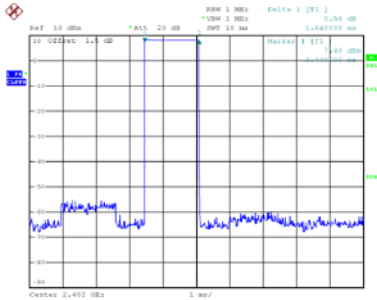
Date: 3.08P.2019 15:14:23

### CH78-DH1



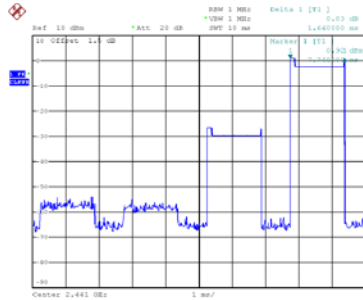
Date: 3.08P.2019 15:14:29

### CH00-DH3



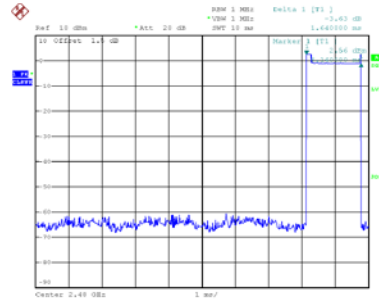
Date: 3.08P.2019 15:14:14

### CH39-DH3



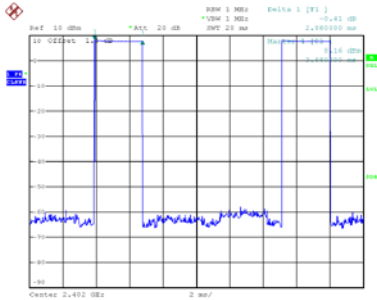
Date: 3.08P.2019 15:14:19

### CH78-DH3



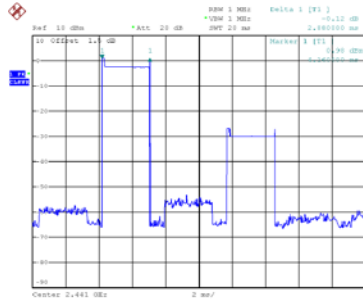
Date: 3.08P.2019 15:15:23

### CH00-DH5



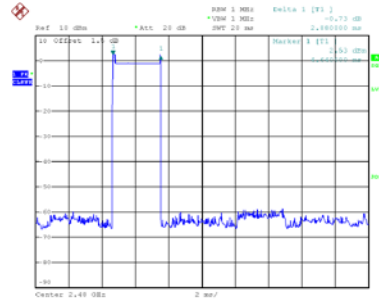
Date: 3.08P.2019 15:15:12

### CH39-DH5



Date: 3.08P.2019 15:15:16

### CH78-DH5

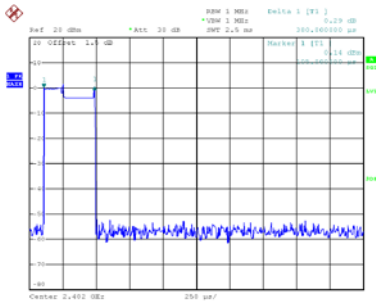


Date: 3.08P.2019 15:16:00

Test Mode:	TX Mode_3Mbps
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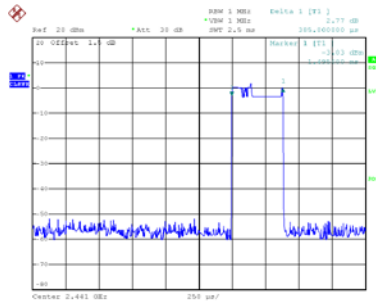
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
3DH1	2402	0.3800	0.1216	0.4000	Pass
3DH3	2402	1.6400	0.2624	0.4000	Pass
3DH5	2402	2.9200	0.3115	0.4000	Pass
3DH1	2441	0.3850	0.1232	0.4000	Pass
3DH3	2441	1.6200	0.2592	0.4000	Pass
3DH5	2441	2.8800	0.3072	0.4000	Pass
3DH1	2480	0.3850	0.1232	0.4000	Pass
3DH3	2480	1.6400	0.2624	0.4000	Pass
3DH5	2480	2.8800	0.3072	0.4000	Pass

### CH00-3DH1



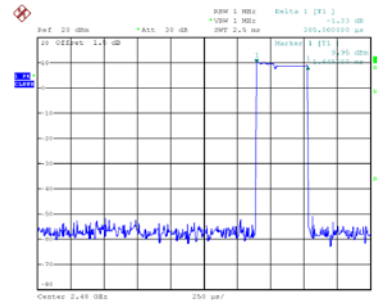
Date: 3.SEP.2019 16:13:37

### CH39-3DH1



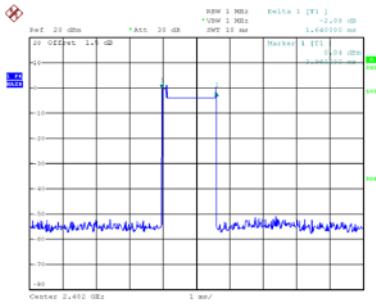
Date: 3.SEP.2019 16:13:59

### CH78-3DH1



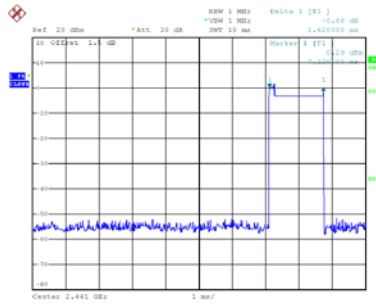
Date: 3.SEP.2019 16:14:02

### CH00-3DH3



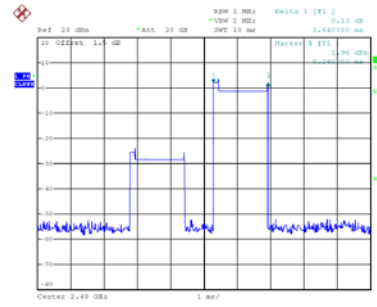
Date: 3.SEP.2019 16:21:27

### CH39-3DH3



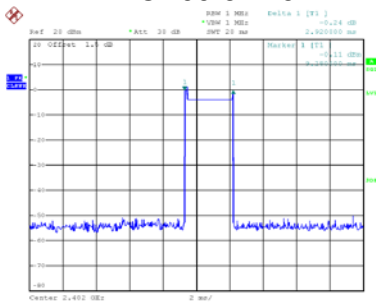
Date: 3.SEP.2019 16:21:47

### CH78-3DH3



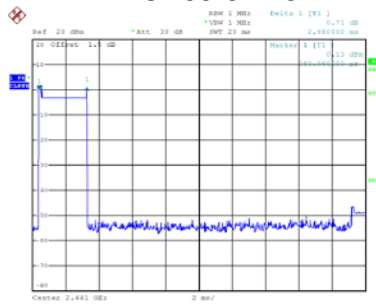
Date: 3.SEP.2019 16:21:53

### CH00-3DH5



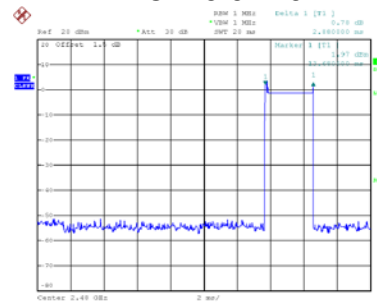
Date: 3.SEP.2019 16:22:22

### CH39-3DH5



Date: 3.SEP.2019 16:22:44

### CH78-3DH5



Date: 3.SEP.2019 16:23:06

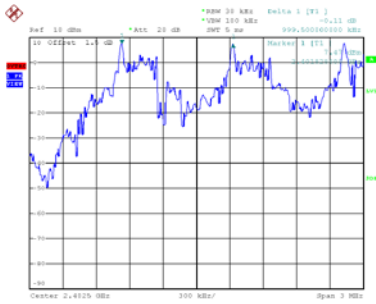
## **APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT**



Test Mode: Hopping on \_1Mbps

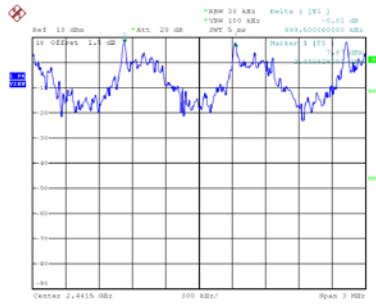
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.000	0.552	Pass
39	2441	1.000	0.460	Pass
78	2480	1.008	0.550	Pass

**CH00**



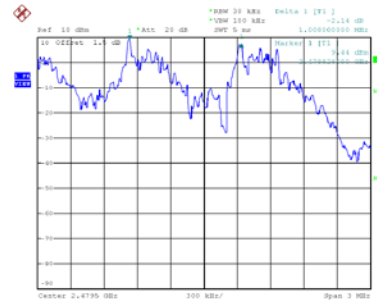
Date: 3. SEP. 2019 15:50:25

**CH39**



Date: 3. SEP. 2019 15:51:34

**CH78**

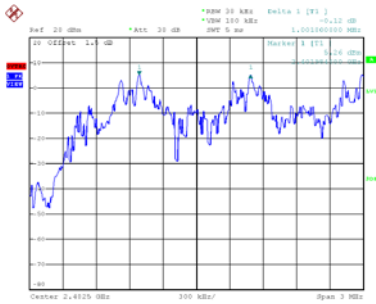


Date: 3. SEP. 2019 15:52:38

Test Mode: Hopping on \_3Mbps

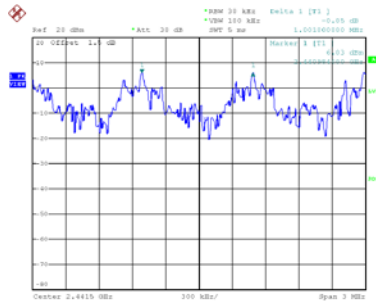
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.001	0.711	Pass
39	2441	1.001	0.720	Pass
78	2480	1.002	0.723	Pass

**CH00**



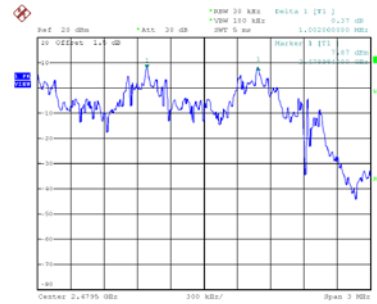
Date: 3.SEP.2019 16:15:12

**CH39**



Date: 3.SEP.2019 16:16:21

**CH78**

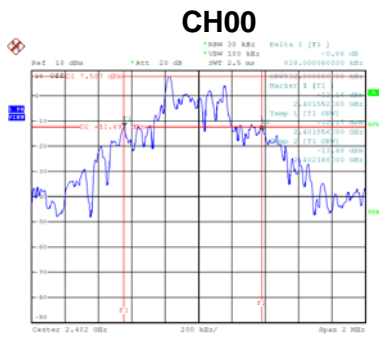


Date: 3.SEP.2019 16:17:25

## APPENDIX H - BANDWIDTH

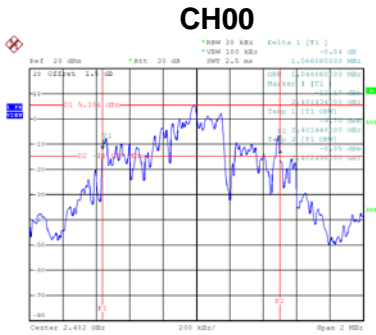
Test Mode:	TX Mode _1Mbps
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Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)
00	2402	0.828	0.832
39	2441	0.690	0.856
78	2480	0.825	0.864

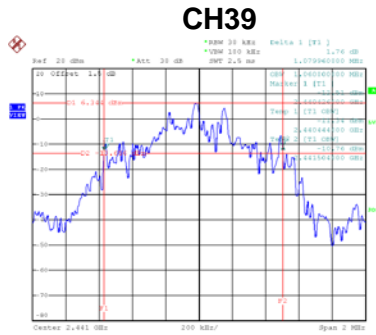


Test Mode: TX Mode \_3Mbps

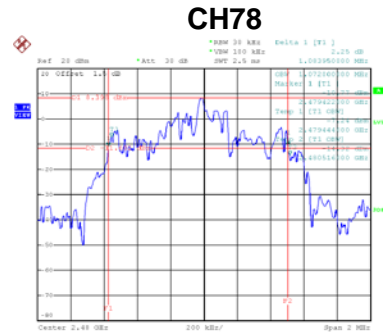
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)
00	2402	1.066	1.048
39	2441	1.080	1.060
78	2480	1.084	1.072



Date: 3.SEP.2019 16:09:42



Date: 3.SEP.2019 16:11:38

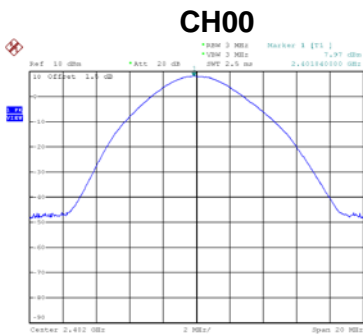


Date: 3.SEP.2019 16:12:30

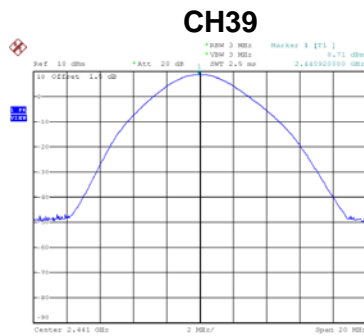
## **APPENDIX I - MAXIMUM OUTPUT POWER & E.I.R.P.**

Test Mode:	TX Mode _1Mbps
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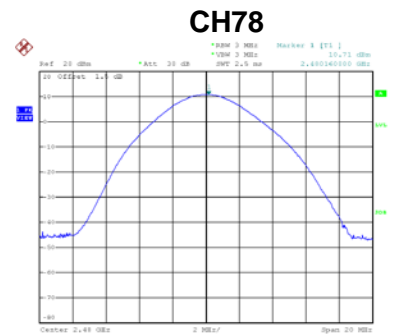
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	7.97	0.0063	21.00	0.125	Pass
39	2441	8.71	0.0074	21.00	0.125	Pass
78	2480	10.71	0.0118	21.00	0.125	Pass



Date: 3.SEP.2019 16:05:03



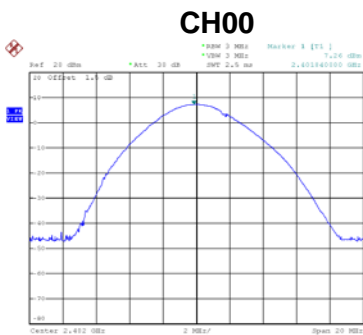
Date: 3.SEP.2019 16:05:21



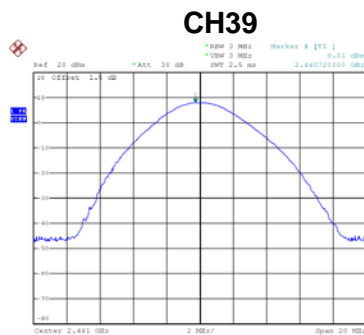
Date: 3.SEP.2019 16:06:06

Test Mode:	TX Mode _3Mbps
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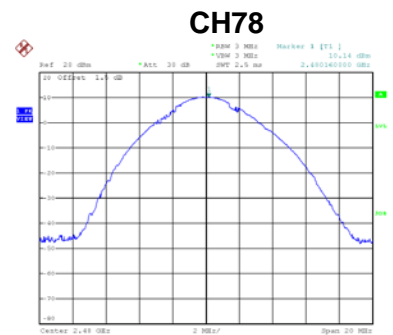
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	7.26	0.0053	21.00	0.125	Pass
39	2441	8.01	0.0063	21.00	0.125	Pass
78	2480	10.14	0.0103	21.00	0.125	Pass



Date: 3.SEP.2019 16:07:25



Date: 3.SEP.2019 16:07:46



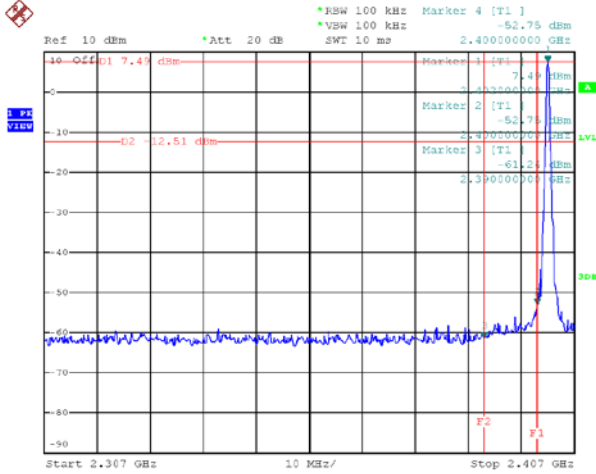
Date: 3.SEP.2019 16:08:03

## APPENDIX J - CONDUCTED SPURIOUS EMISSION

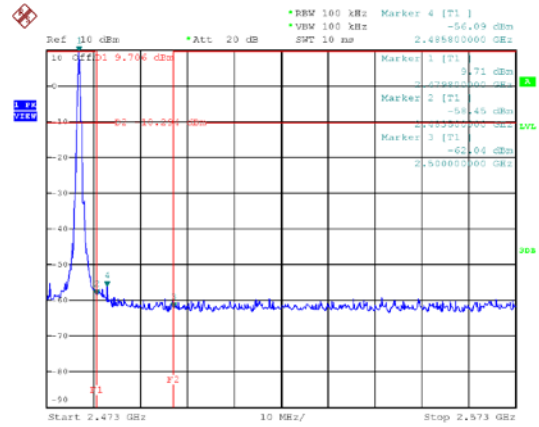


**Test Mode : TX Mode \_1Mbps**

**Bandedge- CH00 (Lower)**



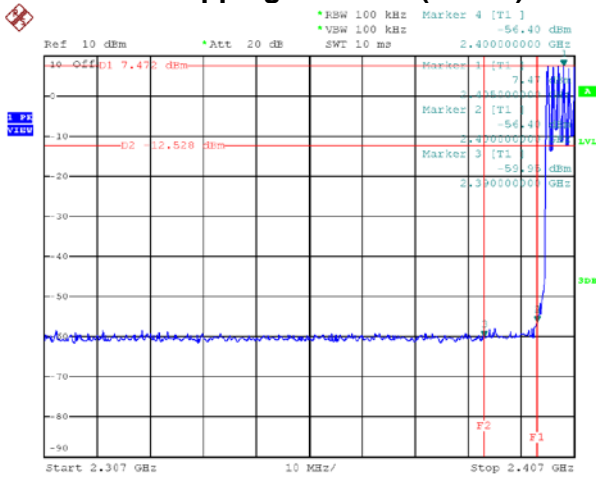
**Bandedge CH78 (Upper)**



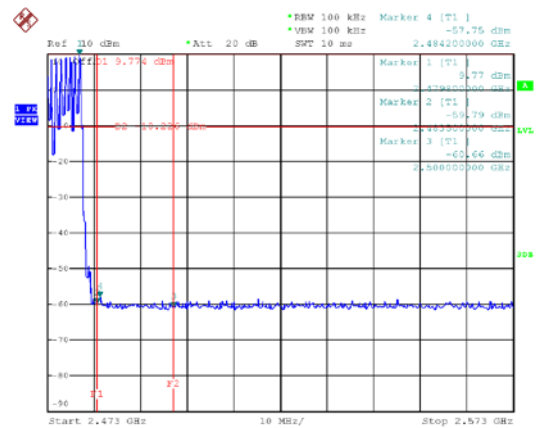
Date: 3.SEP.2019 16:02:25

Date: 3.SEP.2019 15:57:31

**Hopping on mode (Lower)**



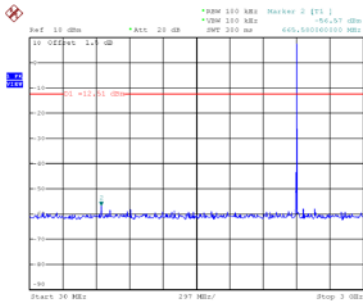
**Hopping on mode (Upper)**



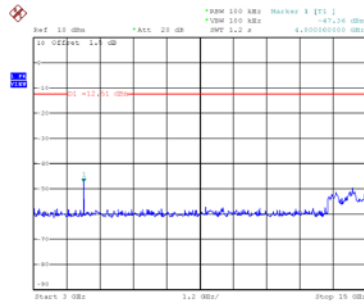
Date: 3.SEP.2019 15:55:51

Date: 3.SEP.2019 15:55:17

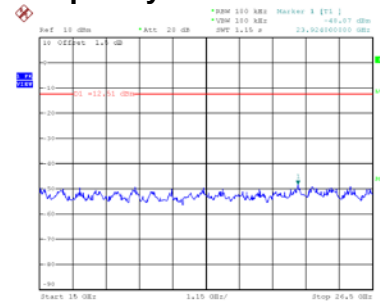
## CH00 – 10th Harmonic of the fundamental frequency



Date: 3.SEP.2019 15:58:25

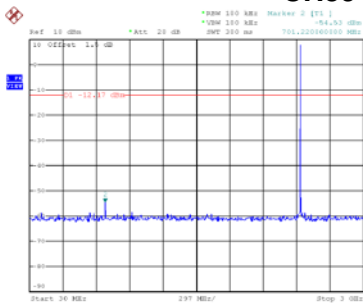


Date: 3.SEP.2019 15:58:32

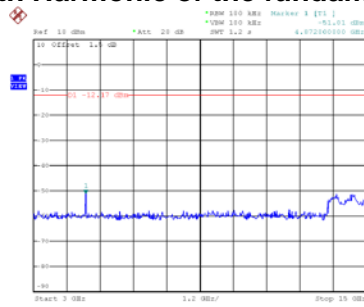


Date: 3.SEP.2019 15:58:39

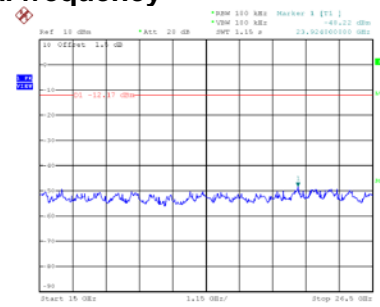
## CH39 – 10th Harmonic of the fundamental frequency



Date: 3.SEP.2019 16:00:46

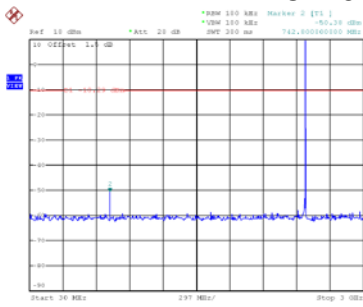


Date: 3.SEP.2019 16:00:53

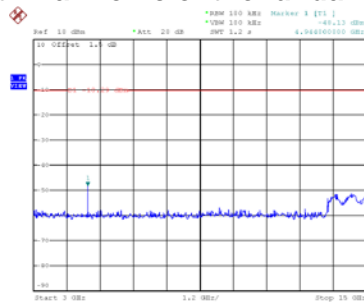


Date: 3.SEP.2019 16:01:00

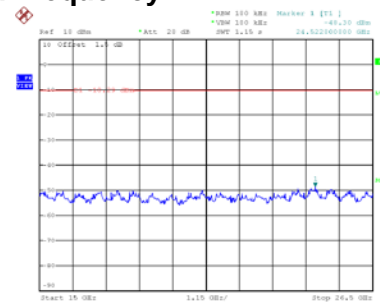
## CH78 – 10th Harmonic of the fundamental frequency



Date: 3.SEP.2019 16:03:23



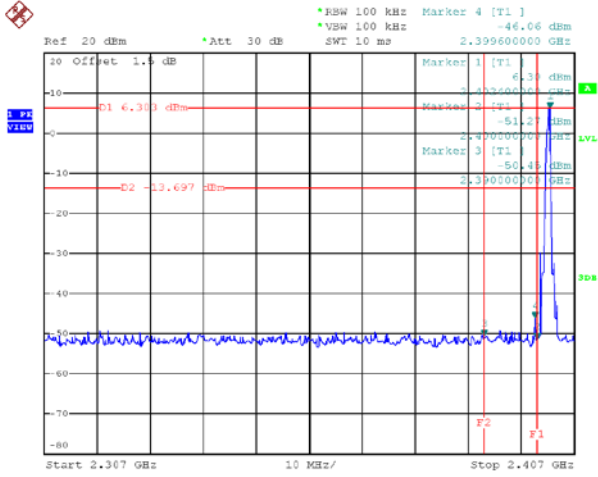
Date: 3.SEP.2019 16:03:30



Date: 3.SEP.2019 16:03:37

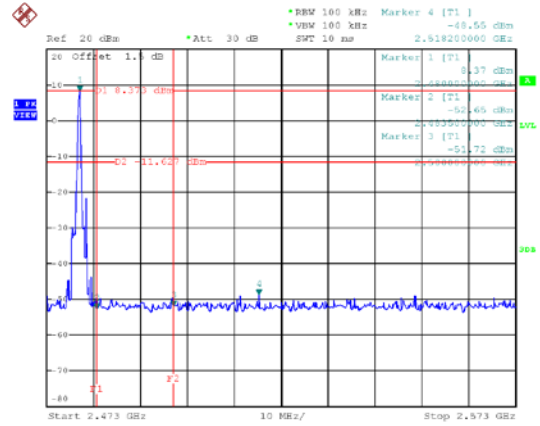
## Test Mode : TX Mode \_3Mbps

### Bandedge- CH00 (Lower)



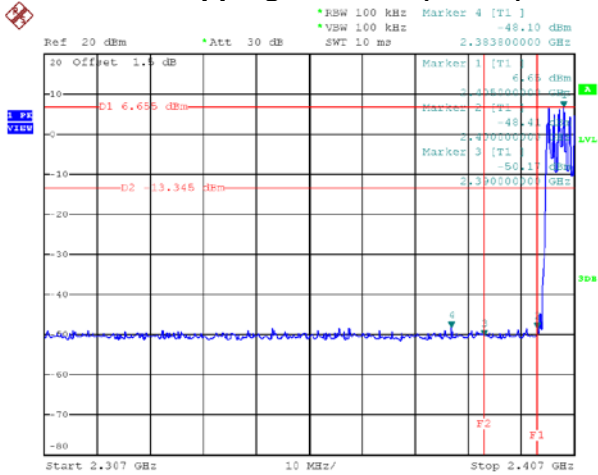
Date: 3.SEP.2019 16:09:09

### Bandedge CH78 (Upper)



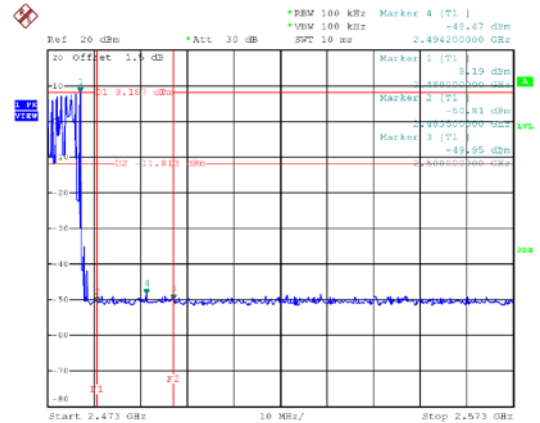
Date: 3.SEP.2019 16:12:00

### Hopping on mode (Lower)



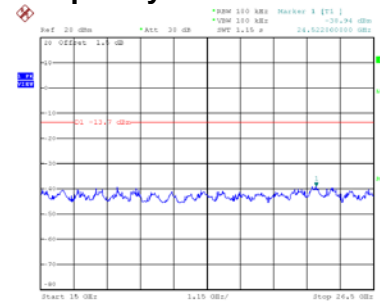
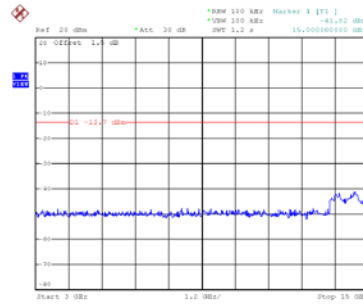
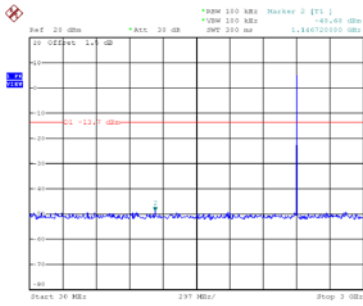
Date: 3.SEP.2019 16:20:04

### Hopping on mode (Upper)



Date: 3.SEP.2019 16:20:54

## CH00 – 10th Harmonic of the fundamental frequency

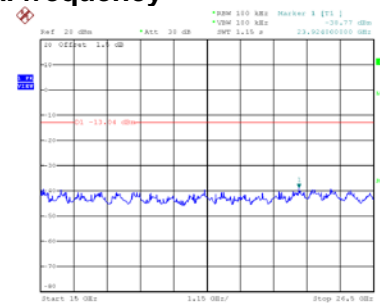
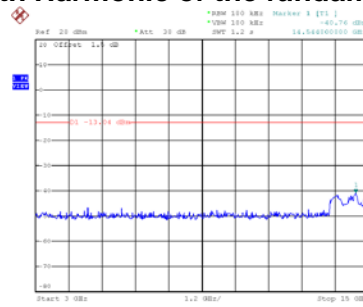
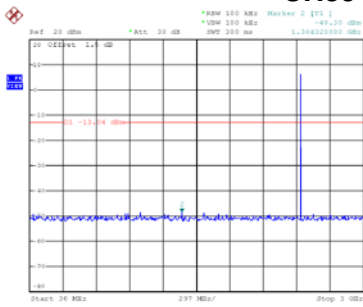


Date: 3.SEP.2019 16:09:55

Date: 3.SEP.2019 16:10:03

Date: 3.SEP.2019 16:10:10

## CH39 – 10th Harmonic of the fundamental frequency

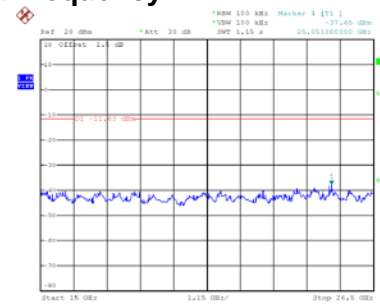
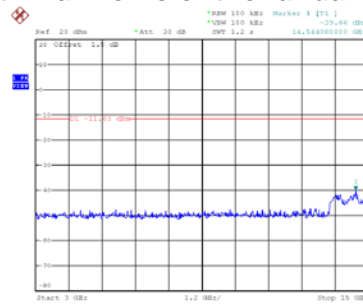
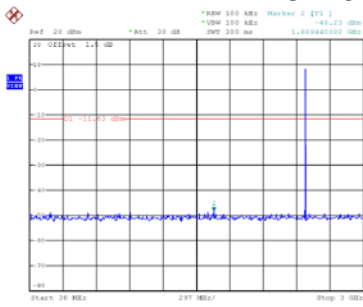


Date: 3.SEP.2019 16:10:50

Date: 3.SEP.2019 16:10:57

Date: 3.SEP.2019 16:11:04

## CH78 – 10th Harmonic of the fundamental frequency



Date: 3.SEP.2019 16:12:43

Date: 3.SEP.2019 16:12:50

Date: 3.SEP.2019 16:12:59

End of Test Report