

FCC Radio Test Report

FCC ID: 2AJIF-MACH20001

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

Project No. : 1611100
Equipment : Industrial Gateway
Model Name : Mach2 Gateway
Applicant : Machfu, Inc.
Address : 20271 Goldenrod Ln., Germantown, MD 20876 USA

Date of Receipt : Nov. 23, 2016
Date of Test : Nov. 23, 2016 ~ Dec. 15, 2016
Issued Date : Dec. 16, 2016
Tested by : BTL Inc.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1611100	Original Issue.	Dec. 16, 2016

1. CERTIFICATION

Equipment : Industrial Gateway
Brand Name : MACHFU
Model Name : Mach2 Gateway
Applicant : Machfu, Inc.
Manufacturer : Machfu, Inc.
Address : 20271 Goldenrod Ln., Germantown, MD 20876 USA
Date of Test : Nov. 23, 2016 ~ Dec. 15, 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 in 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-1-1611100) 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): FCC Part15, Subpart C (15.247)			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)	Hopping Channel Separation	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.247 (b)(1)	Peak Output Power	PASS	
15.247(d) 15.209	Radiated Spurious Emission	PASS	
15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS	
15.247 (a)(1)(iii)	Dwell Time	PASS	
15.205	Restricted Bands	PASS	
15.203	Antenna Requirement	PASS	

Note:

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

2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

Conducted emission Test:

C05: (VCCI RN: C-4742; FCC RN: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_{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 (1m)	CISPR	6GHz ~ 18GHz	V	5.34
		6GHz ~ 18GHz	H	5.34

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

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

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

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

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

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Industrial Gateway		
Brand Name	MACHFU		
Model Name	Mach2 Gateway		
Model Difference	N/A		
Output Power (Max.)	Operation Frequency	2402~2480 MHz	
	Modulation Technology	GFSK(1Mbps) π /4-DQPSK(2Mbps)	
	Bit Rate of Transmitter	8-DPSK(3Mbps)	
	Output Power Max.	11.20 dBm(1Mbps) 8.39 dBm(3Mbps)	
Power Source	Supplied from AC ADAPTER.		
Power Rating	I/P: 100-240V 50-60Hz 0.31A MAX O/P: 12.0V --- 1.0A 12.0W MAX		
WWAN Module Manufacturer	Telit	Model	LE910-NAG (FCC ID: RI7LE910NA)
2.4GHz WiFi/Bluetooth/ GNSS Module Manufacturer	JORJIN	Model	WG7871-BN

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	taoglas	GW.05	monopole	Standard RP-SMA(M)	1.25

3.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX Mode Note (1)

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

For Conducted Emission	
Final Test Mode	Description
Mode 1	TX Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	TX Mode Note (1)

Note:

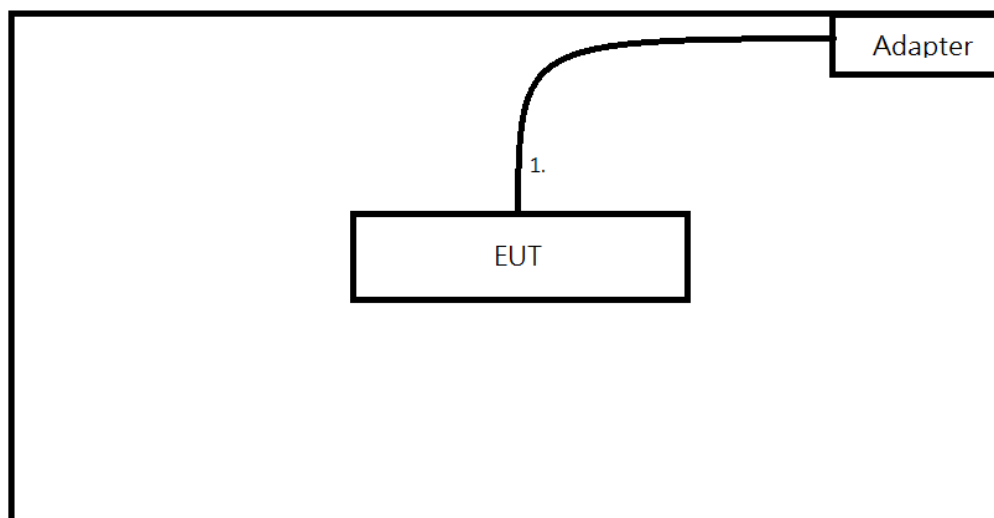
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

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

Test Software Version	putty		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	0x07	0x07	0x07
Parameters(3Mbps)	0x07	0x07	0x07

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 DESCRIPTION OF SUPPORT UNITS

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

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

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

Note:

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

The following table is the setting of the receiver

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

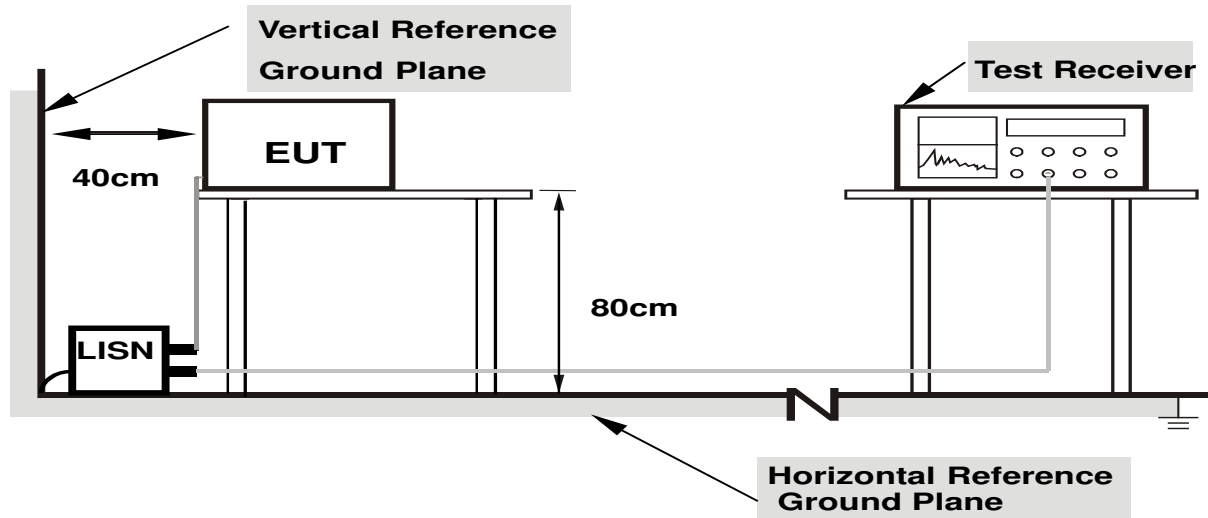
4.1.2 TEST PROCEDURE

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

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



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

4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting/receiving data or hopping on mode.

4.1.6 EUT TEST CONDITIONS

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

4.1.7 TEST RESULTS

Please refer to the Attachment A.

Remark:

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

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9KHz -1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

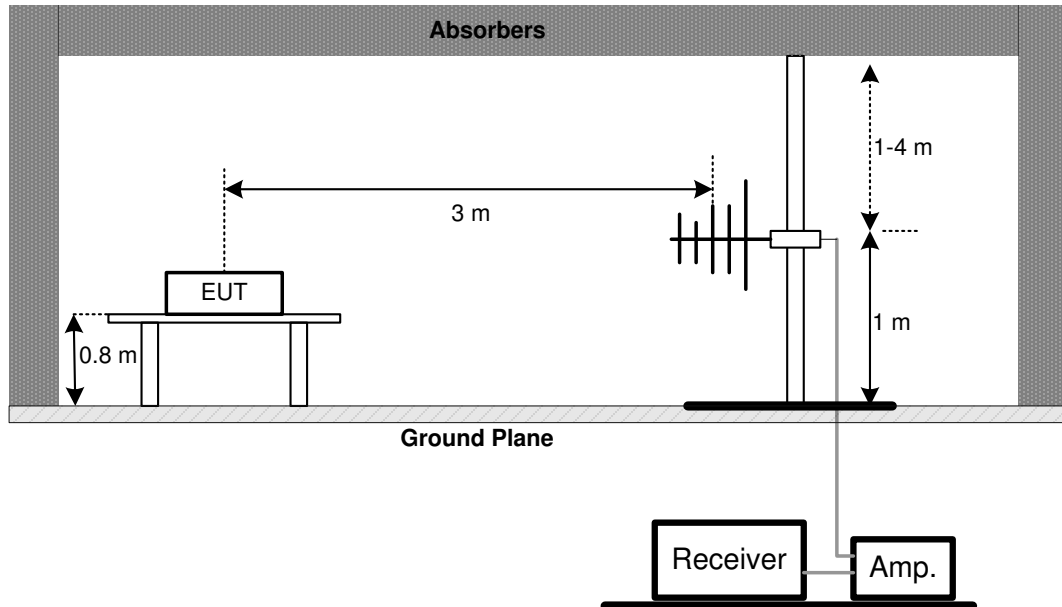
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of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

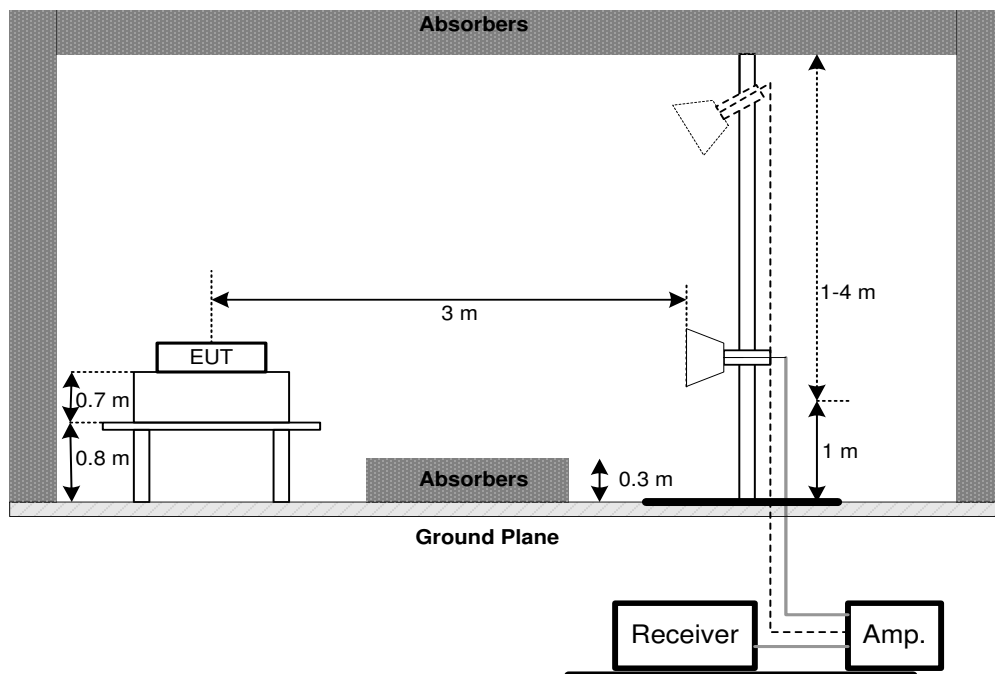
No deviation

4.2.4 TEST SETUP

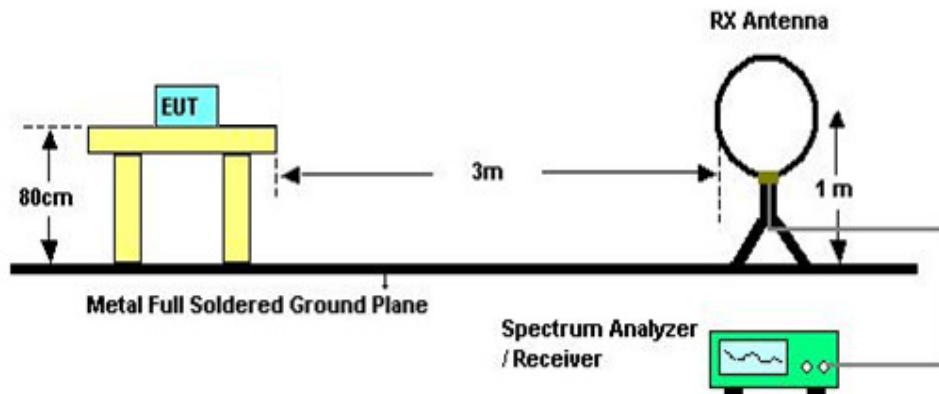
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For Radiated Emissions Below 30MHz



4.2.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.2.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Attachment B

Remark:

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

4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)

Please refer to the Attachment C.

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Attachment D.

Remark:

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

5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS

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

5.1.1 TEST PROCEDURE

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

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

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

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: 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: 55%

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

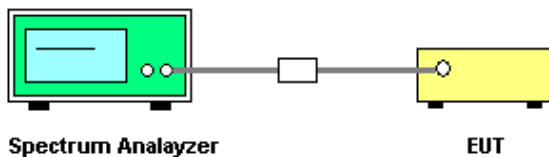
7.1.1 TEST PROCEDURE

- 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: 55%
 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: 55%
 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 (hopping channel >75) 0.125Watt or 21dBm (hopping channel <75)	2400-2483.5	PASS

9.1.1 TEST PROCEDURE

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

9.1.2 DEVIATION FROM STANDARD

No deviation.

9.1.3 TEST SETUP



9.1.4 EUT OPERATION CONDITIONS

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

9.1.5 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: 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.

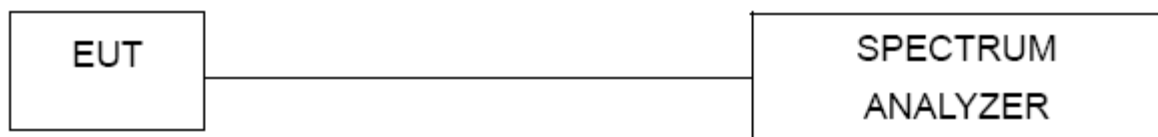
10.1.1 TEST PROCEDURE

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

10.1.2 DEVIATION FROM STANDARD

No deviation.

10.1.3 TEST SETUP



10.1.4 EUT OPERATION CONDITIONS

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

10.1.5 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: 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. 15, 2017
3	EMI Test Receiver	R&S	ESR7	101433	Dec. 09, 2017
4	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	Trilog-Broadband Antenna	Schwarzbeck	VULB9168-352	9168-352	Feb. 04, 2017
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-546	Nov. 05, 2017
3	Pre-Amplifier	HP	8447D	2944A08891	Mar. 09 2017
4	Pre-Amplifier	Agilent	8449B	3008A02331	Jan. 24, 2017
5	Test Cable	EMCI	EMC8D-NM-N M-8000	150301	Mar. 09, 2017
6	Test Cable	EMCI	EMC104-SM-S M-2500	150303	Mar. 09, 2017
7	Test Cable	EMCI	EMC104-NM-S M-1000	150304	Mar. 09, 2017
8	Test Cable	EMCI	EMC104-SM-S M-5000	150302	Mar. 29, 2017
9	Test Cable	EMCI	EMC104-SM-S M-800	150305	Mar. 29, 2017
10	EXA Spectrum Analyzer	Agilent	N9010A	MY52220990	Feb. 24, 2017
11	EMI Test Receiver	Agilent	N9038A	MY51210215	Jan. 08, 2017
12	Loop Antenna	EMCO	6502	00042960	Nov. 05. 2017
13	Horn Antenna	Schwarzbeck	BBHA-9170	187	May 12, 2017

Number of Hopping Channel					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 18, 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. 18, 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. 18, 2017

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 18, 2017

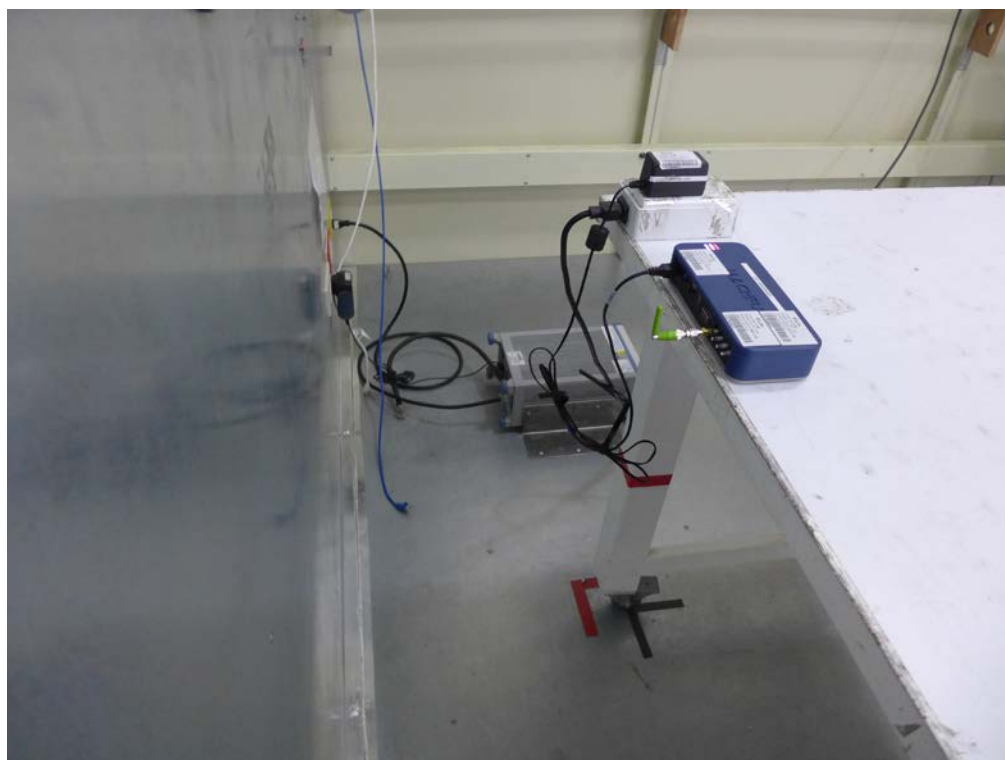
Peak Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2487A	6K00004714	May 18, 2017
2	Power Meter Sensor	Anritsu	MA2491A	034138	May 17, 2017

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 18, 2017

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

12. EUT TEST PHOTO

Conducted Measurement Photos



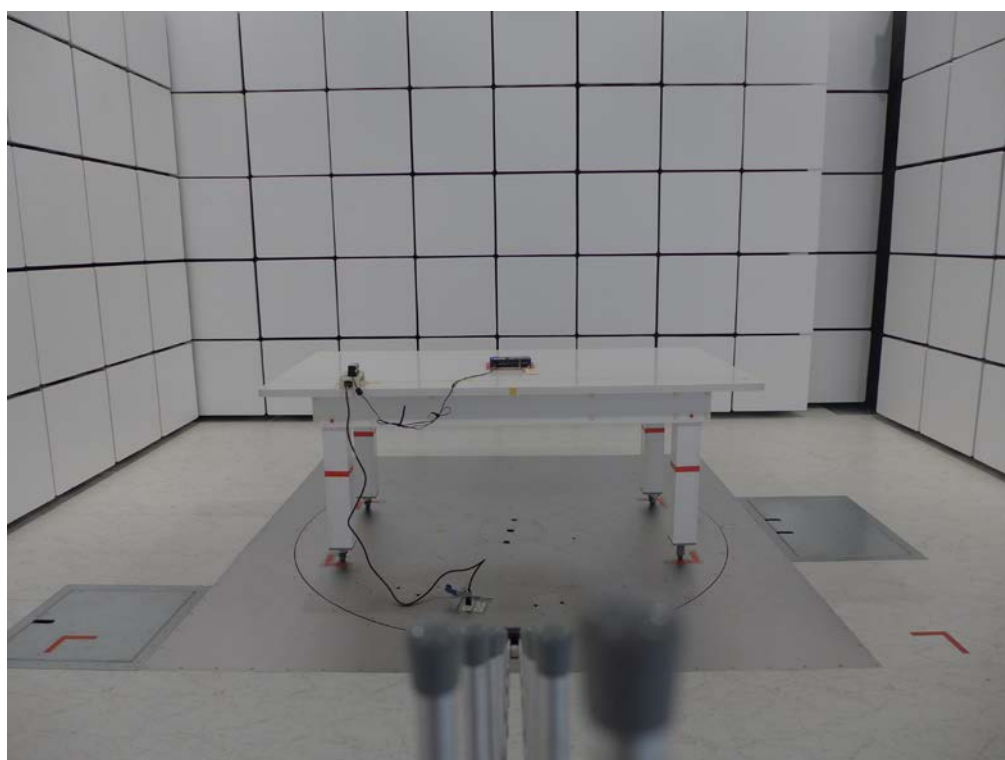
Radiated Measurement Photos

9KHz to 30MHz



Radiated Measurement Photos

30MHz to 1000MHz



Radiated Measurement Photos

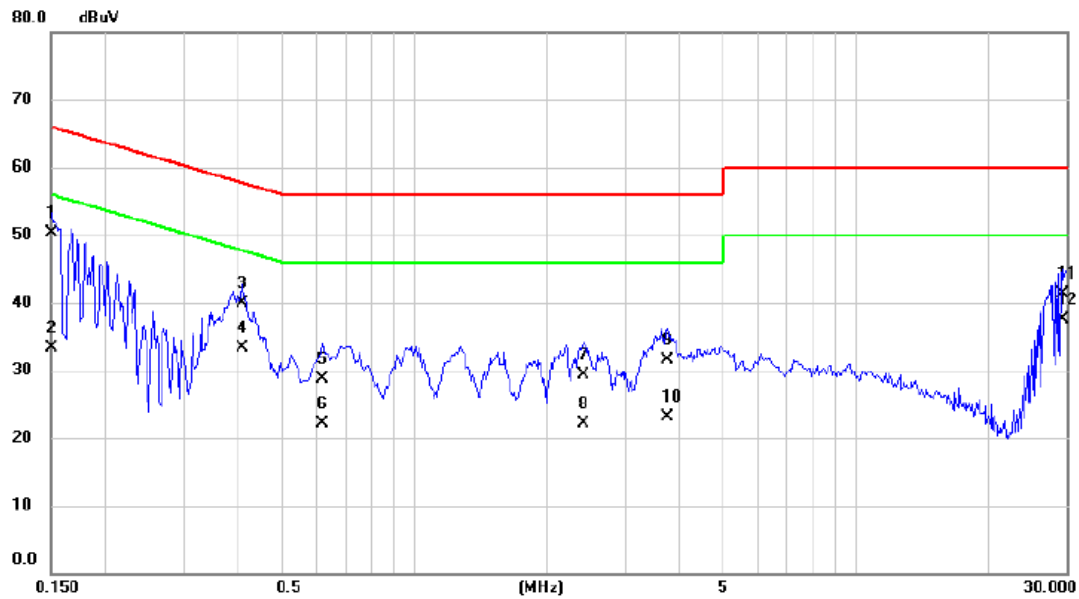
Above 1000MHz



ATTACHMENT A - CONDUCTED EMISSION

Test Mode: TX Mode

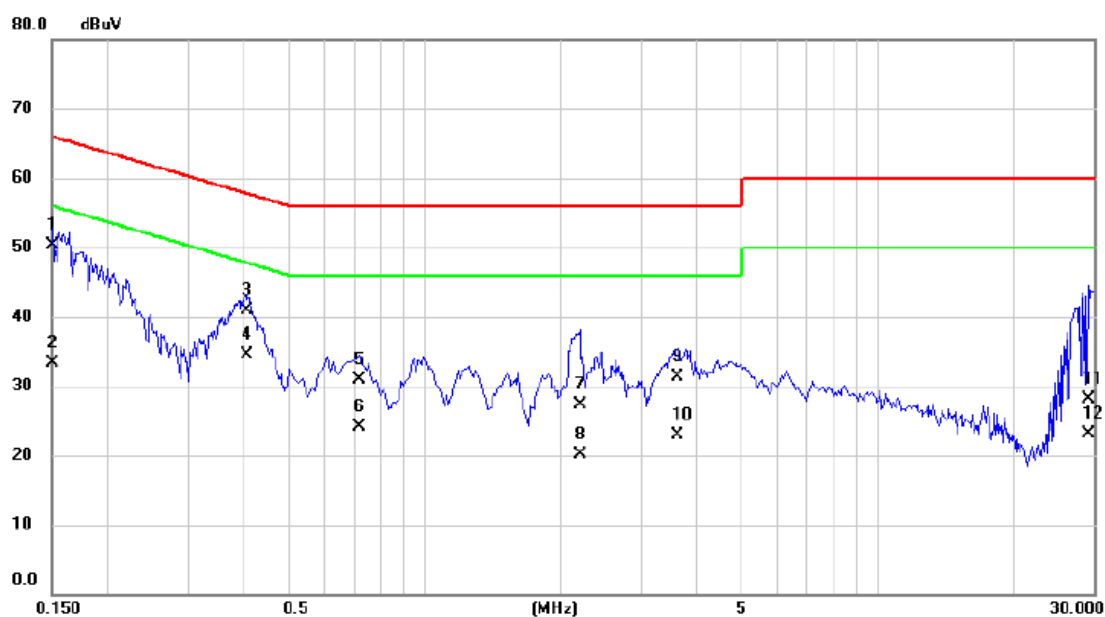
Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	40.60	9.64	50.24	66.00	-15.76	QP	
2		0.1500	23.60	9.64	33.24	56.00	-22.76	AVG	
3		0.4083	30.20	9.63	39.83	57.68	-17.85	QP	
4		0.4083	23.60	9.63	33.23	47.68	-14.45	AVG	
5		0.6170	19.10	9.63	28.73	56.00	-27.27	QP	
6		0.6170	12.50	9.63	22.13	46.00	-23.87	AVG	
7		2.4260	19.70	9.64	29.34	56.00	-26.66	QP	
8		2.4260	12.50	9.64	22.14	46.00	-23.86	AVG	
9		3.7490	21.90	9.66	31.56	56.00	-24.44	QP	
10		3.7490	13.50	9.66	23.16	46.00	-22.84	AVG	
11		29.5000	31.60	9.69	41.29	60.00	-18.71	QP	
12	*	29.5000	27.80	9.69	37.49	50.00	-12.51	AVG	

Test Mode: TX Mode

Neutral



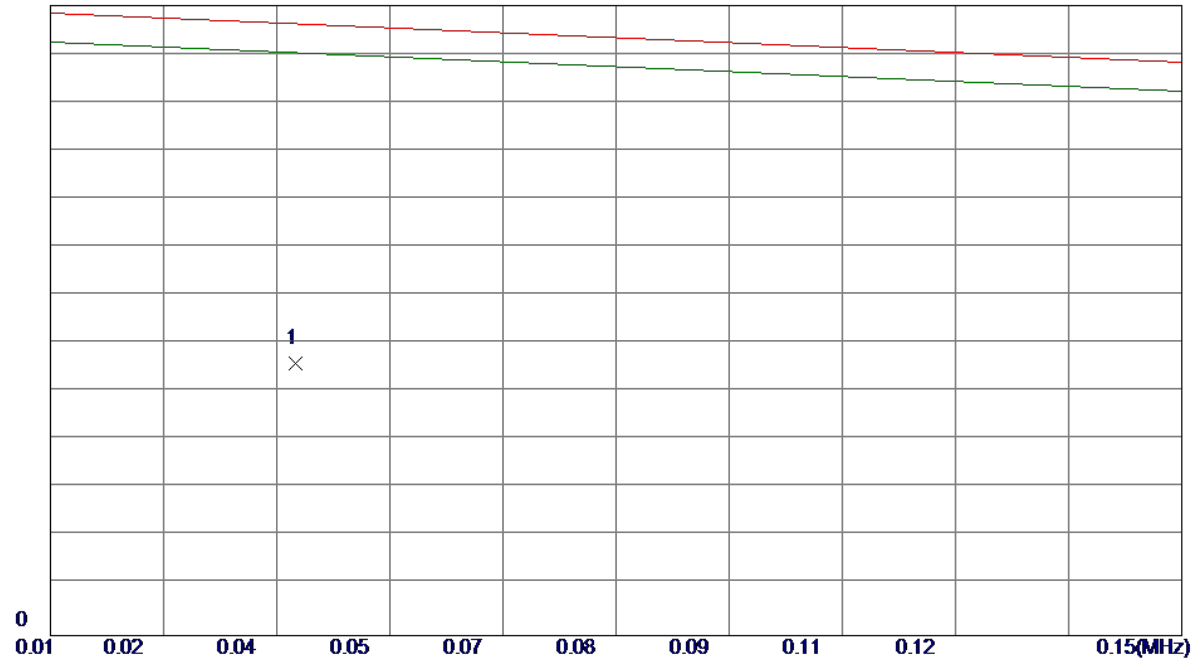
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.1500	40.60	9.65	50.25	66.00	-15.75	QP	
2		0.1500	23.60	9.65	33.25	56.00	-22.75	AVG	
3		0.4034	31.30	9.63	40.93	57.78	-16.85	QP	
4	*	0.4034	24.90	9.63	34.53	47.78	-13.25	AVG	
5		0.7160	21.30	9.64	30.94	56.00	-25.06	QP	
6		0.7160	14.40	9.64	24.04	46.00	-21.96	AVG	
7		2.2010	17.60	9.65	27.25	56.00	-28.75	QP	
8		2.2010	10.40	9.65	20.05	46.00	-25.95	AVG	
9		3.6140	21.70	9.66	31.36	56.00	-24.64	QP	
10		3.6140	13.20	9.66	22.86	46.00	-23.14	AVG	
11		29.2000	18.30	9.72	28.02	60.00	-31.98	QP	
12		29.2000	13.30	9.72	23.02	50.00	-26.98	AVG	

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

Test Mode:	TX Mode
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Ant 0°

130 dBuV/m

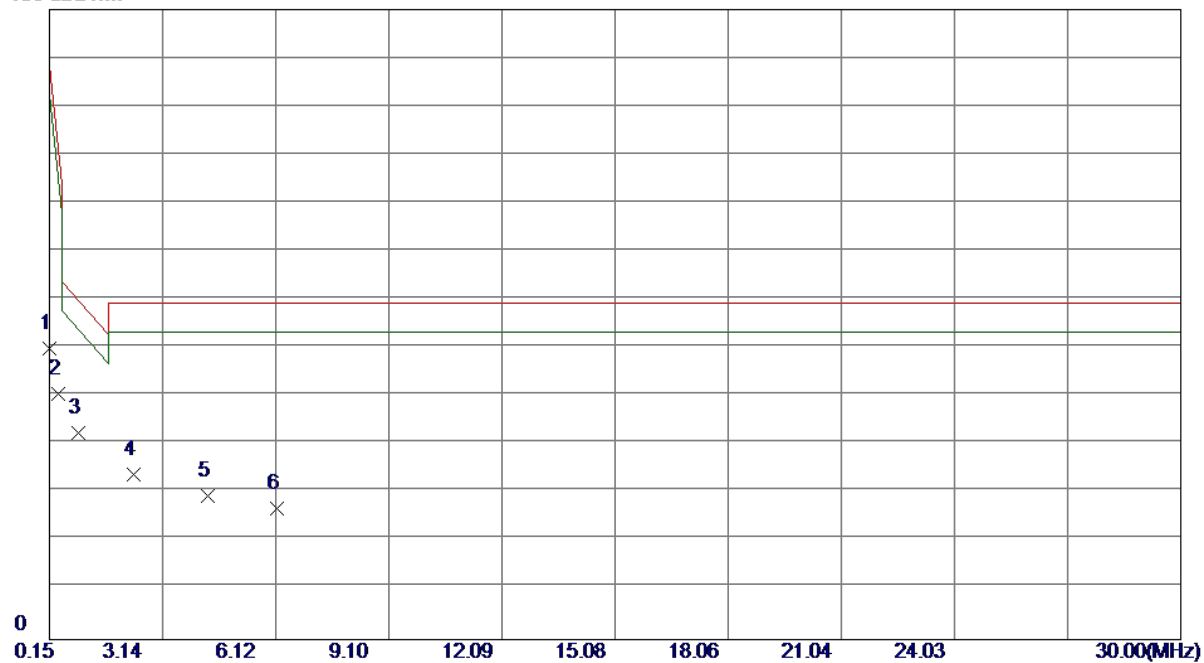


No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	0.0395	42.03	14.04	56.07	126.31	-70.24	Peak	

Test Mode: TX Mode

Ant 0°

130 dBuV/m

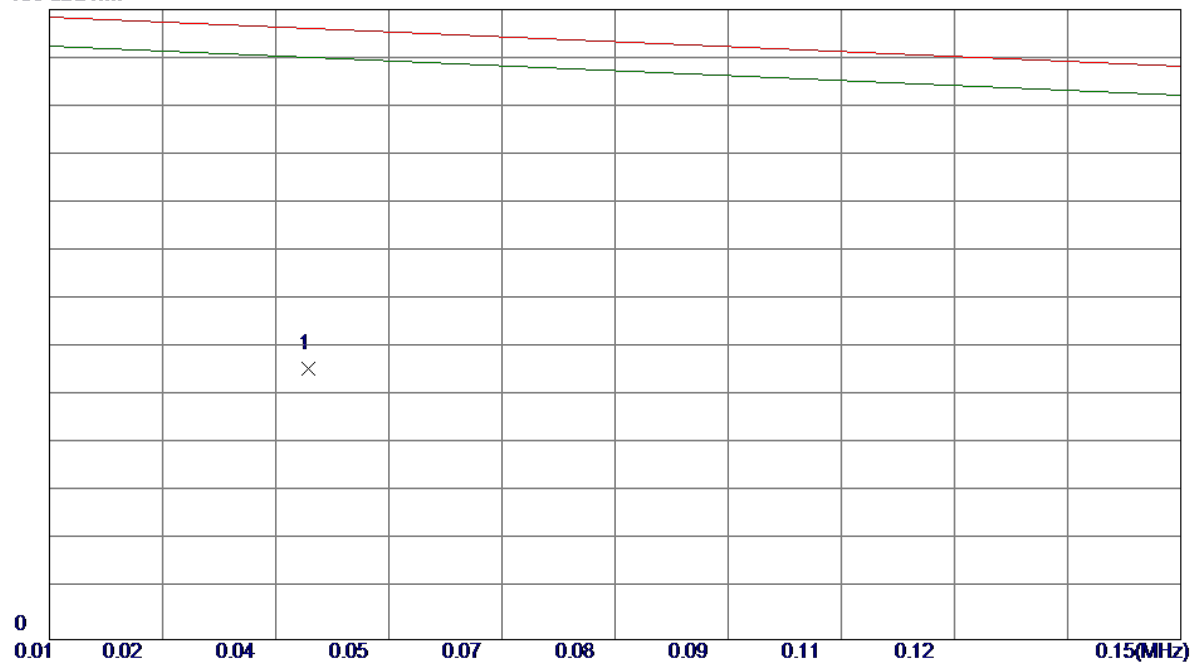


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	0.1500	47.94	12.02	59.96	118.33	-58.37	Peak	
2	0.3886	38.80	11.80	50.60	101.11	-50.51	Peak	
3 *	0.9261	30.79	11.97	42.76	69.91	-27.15	Peak	
4	2.3887	22.56	11.38	33.94	69.54	-35.60	Peak	
5	4.3290	18.38	11.30	29.68	69.54	-39.86	Peak	
6	6.1497	15.55	11.38	26.93	69.54	-42.61	Peak	

Test Mode: TX Mode

Ant 90°

130 dBuV/m

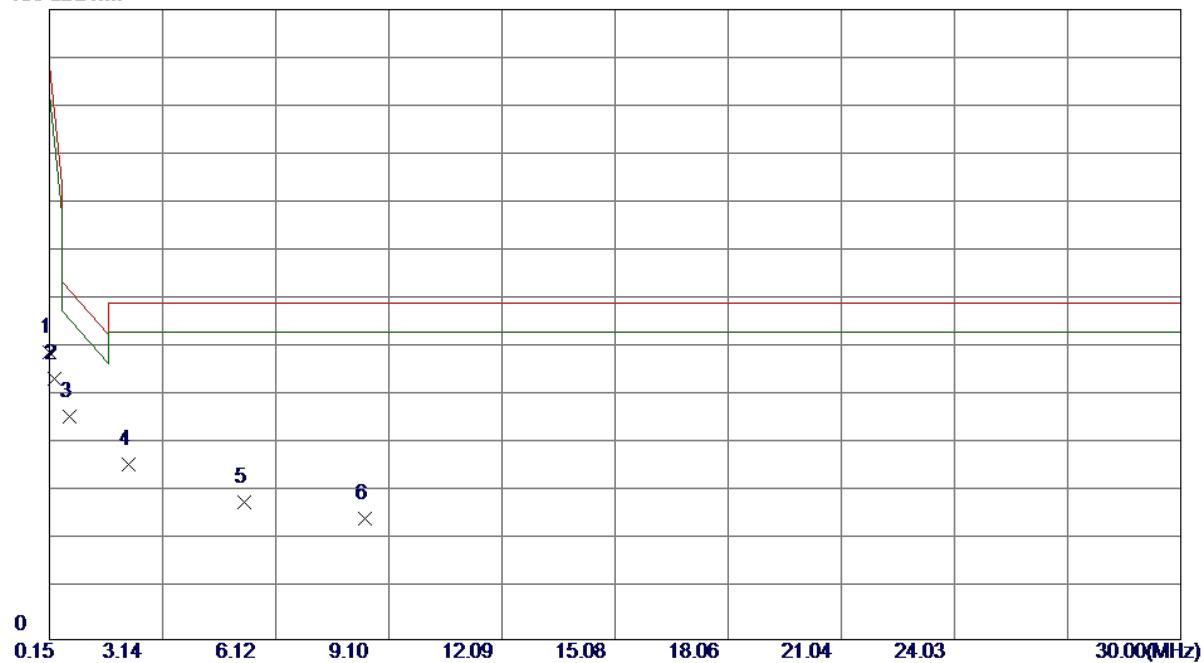


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.0413	42.09	13.87	55.96	126.18	-70.22	Peak	

Test Mode: TX Mode

Ant 90°

130 dBuV/m



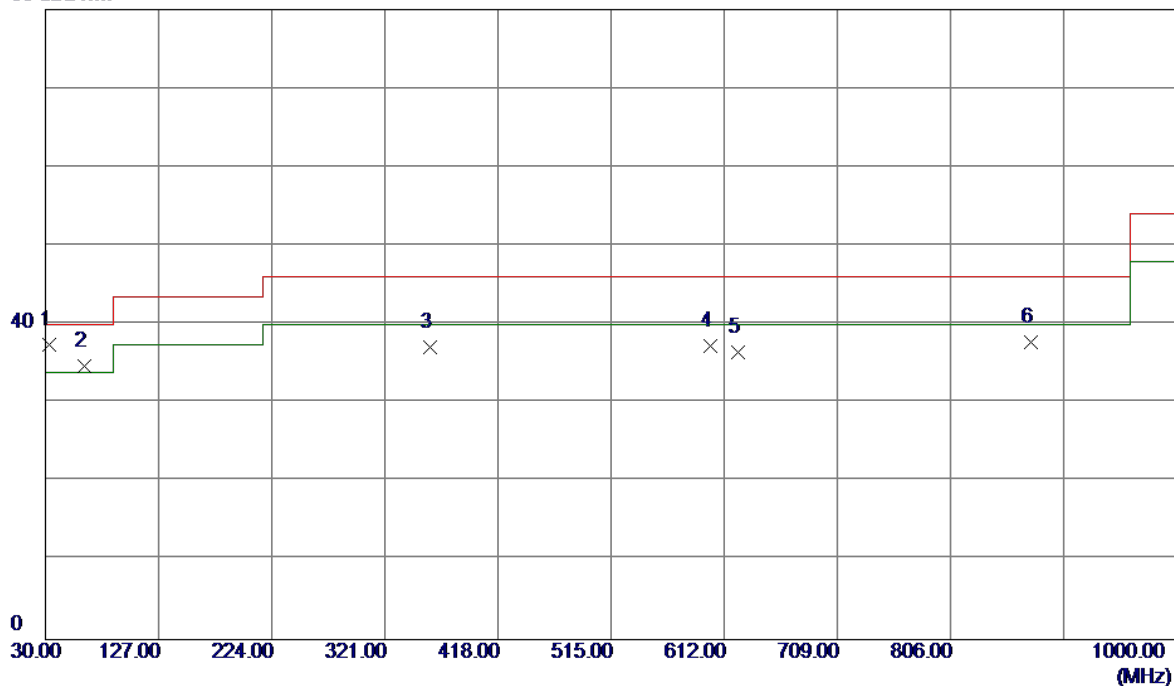
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	0.1500	47.17	12.02	59.19	118.33	-59.14	Peak	
2	0.2691	42.03	11.85	53.88	109.74	-55.86	Peak	
3 *	0.6873	34.17	11.87	46.04	72.04	-26.00	Peak	
4	2.2395	24.62	11.44	36.06	69.54	-33.48	Peak	
5	5.2842	16.97	11.39	28.36	69.54	-41.18	Peak	
6	8.4780	13.54	11.33	24.87	69.54	-44.67	Peak	

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

Test Mode: TX 2480MHz _CH78_1Mbps

Vertical

80 dBuV/m

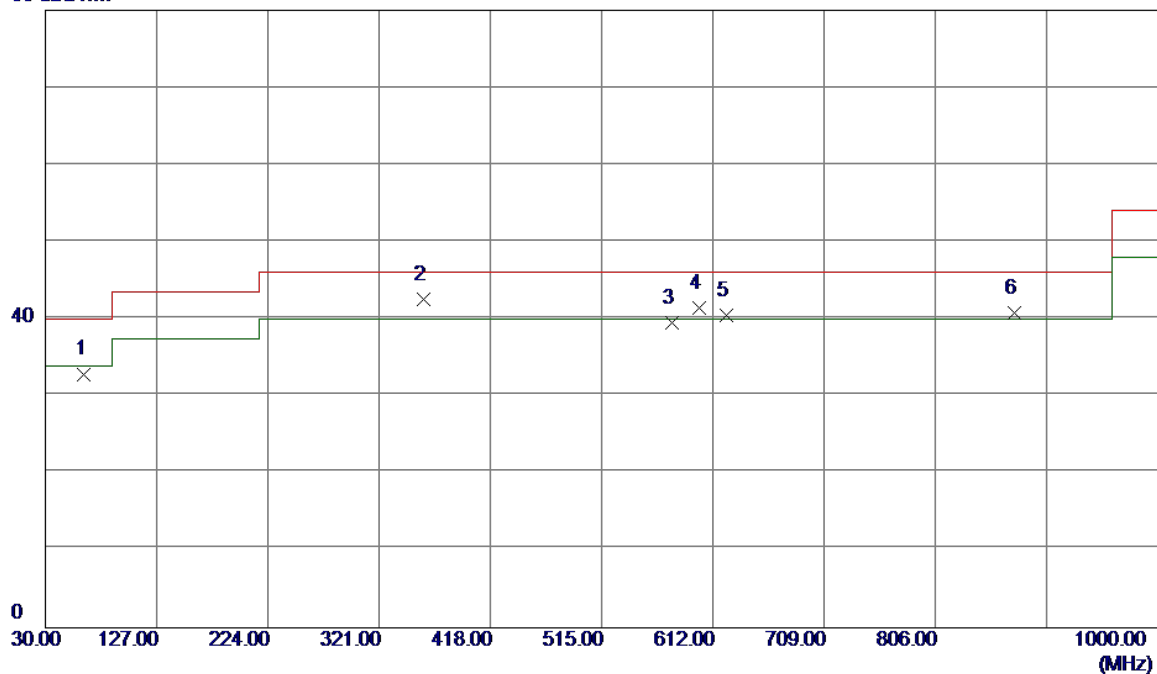


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	32.9100	46.47	-9.06	37.41	40.00	-2.59	Peak	
2	62.9800	44.18	-9.49	34.69	40.00	-5.31	Peak	
3	359.8000	43.21	-6.12	37.09	46.00	-8.91	Peak	
4	600.3600	37.94	-0.62	37.32	46.00	-8.68	Peak	
5	623.6400	36.89	-0.44	36.45	46.00	-9.55	Peak	
6	874.8700	34.19	3.62	37.81	46.00	-8.19	Peak	

Test Mode: TX 2480MHz _CH78_1Mbps

Horizontal

80 dBuV/m



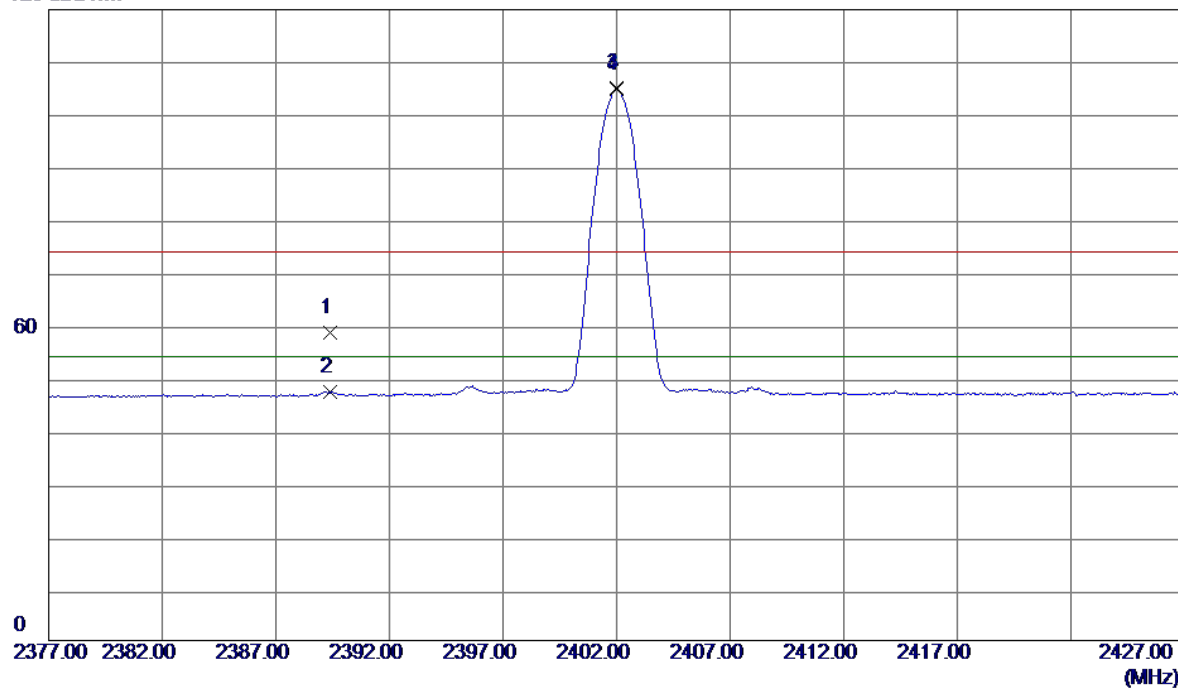
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	63.9500	42.53	-9.65	32.88	40.00	-7.12	Peak	
2 *	359.8000	48.71	-6.12	42.59	46.00	-3.41	Peak	
3	576.1100	40.75	-1.24	39.51	46.00	-6.49	Peak	
4	600.3600	42.01	-0.62	41.39	46.00	-4.61	Peak	
5	623.6400	40.89	-0.44	40.45	46.00	-5.55	Peak	
6	874.8700	37.12	3.62	40.74	46.00	-5.26	Peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Test Mode : TX 2402MHz _CH00_1Mbps

Vertical

120 dBuV/m

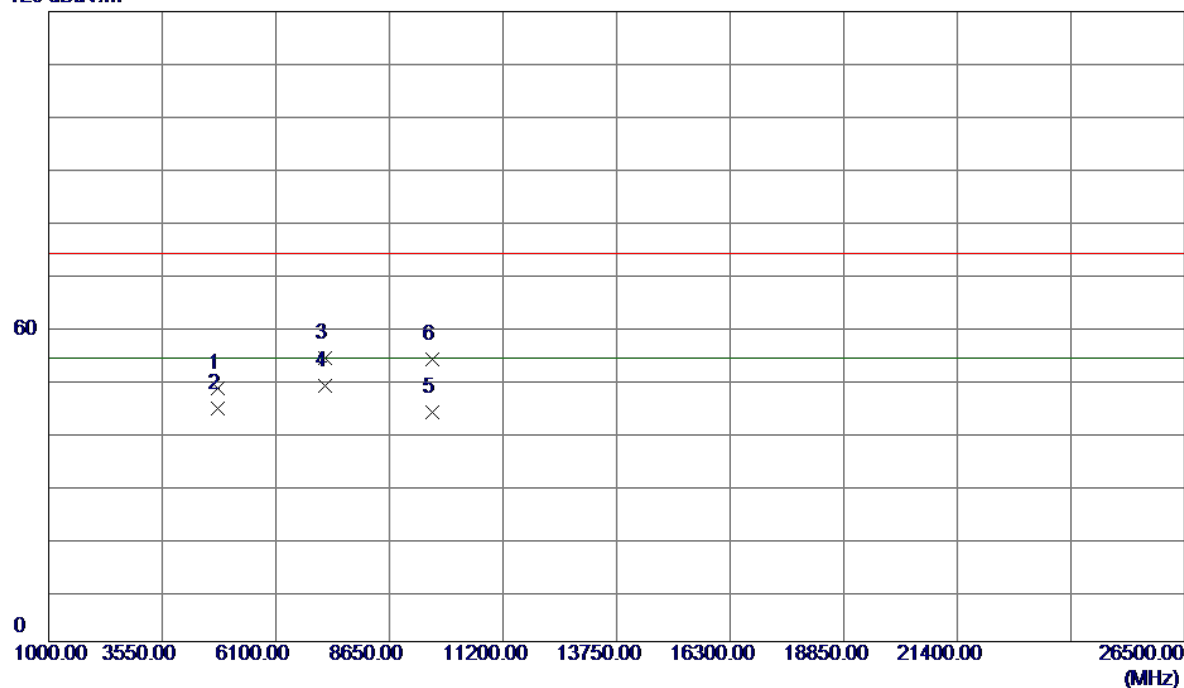


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2389.4020	27.69	30.96	58.65	74.00	-15.35	Peak	
2	2389.4020	16.38	30.96	47.34	54.00	-6.66	AVG	
3	2402.0000	73.99	31.01	105.00	74.00	31.00	Peak	
4 *	2402.0000	73.77	31.01	104.78	54.00	50.78	AVG	

Test Mode :	TX 2402MHz _CH00_1Mbps
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Vertical

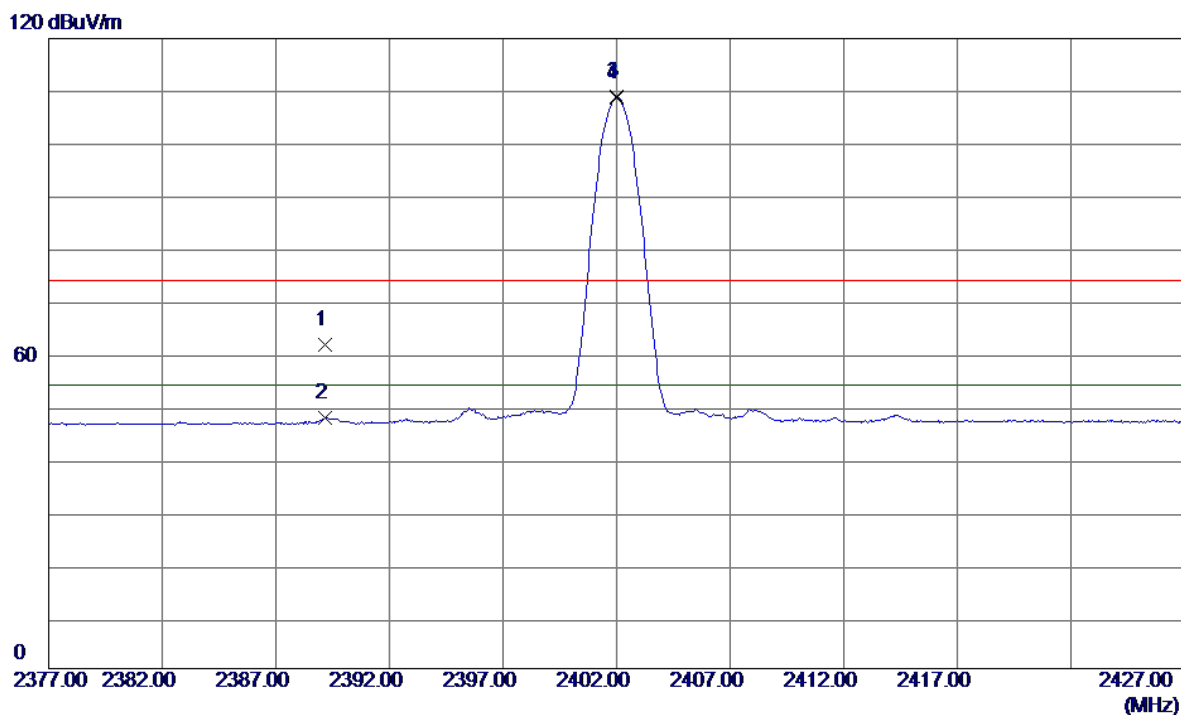
120 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4804.0000	59.73	-11.50	48.23	74.00	-25.77	Peak	
2	4804.0000	55.99	-11.50	44.49	54.00	-9.51	AVG	
3	7206.0000	59.36	-5.47	53.89	74.00	-20.11	Peak	
4	7206.0000	54.14	-5.47	48.67	54.00	-5.33	AVG	
5	9608.0000	42.89	0.69	43.58	54.00	-10.42	AVG	
6 *	9608.0000	53.00	0.69	53.69	54.00	-0.31	AVG	

Test Mode :	TX 2402MHz _CH00_1Mbps
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Horizontal

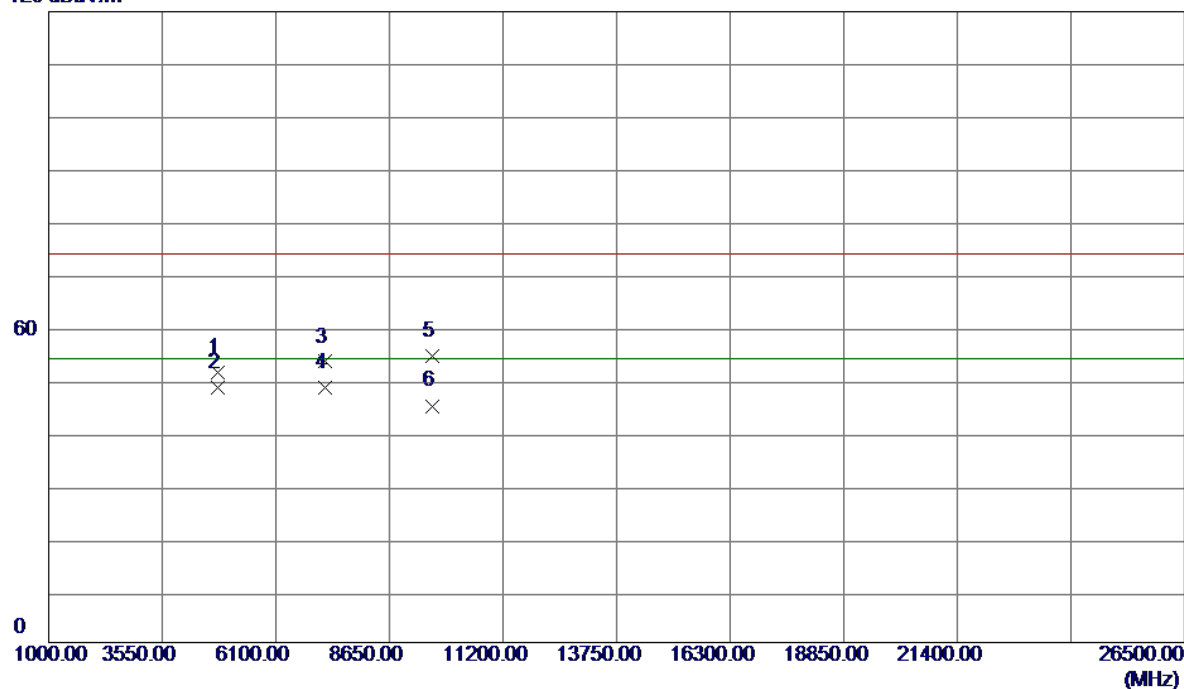


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2389.1550	30.69	30.96	61.65	74.00	-12.35	Peak	
2	2389.1550	16.91	30.96	47.87	54.00	-6.13	AVG	
3	2402.0000	77.97	31.01	108.98	74.00	34.98	Peak	
4 *	2402.0000	77.77	31.01	108.78	54.00	54.78	AVG	

Test Mode :	TX 2402MHz _CH00_1Mbps
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Horizontal

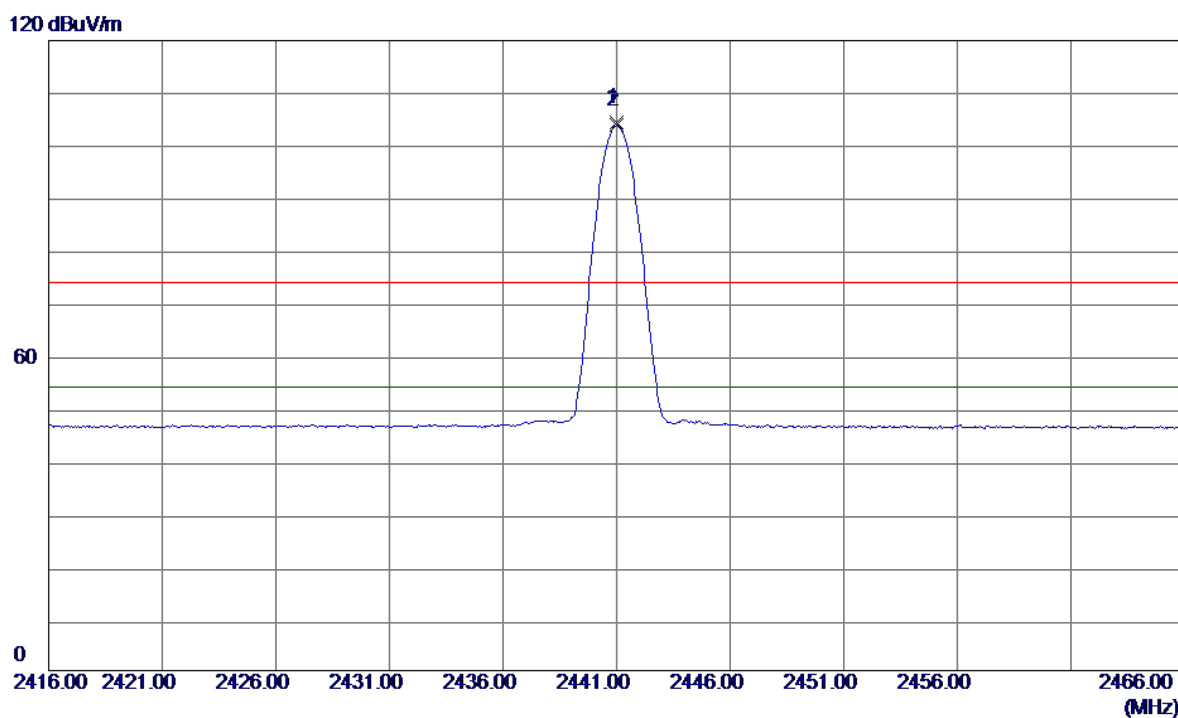
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4804.0000	62.95	-11.50	51.45	74.00	-22.55	Peak	
2	4804.0000	59.95	-11.50	48.45	54.00	-5.55	AVG	
3	7206.0000	58.87	-5.47	53.40	74.00	-20.60	Peak	
4 *	7206.0000	53.95	-5.47	48.48	54.00	-5.52	AVG	
5	9608.0000	53.83	0.69	54.52	74.00	-19.48	Peak	
6	9608.0000	44.31	0.69	45.00	54.00	-9.00	AVG	

Test Mode : TX 2441MHz _CH39_1Mbps

Vertical

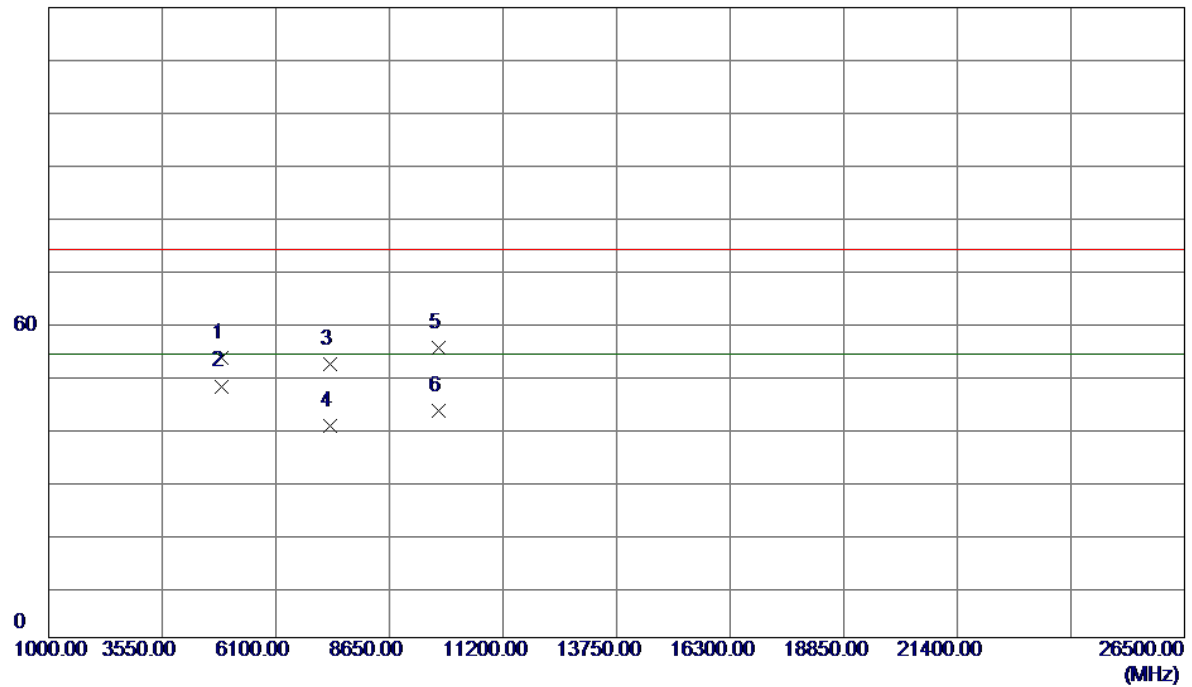


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	73.26	31.15	104.41	74.00	30.41	Peak	
2 *	2441.0000	72.69	31.15	103.84	54.00	49.84	AVG	

Test Mode : TX 2441MHz _CH39_1Mbps

Vertical

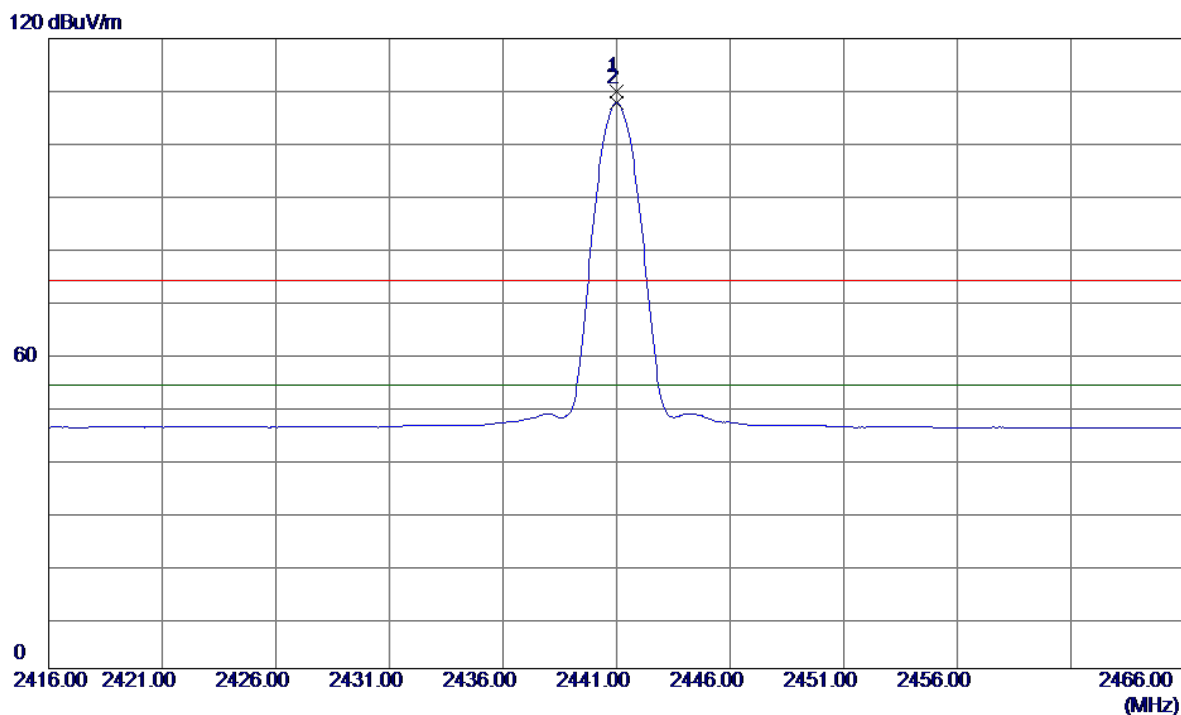
120 dBuV/m



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4882.0000	64.77	-11.38	53.39	74.00	-20.61	Peak	
2 *	4882.0000	59.26	-11.38	47.88	54.00	-6.12	AVG	
3	7323.0000	57.01	-5.03	51.98	74.00	-22.02	Peak	
4	7323.0000	45.30	-5.03	40.27	54.00	-13.73	AVG	
5	9764.0000	54.03	1.15	55.18	74.00	-18.82	Peak	
6	9764.0000	42.15	1.15	43.30	54.00	-10.70	AVG	

Test Mode :	TX 2441MHz _CH39_1Mbps
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Horizontal

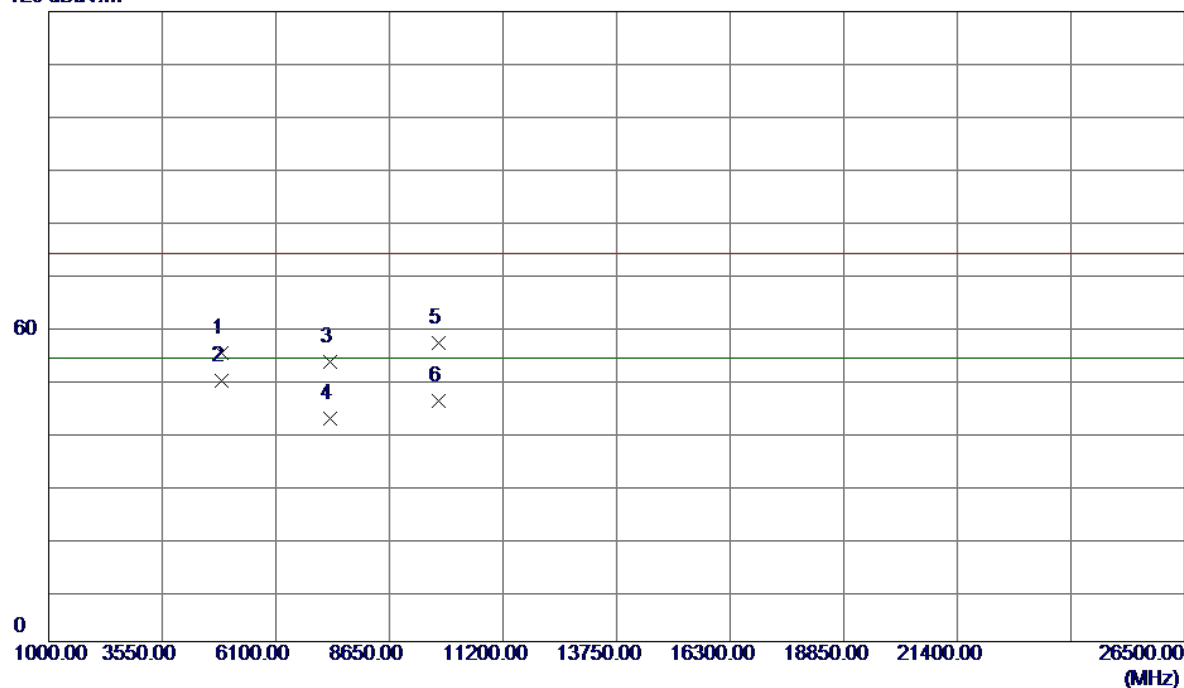


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	78.83	31.15	109.98	74.00	35.98	Peak	
2 *	2441.0000	76.57	31.15	107.72	54.00	53.72	AVG	

Test Mode :	TX 2441MHz _CH39_1Mbps
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Horizontal

120 dBuV/m

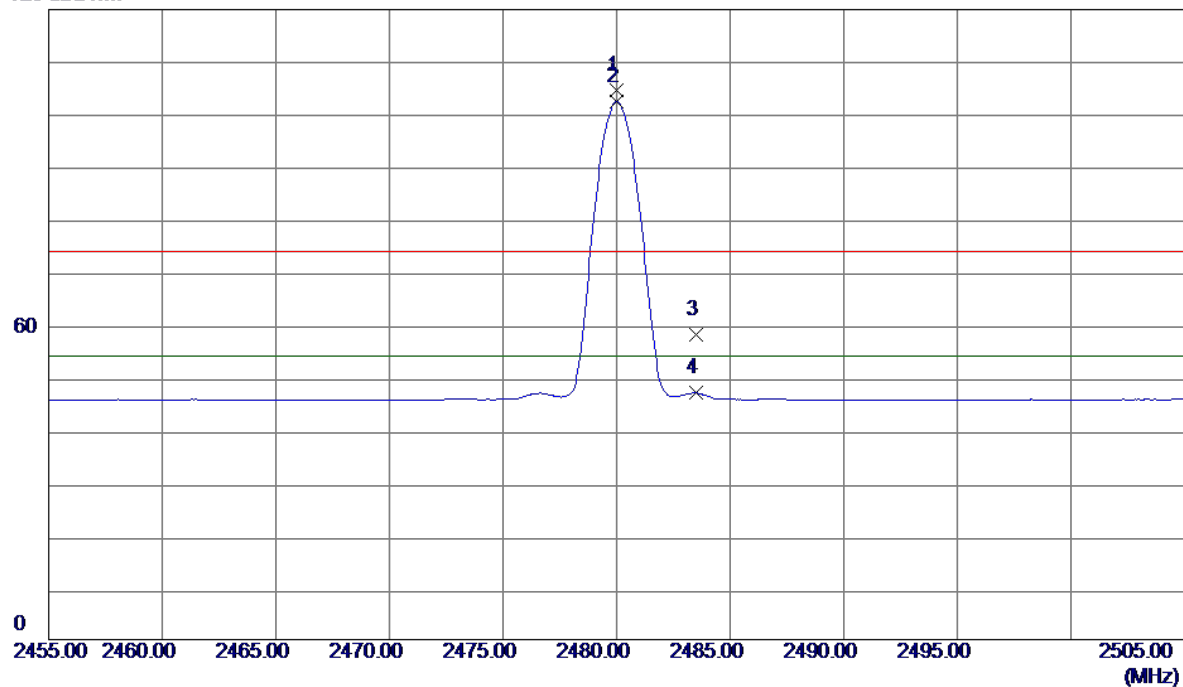


No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4882.0000	66.23	-11.38	54.85	74.00	-19.15	Peak	
2 *	4882.0000	61.15	-11.38	49.77	54.00	-4.23	AVG	
3	7323.0000	58.37	-5.03	53.34	74.00	-20.66	Peak	
4	7323.0000	47.53	-5.03	42.50	54.00	-11.50	AVG	
5	9764.0000	55.70	1.15	56.85	74.00	-17.15	Peak	
6	9764.0000	44.70	1.15	45.85	54.00	-8.15	AVG	

Test Mode : TX 2480MHz _CH78_1Mbps

Vertical

120 dBuV/m

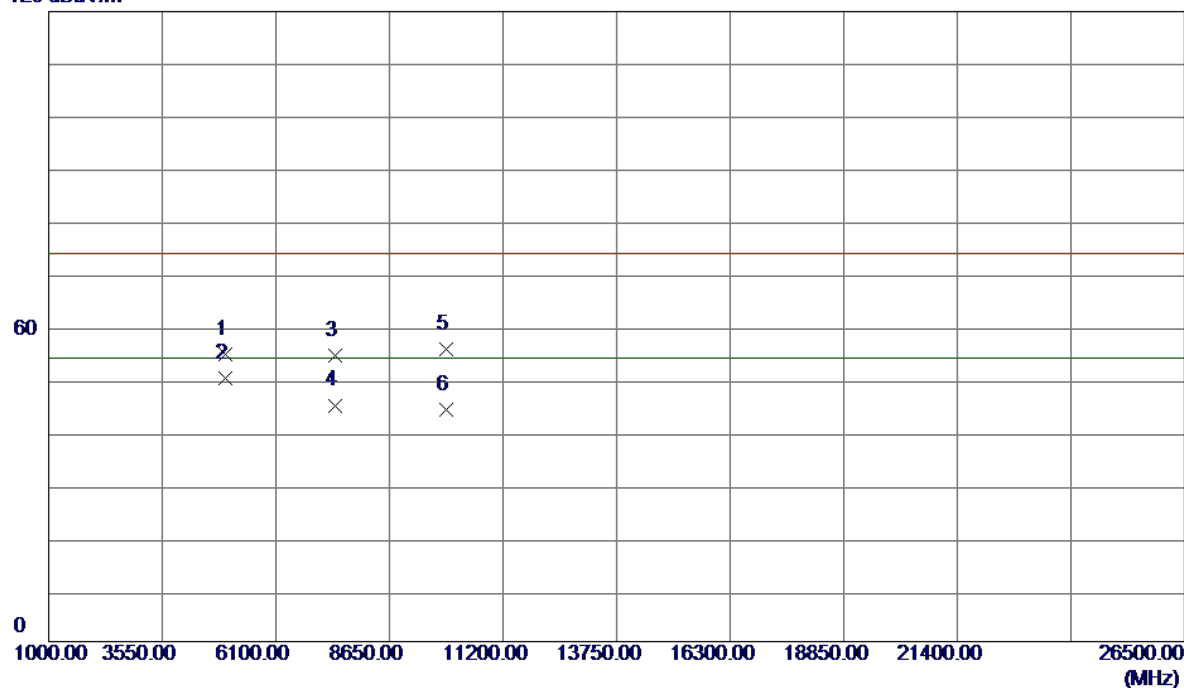


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2480.0000	73.38	31.30	104.68	74.00	30.68	Peak	
2 *	2480.0000	71.11	31.30	102.41	54.00	48.41	AVG	
3	2483.5000	26.82	31.31	58.13	74.00	-15.87	Peak	
4	2483.5000	15.65	31.31	46.96	54.00	-7.04	AVG	

Test Mode :	TX 2480MHz _CH78_1Mbps
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Vertical

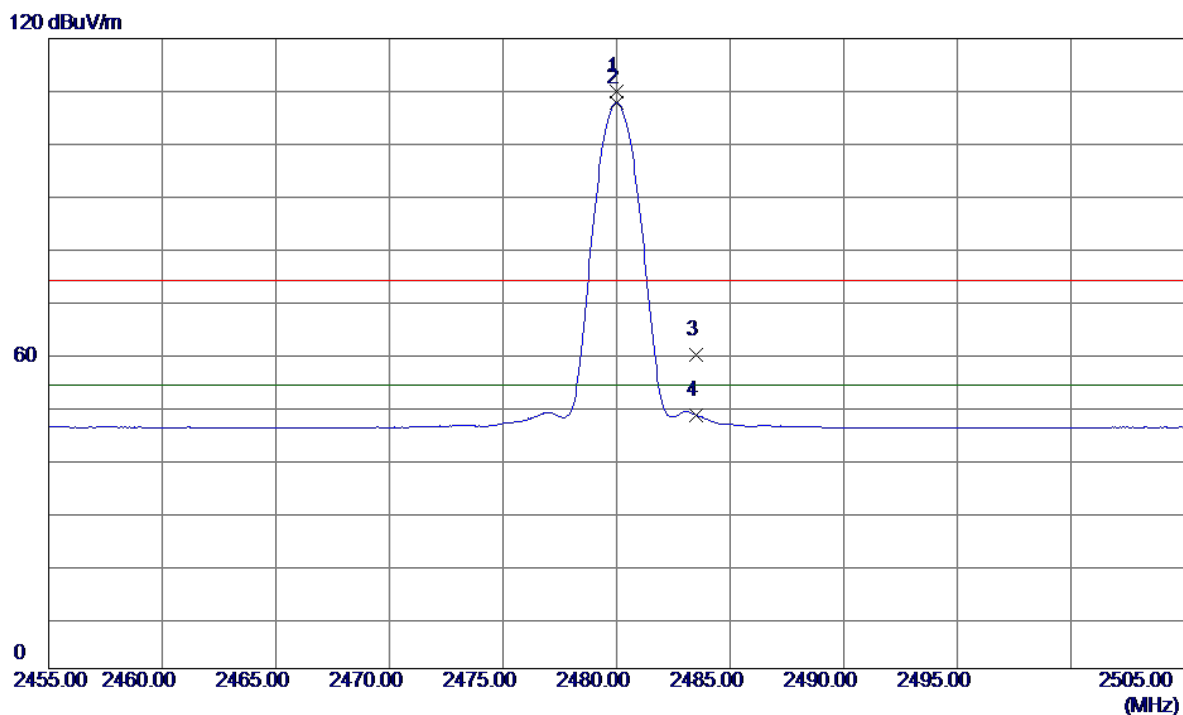
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4960.0000	65.87	-11.26	54.61	74.00	-19.39	Peak	
2 *	4960.0000	61.40	-11.26	50.14	54.00	-3.86	AVG	
3	7440.0000	59.06	-4.59	54.47	74.00	-19.53	Peak	
4	7440.0000	49.59	-4.59	45.00	54.00	-9.00	AVG	
5	9920.0000	54.16	1.60	55.76	74.00	-18.24	Peak	
6	9920.0000	42.53	1.60	44.13	54.00	-9.87	AVG	

Test Mode : TX 2480MHz _CH78_1Mbps

Horizontal

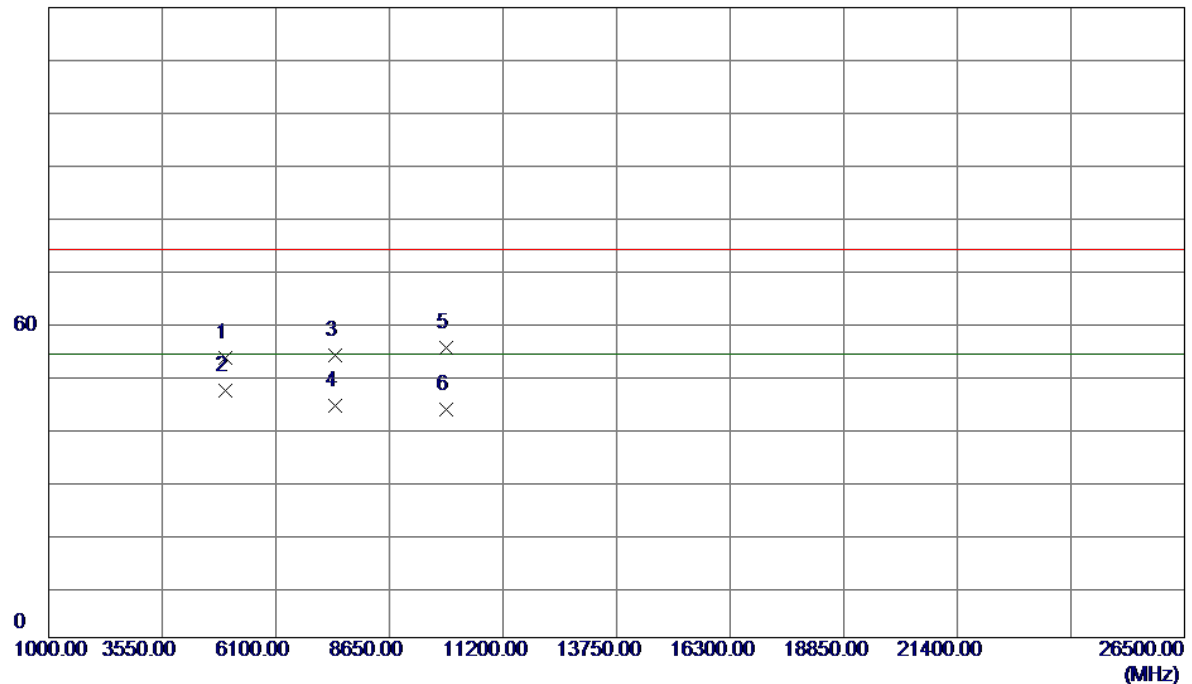


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2480.0000	78.71	31.30	110.01	74.00	36.01	Peak	
2 *	2480.0000	76.46	31.30	107.76	54.00	53.76	AVG	
3	2483.5000	28.42	31.31	59.73	74.00	-14.27	Peak	
4	2483.5000	16.89	31.31	48.20	54.00	-5.80	AVG	

Test Mode : TX 2480MHz _CH78_1Mbps

Horizontal

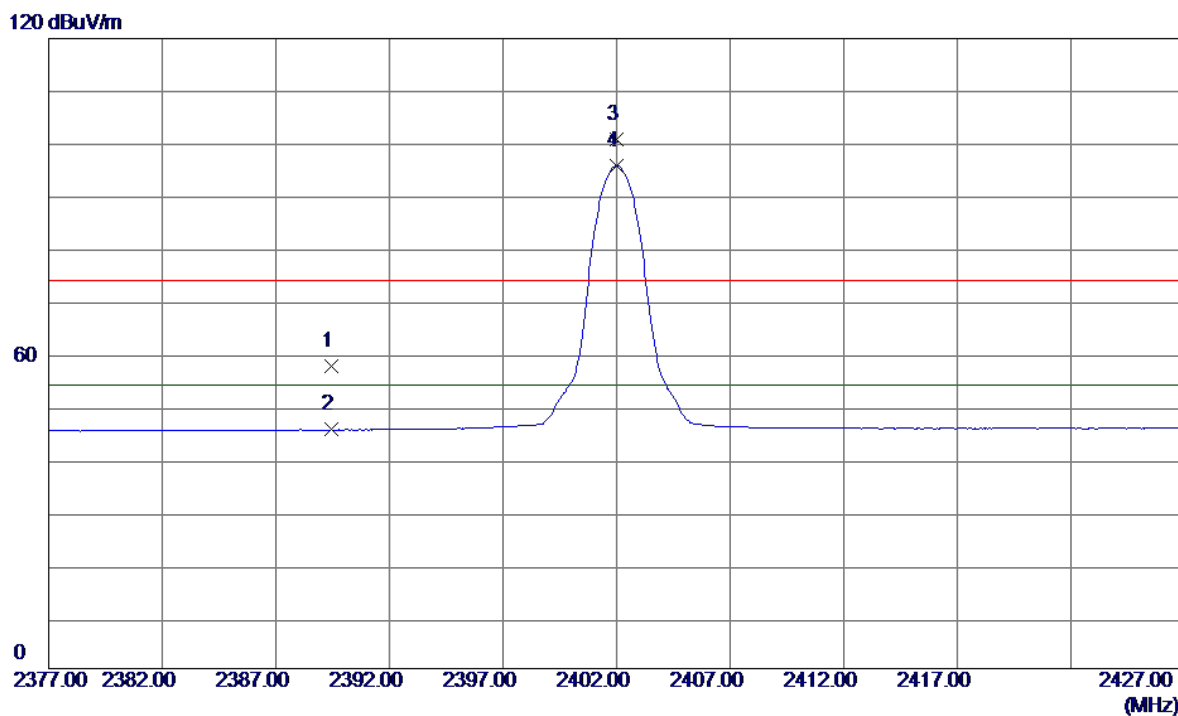
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4960.0000	64.54	-11.26	53.28	74.00	-20.72	Peak	
2 *	4960.0000	58.34	-11.26	47.08	54.00	-6.92	AVG	
3	7440.0000	58.34	-4.59	53.75	74.00	-20.25	Peak	
4	7440.0000	48.64	-4.59	44.05	54.00	-9.95	AVG	
5	9920.0000	53.65	1.60	55.25	74.00	-18.75	Peak	
6	9920.0000	41.81	1.60	43.41	54.00	-10.59	AVG	

Test Mode : TX 2402MHz _CH00_3Mbps

Vertical

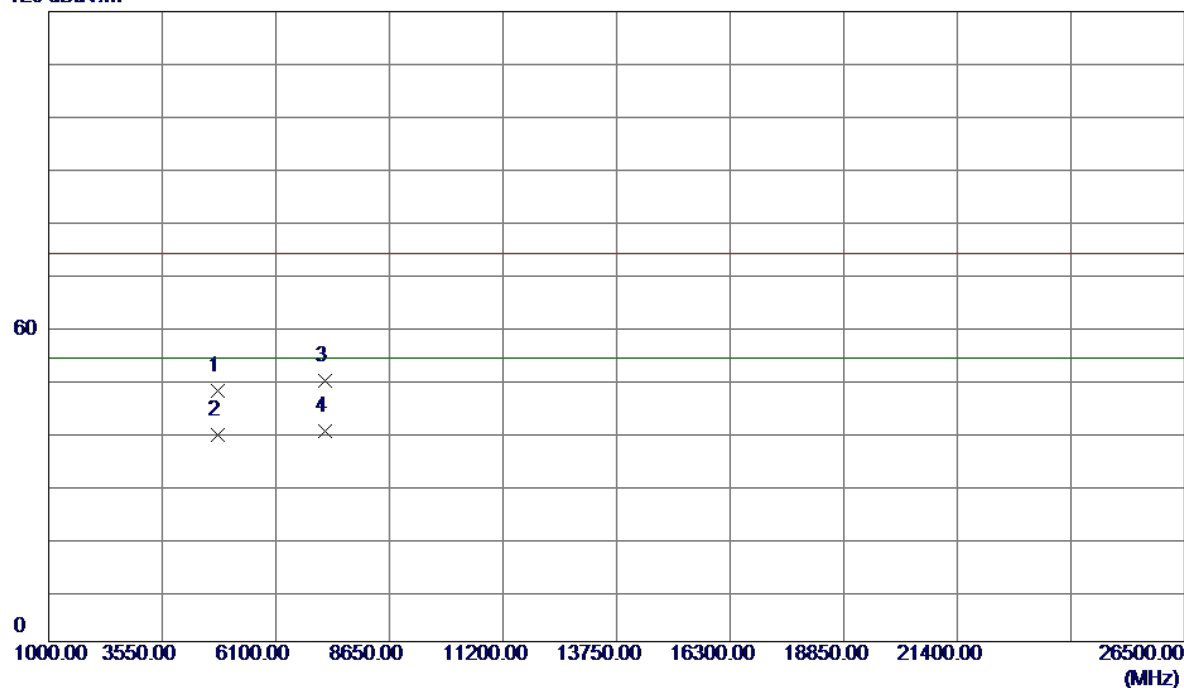


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2389.4500	26.59	30.96	57.55	74.00	-16.45	Peak	
2	2389.4500	14.55	30.96	45.51	54.00	-8.49	AVG	
3	2402.0000	69.74	31.01	100.75	74.00	26.75	Peak	
4 *	2402.0000	64.72	31.01	95.73	54.00	41.73	AVG	

Test Mode :	TX 2402MHz _CH00_3Mbps
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Vertical

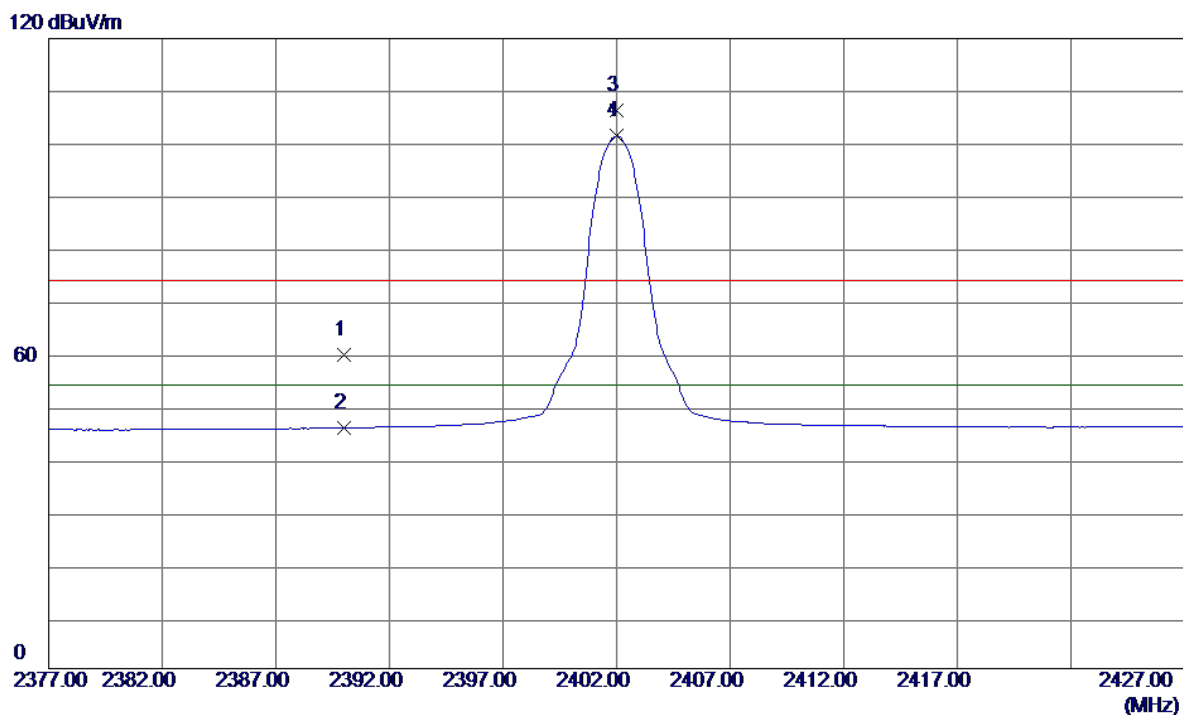
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4804.0000	59.33	-11.50	47.83	74.00	-26.17	Peak	
2	4804.0000	50.77	-11.50	39.27	54.00	-14.73	AVG	
3	7206.0000	55.17	-5.47	49.70	74.00	-24.30	Peak	
4 *	7206.0000	45.56	-5.47	40.09	54.00	-13.91	AVG	

Test Mode : TX 2402MHz _CH00_3Mbps

Horizontal

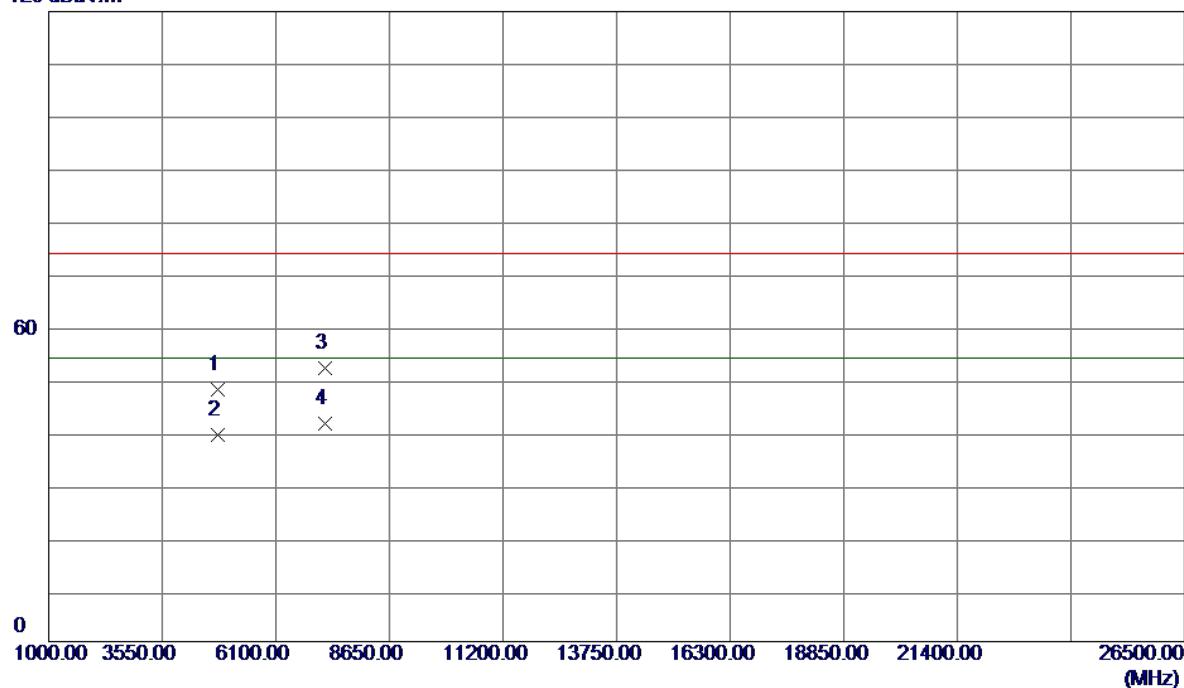


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	28.78	30.97	59.75	74.00	-14.25	Peak	
2	2390.0000	14.89	30.97	45.86	54.00	-8.14	AVG	
3	2402.0000	75.42	31.01	106.43	74.00	32.43	Peak	
4 *	2402.0000	70.41	31.01	101.42	54.00	47.42	AVG	

Test Mode : TX 2402MHz _CH00_3Mbps

Horizontal

120 dBuV/m

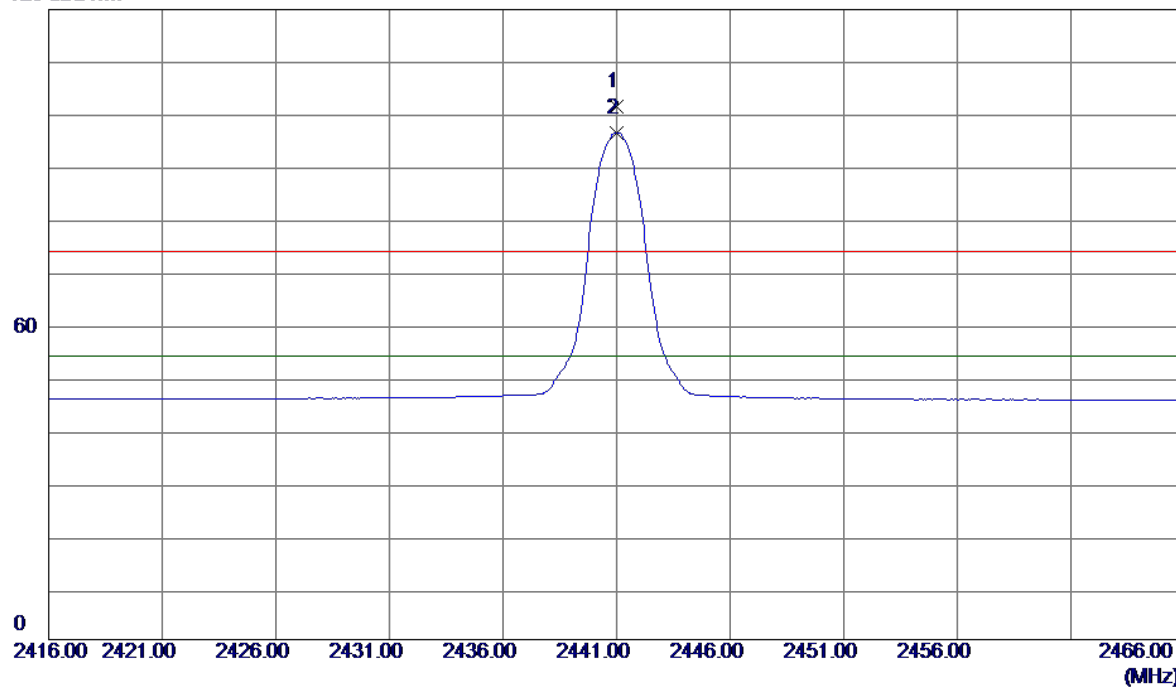


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin	Detector	Comment
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		
1	4804.0000	59.40	-11.50	47.90	74.00	-26.10	Peak	
2	4804.0000	50.97	-11.50	39.47	54.00	-14.53	AVG	
3	7206.0000	57.47	-5.47	52.00	74.00	-22.00	Peak	
4 *	7206.0000	47.09	-5.47	41.62	54.00	-12.38	AVG	

Test Mode : TX 2441MHz _CH39_3Mbps

Vertical

120 dBuV/m

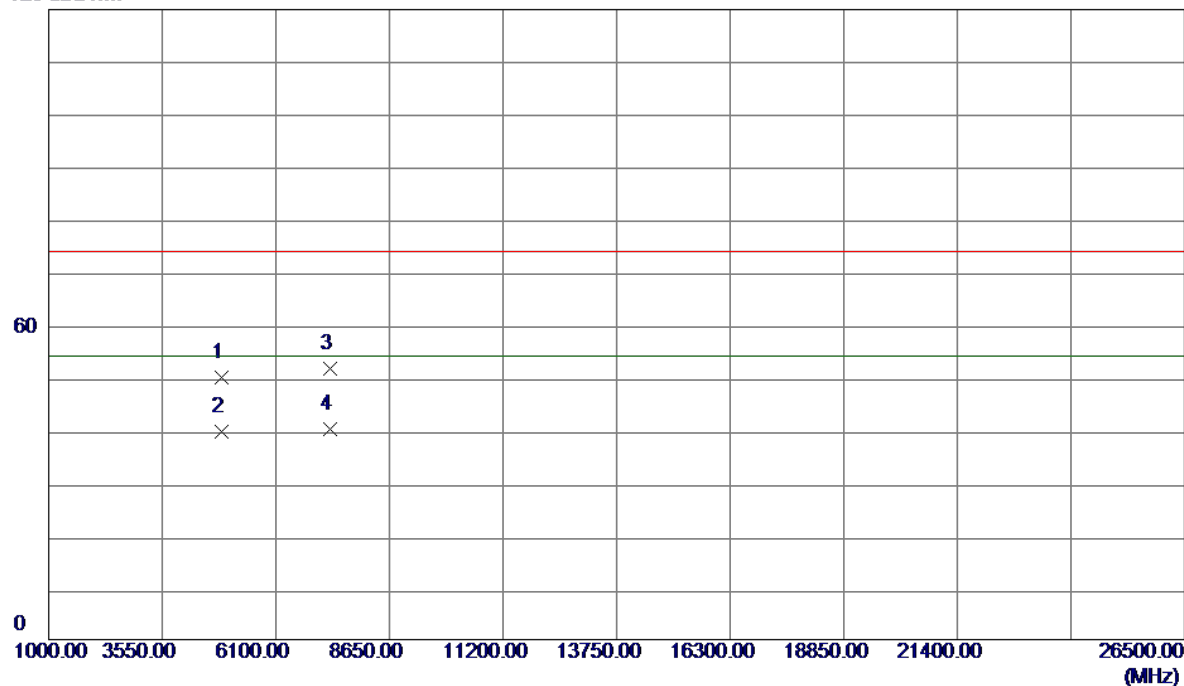


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	70.44	31.15	101.59	74.00	27.59	Peak	
2 *	2441.0000	65.40	31.15	96.55	54.00	42.55	AVG	

Test Mode : TX 2441MHz _CH39_3Mbps

Vertical

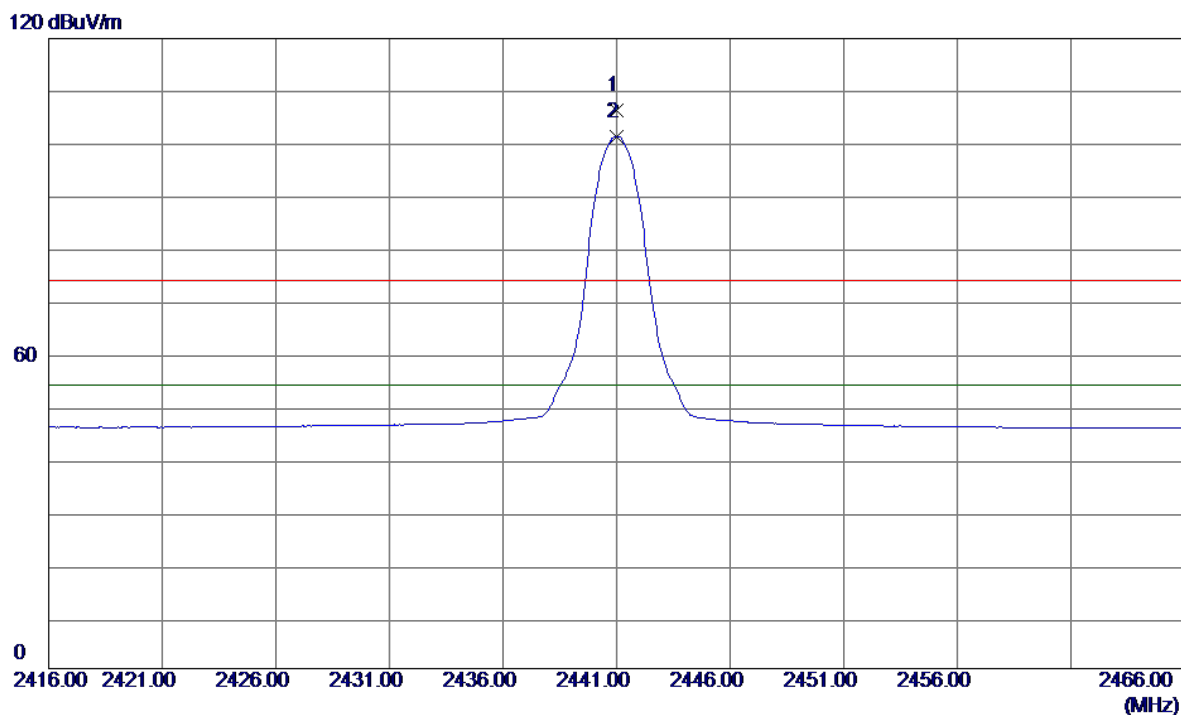
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4882.0000	61.39	-11.38	50.01	74.00	-23.99	Peak	
2	4882.0000	50.96	-11.38	39.58	54.00	-14.42	AVG	
3	7323.0000	56.70	-5.03	51.67	74.00	-22.33	Peak	
4 *	7323.0000	45.00	-5.03	39.97	54.00	-14.03	AVG	

Test Mode :	TX 2441MHz _CH39_3Mbps
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Horizontal

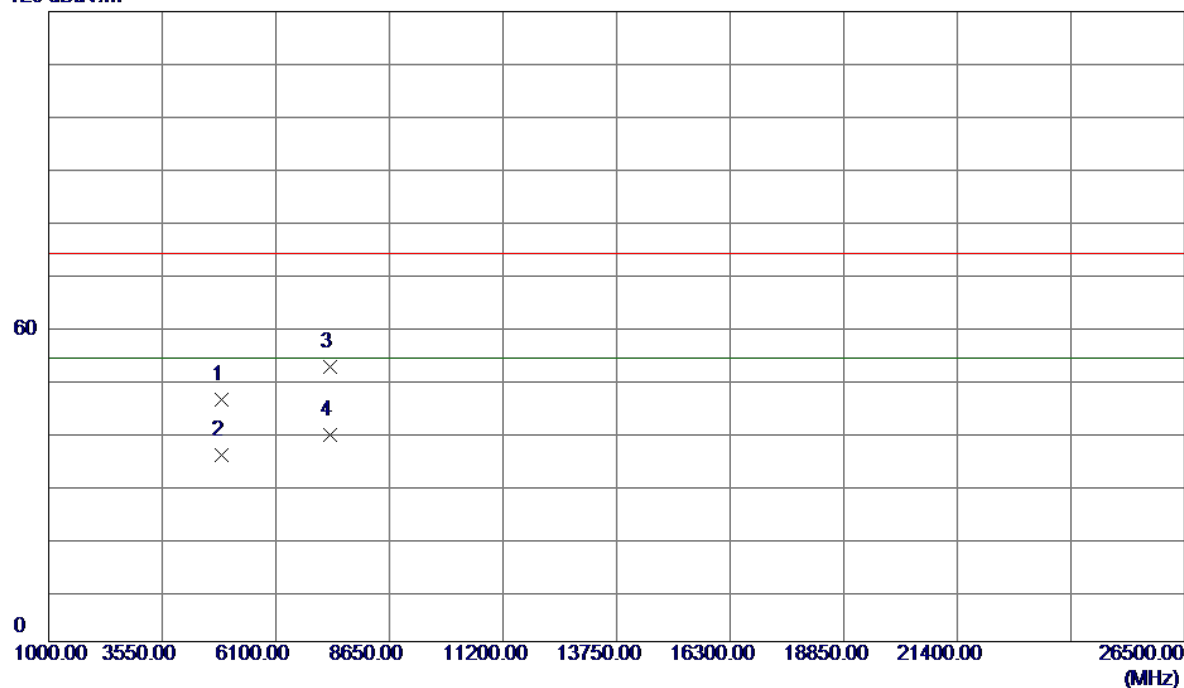


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2441.0000	75.27	31.15	106.42	74.00	32.42	Peak	
2 *	2441.0000	70.24	31.15	101.39	54.00	47.39	AVG	

Test Mode :	TX 2441MHz _CH39_3Mbps
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Horizontal

120 dBuV/m

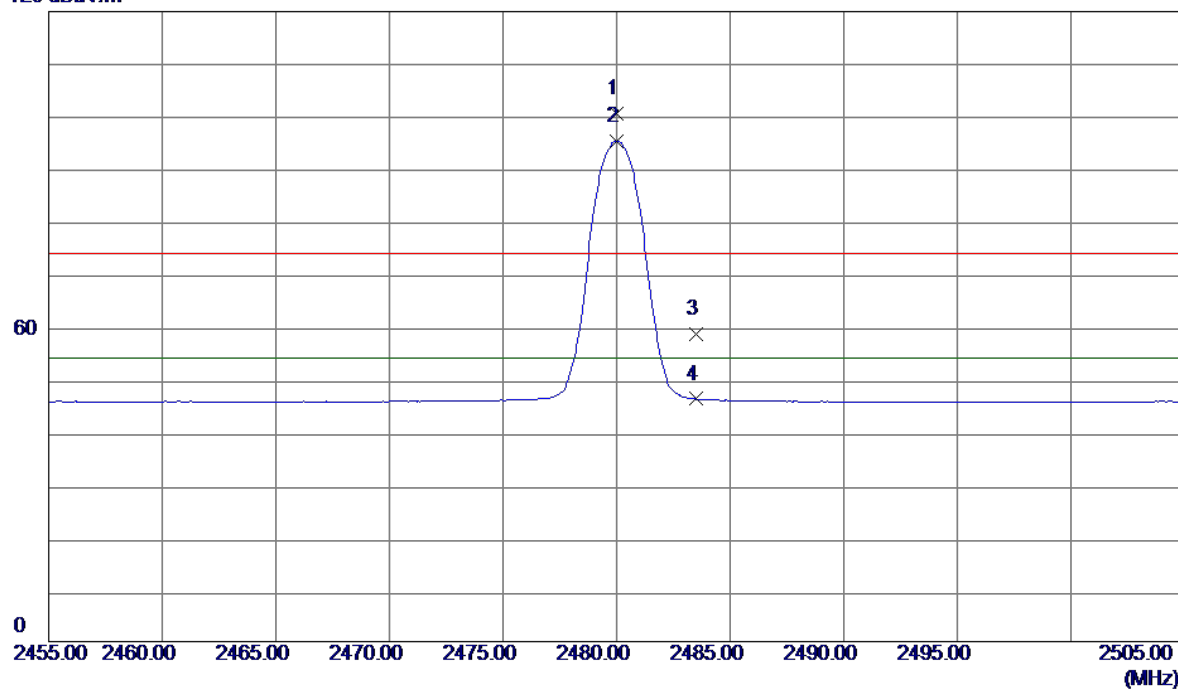


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4882.0000	57.42	-11.38	46.04	74.00	-27.96	Peak	
2	4882.0000	46.97	-11.38	35.59	54.00	-18.41	AVG	
3	7323.0000	57.45	-5.03	52.42	74.00	-21.58	Peak	
4 *	7323.0000	44.46	-5.03	39.43	54.00	-14.57	AVG	

Test Mode : TX 2480MHz _CH78_3Mbps

Vertical

120 dBuV/m

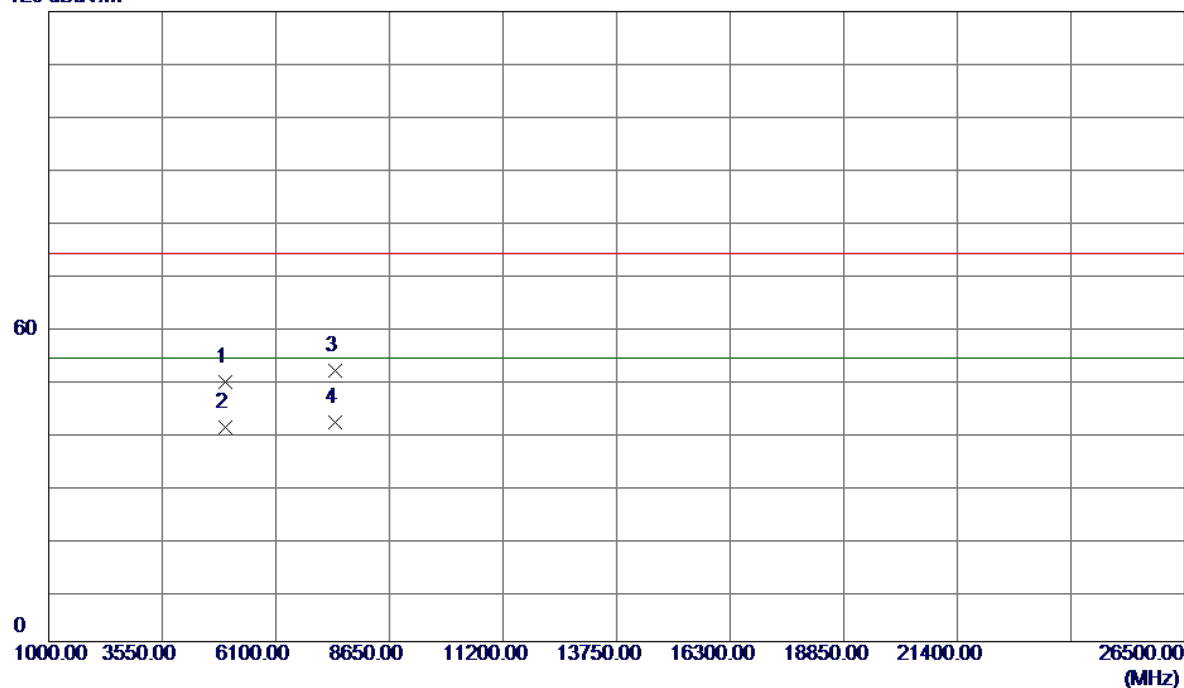


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2480.0000	69.18	31.30	100.48	74.00	26.48	Peak	
2 *	2480.0000	64.05	31.30	95.35	54.00	41.35	AVG	
3	2483.5000	27.19	31.31	58.50	74.00	-15.50	Peak	
4	2483.5000	14.89	31.31	46.20	54.00	-7.80	AVG	

Test Mode :	TX 2480MHz _CH78_3Mbps
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Vertical

120 dBuV/m

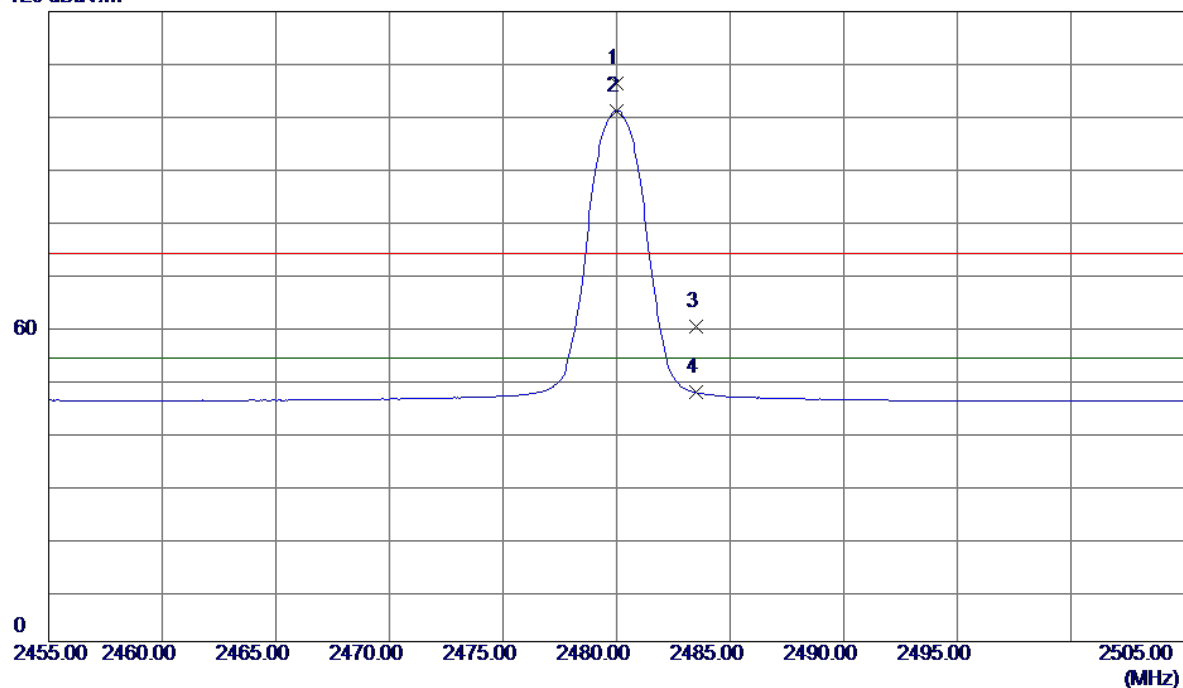


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4960.0000	60.72	-11.26	49.46	74.00	-24.54	Peak	
2	4960.0000	52.03	-11.26	40.77	54.00	-13.23	AVG	
3	7440.0000	56.18	-4.59	51.59	74.00	-22.41	Peak	
4 *	7440.0000	46.35	-4.59	41.76	54.00	-12.24	AVG	

Test Mode : TX 2480MHz _CH78_3Mbps

Horizontal

120 dBuV/m

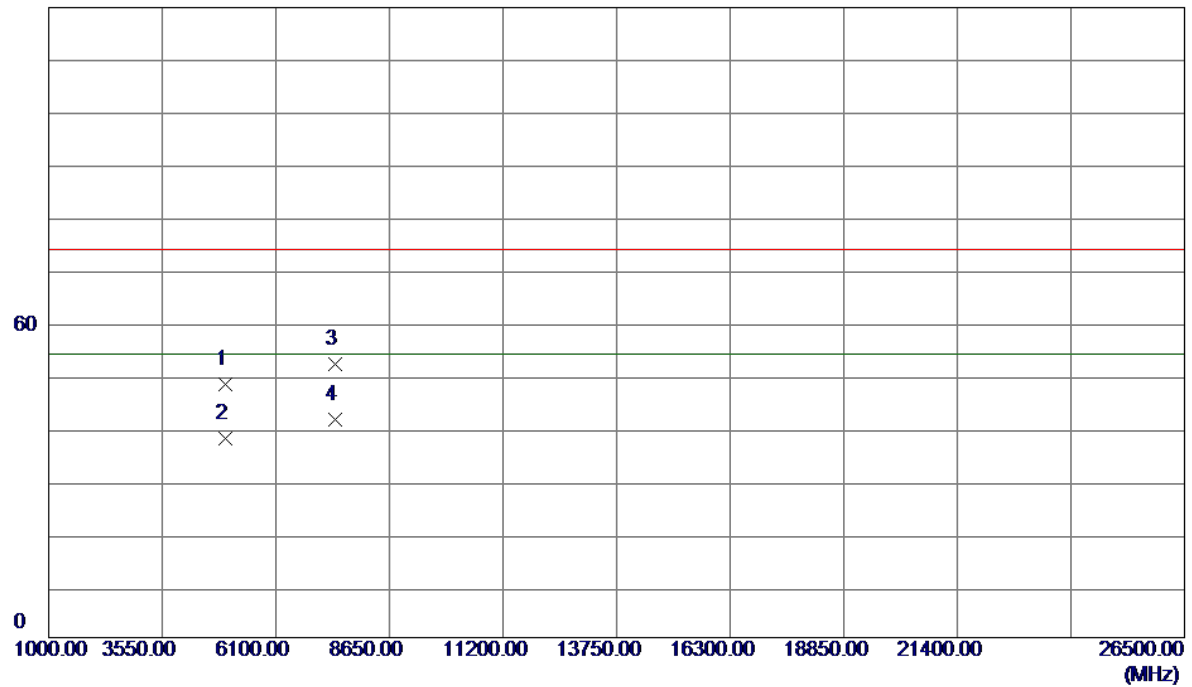


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2480.0000	74.98	31.30	106.28	74.00	32.28	Peak	
2 *	2480.0000	69.80	31.30	101.10	54.00	47.10	AVG	
3	2483.5000	28.79	31.31	60.10	74.00	-13.90	Peak	
4	2483.5000	16.18	31.31	47.49	54.00	-6.51	AVG	

Test Mode : TX 2480MHz _CH78_3Mbps

Horizontal

120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4960.0000	59.54	-11.26	48.28	74.00	-25.72	Peak	
2	4960.0000	49.20	-11.26	37.94	54.00	-16.06	AVG	
3	7440.0000	56.60	-4.59	52.01	74.00	-21.99	Peak	
4 *	7440.0000	46.04	-4.59	41.45	54.00	-12.55	AVG	

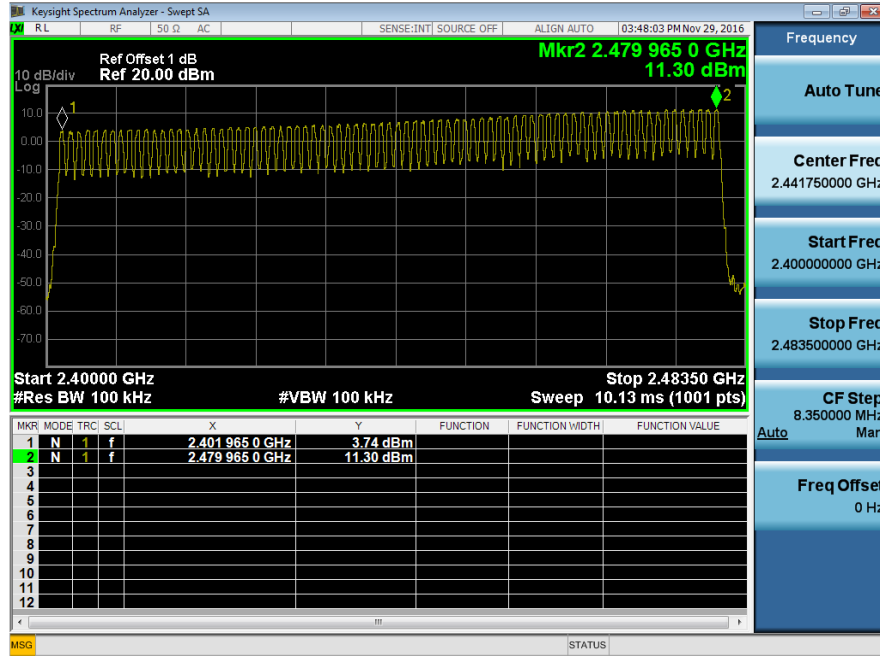
ATTACHMENT E - NUMBER OF HOPPING CHANNEL

Test Mode

Hopping Mode_1Mbps

Number of Hopping Channel

79

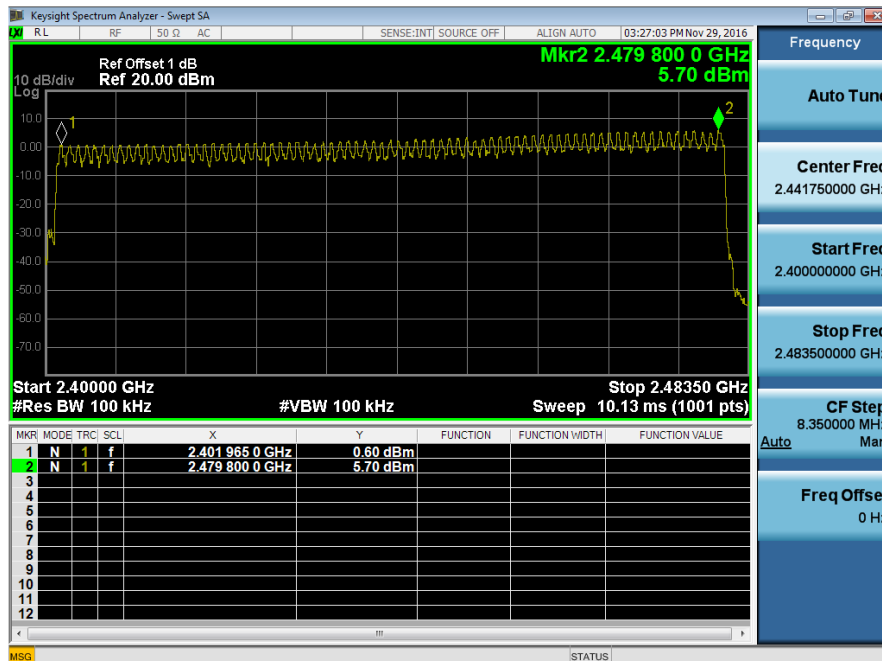


Test Mode

Hopping Mode_3Mbps

Number of Hopping Channel

79

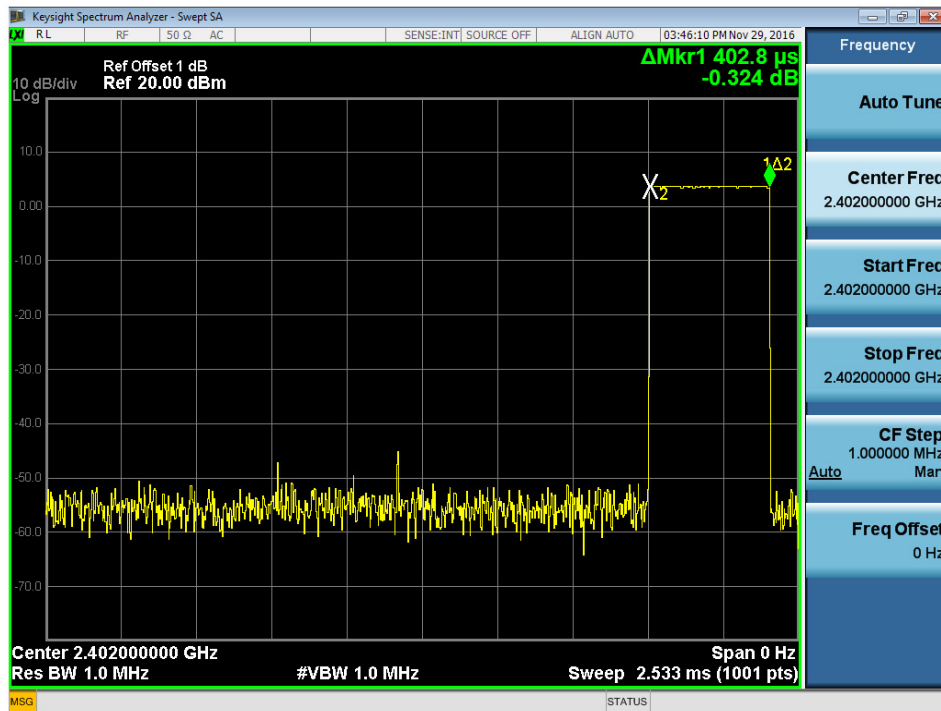


ATTACHMENT F - AVERAGE TIME OF OCCUPANCY

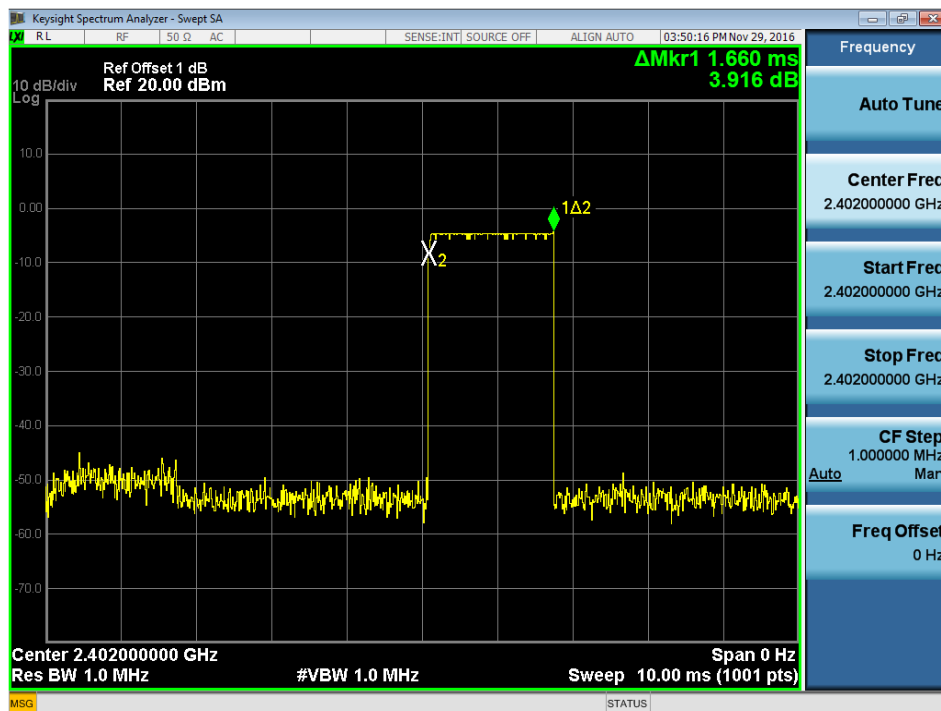
Test Mode :	TX Mode_1Mbps
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Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.9000	0.3093	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH1	2402	0.4028	0.1289	0.4000	Pass
DH5	2441	2.9000	0.3093	0.4000	Pass
DH3	2441	1.6600	0.2656	0.4000	Pass
DH1	2441	0.4028	0.1289	0.4000	Pass
DH5	2480	2.9000	0.3093	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH1	2480	0.3901	0.1248	0.4000	Pass

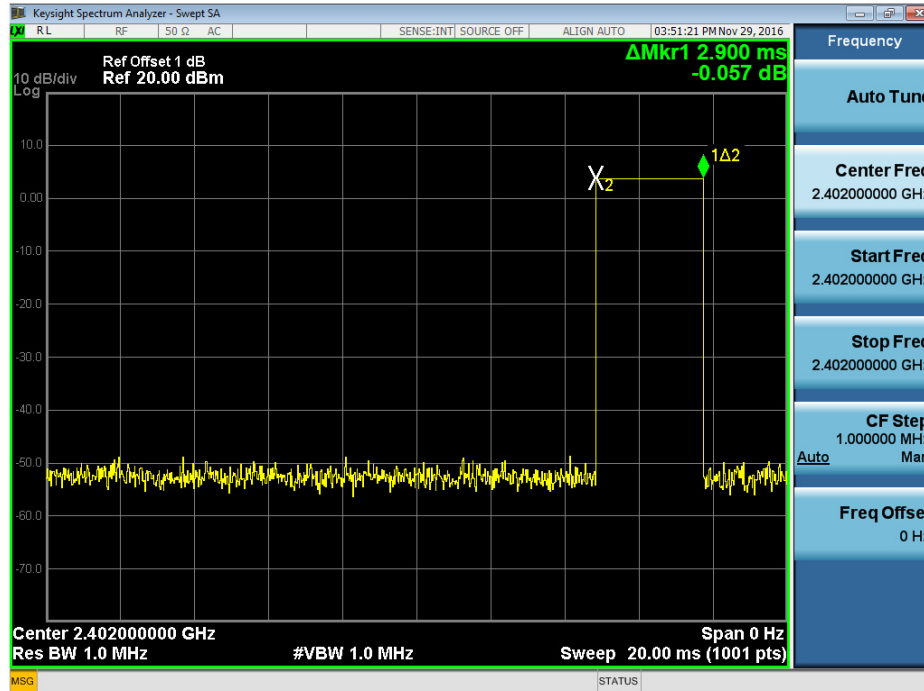
CH00-DH1



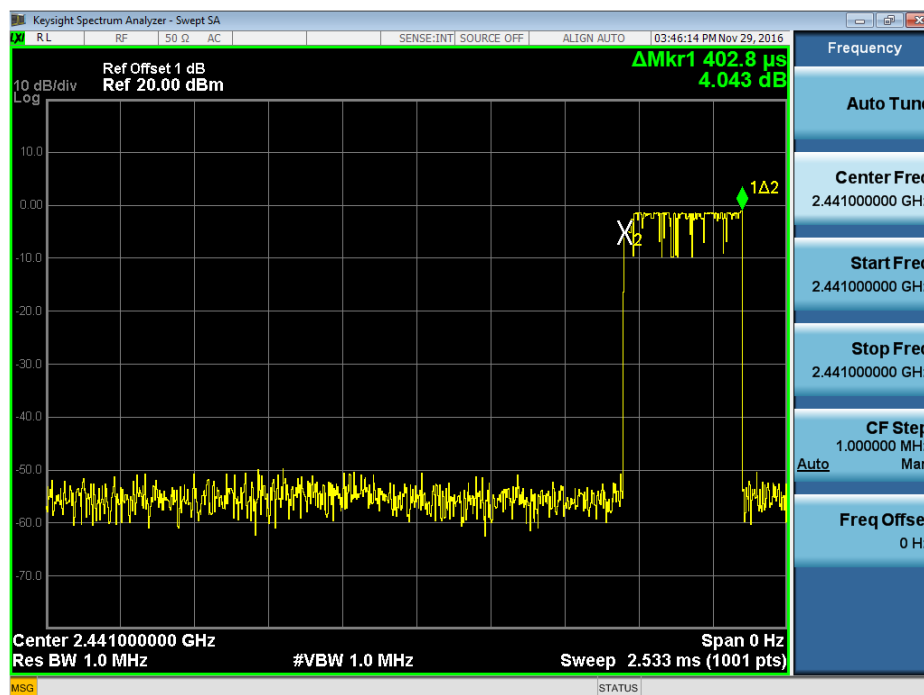
CH00-DH3



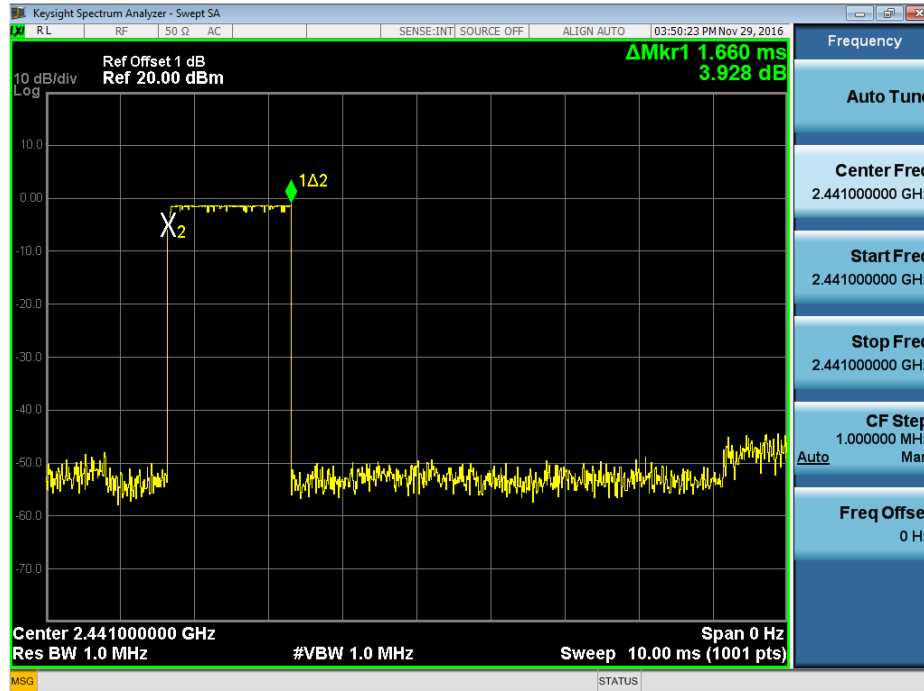
CH00-DH5



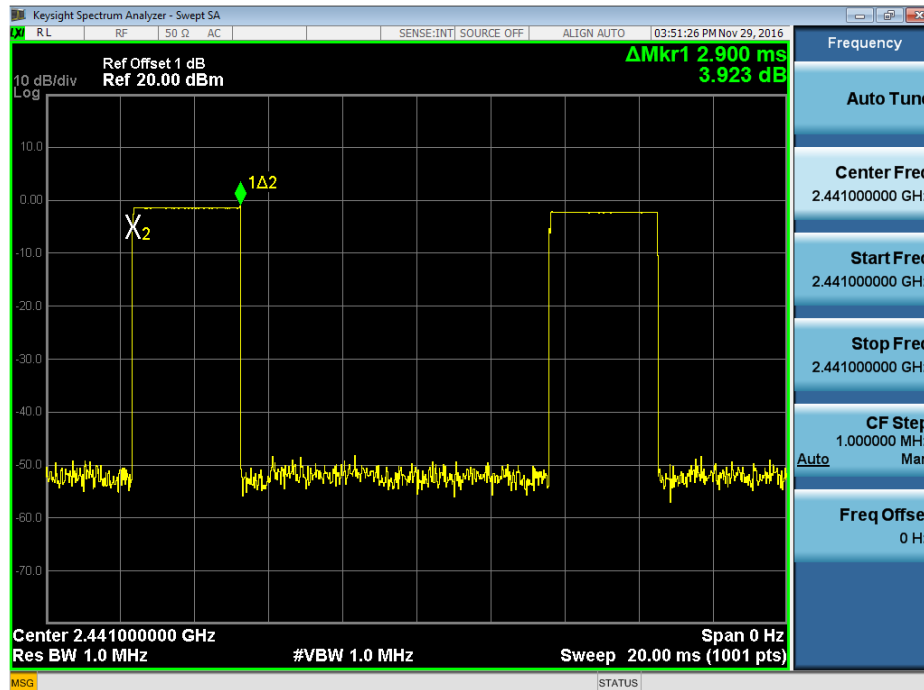
CH39-DH1



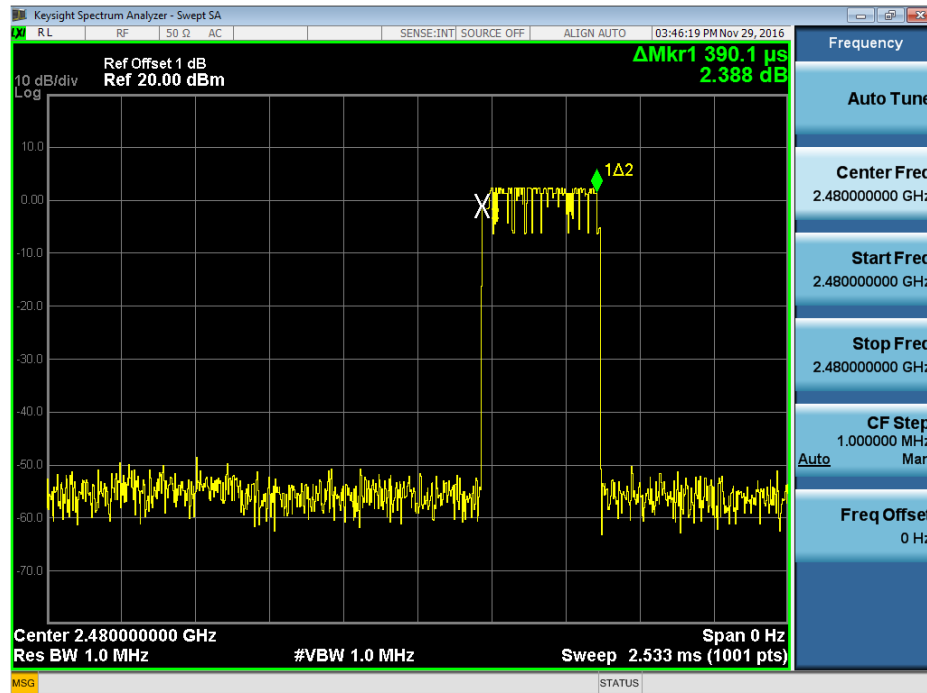
CH39-DH3



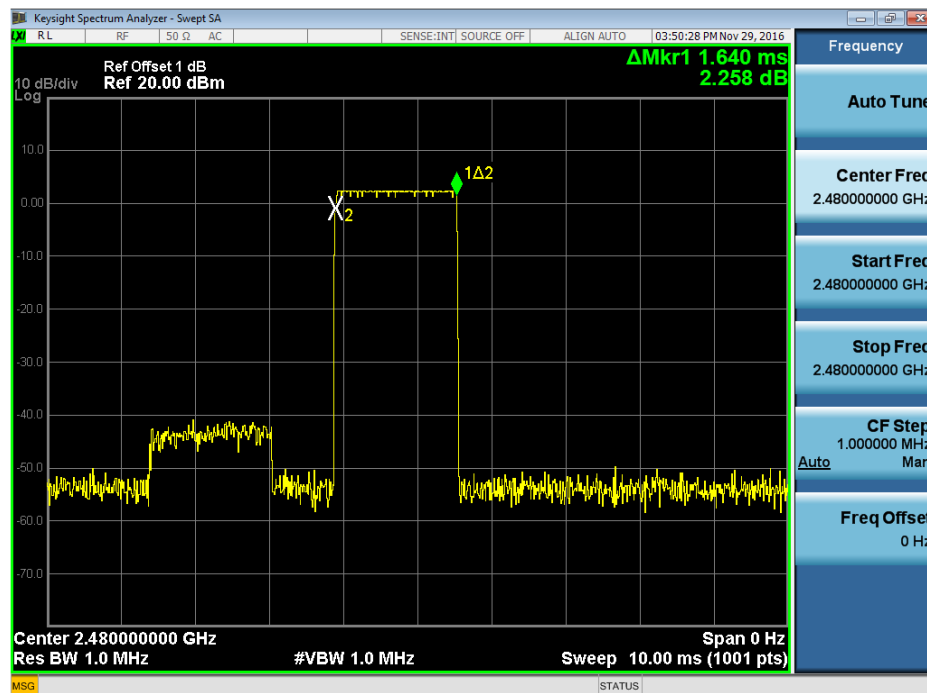
CH39-DH5



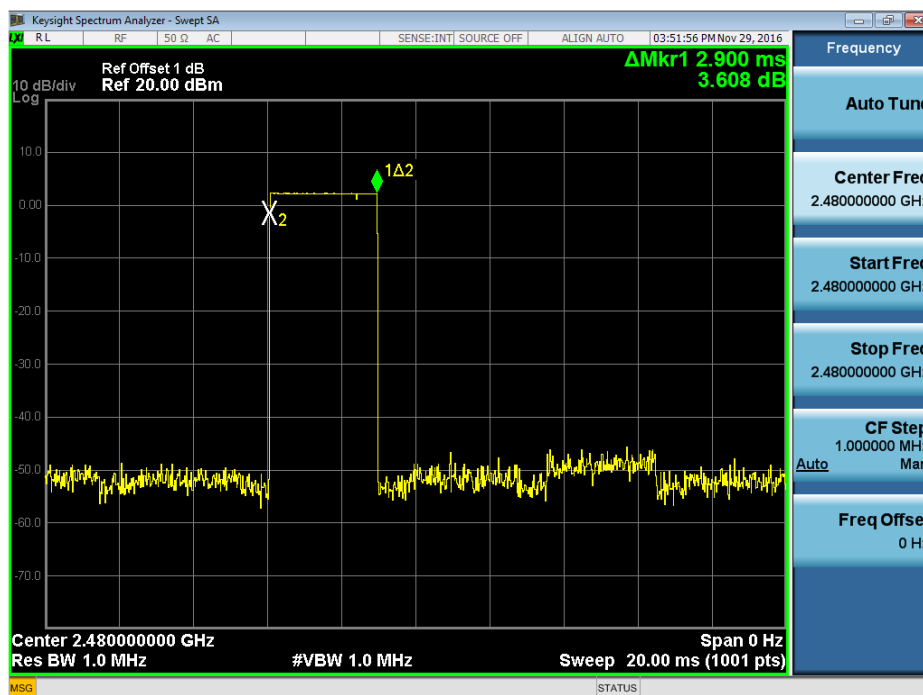
CH78-DH1



CH78-DH3



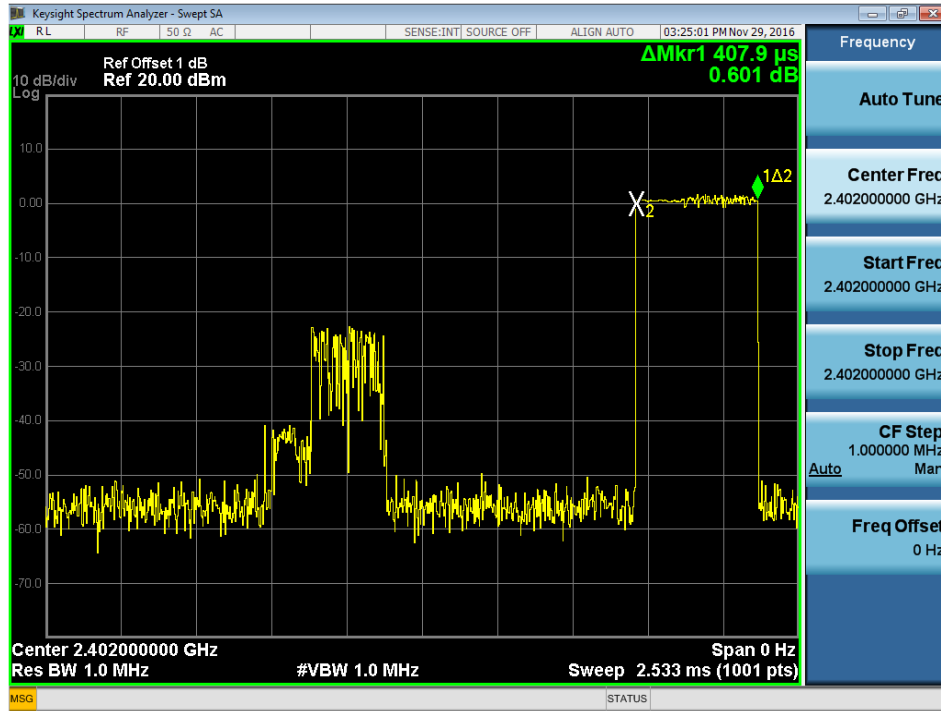
CH78-DH5



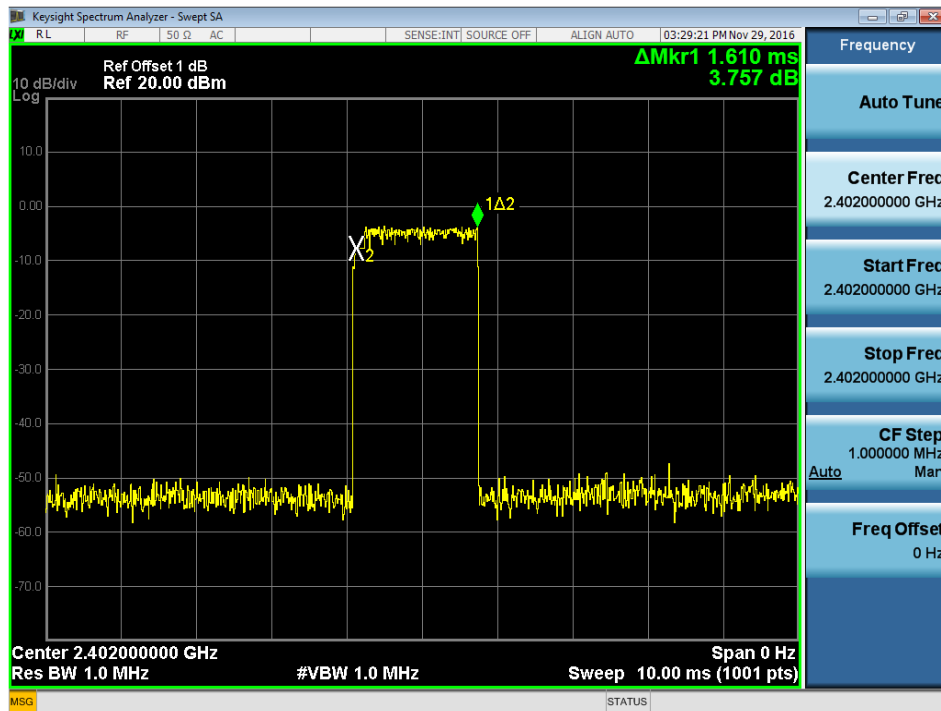
Test Mode :	TX Mode_3Mbps
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Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.9200	0.3115	0.4000	Pass
DH3	2402	1.6100	0.2576	0.4000	Pass
DH1	2402	0.4079	0.1305	0.4000	Pass
DH5	2441	2.8800	0.3072	0.4000	Pass
DH3	2441	1.6200	0.2592	0.4000	Pass
DH1	2441	0.3648	0.1167	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass
DH3	2480	1.6500	0.2640	0.4000	Pass
DH1	2480	0.3724	0.1192	0.4000	Pass

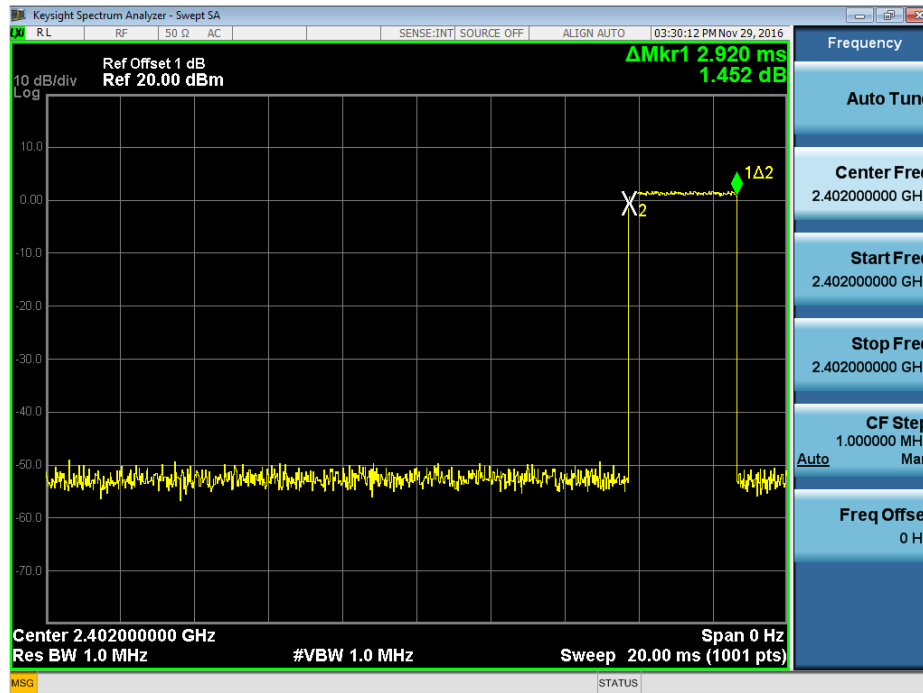
CH00-DH1



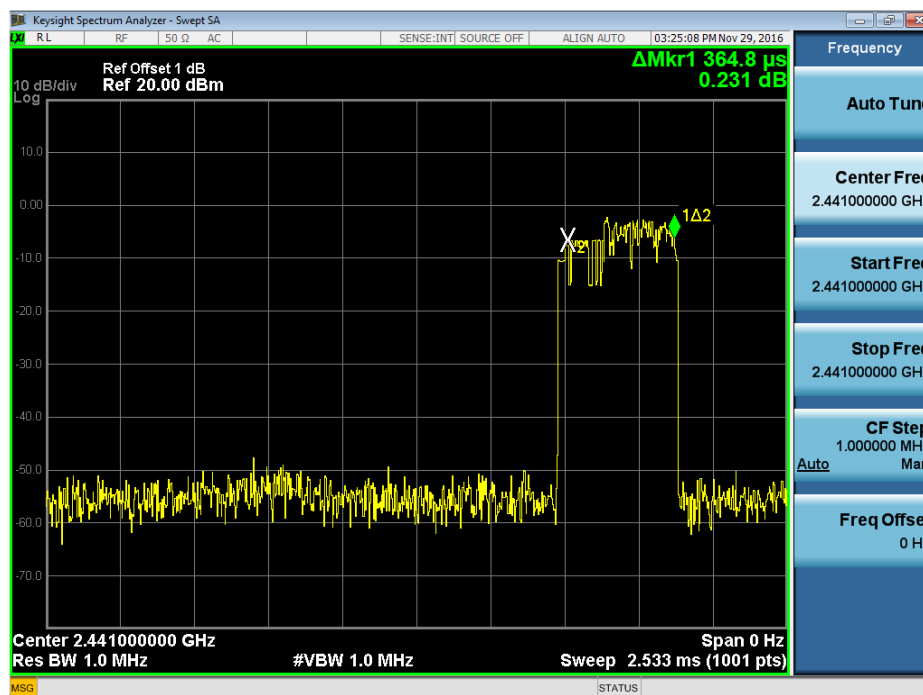
CH00-DH3



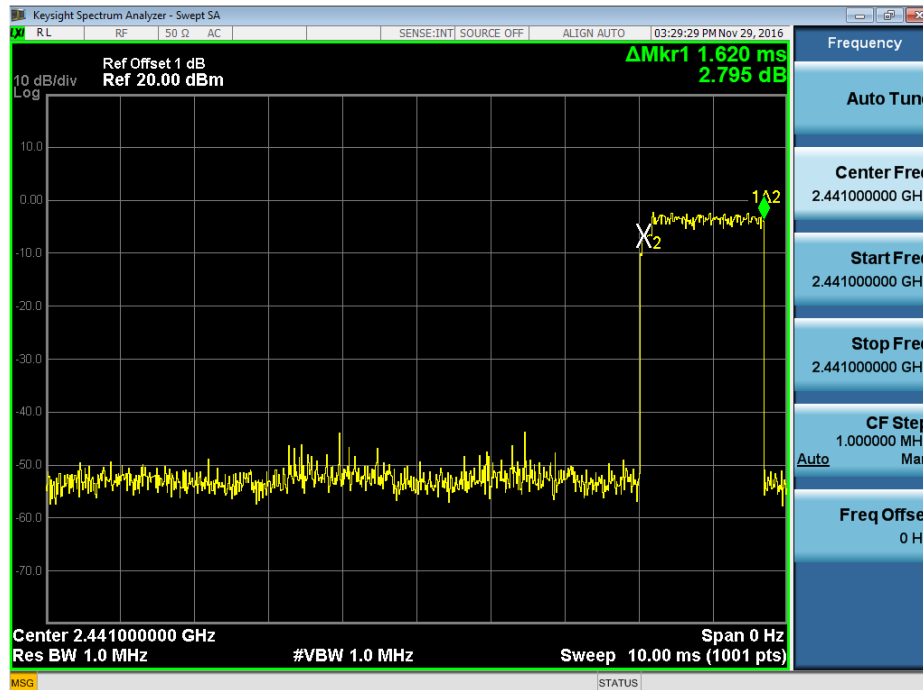
CH00-DH5



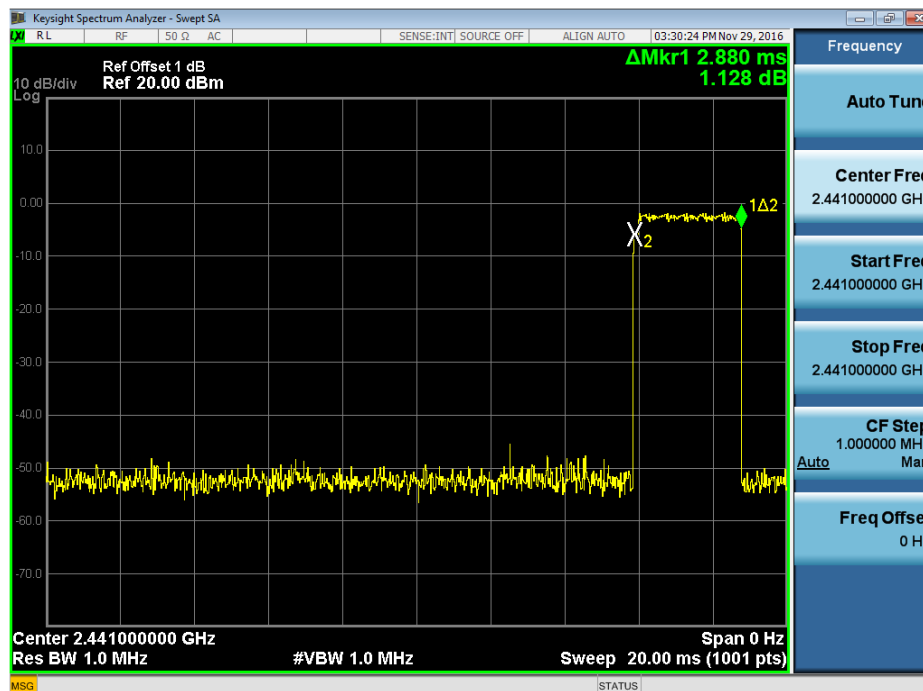
CH39-DH1



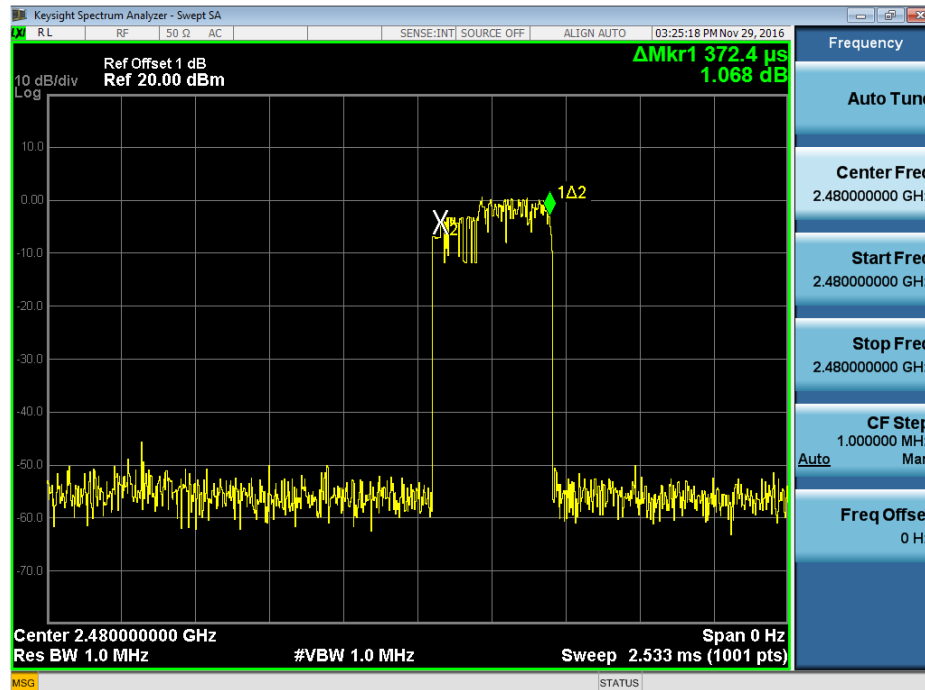
CH39-DH3



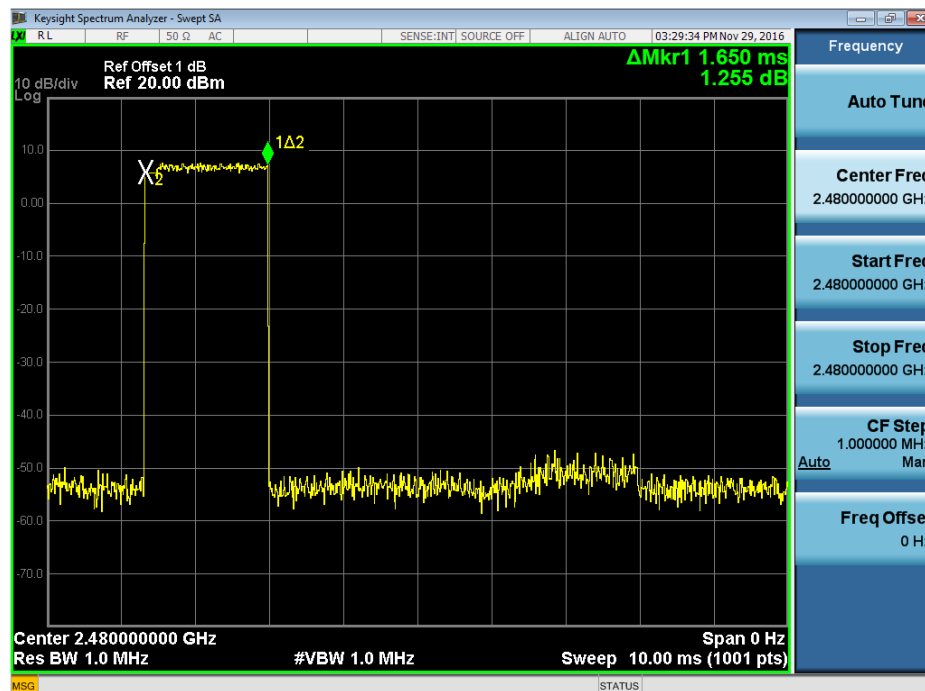
CH39-DH5



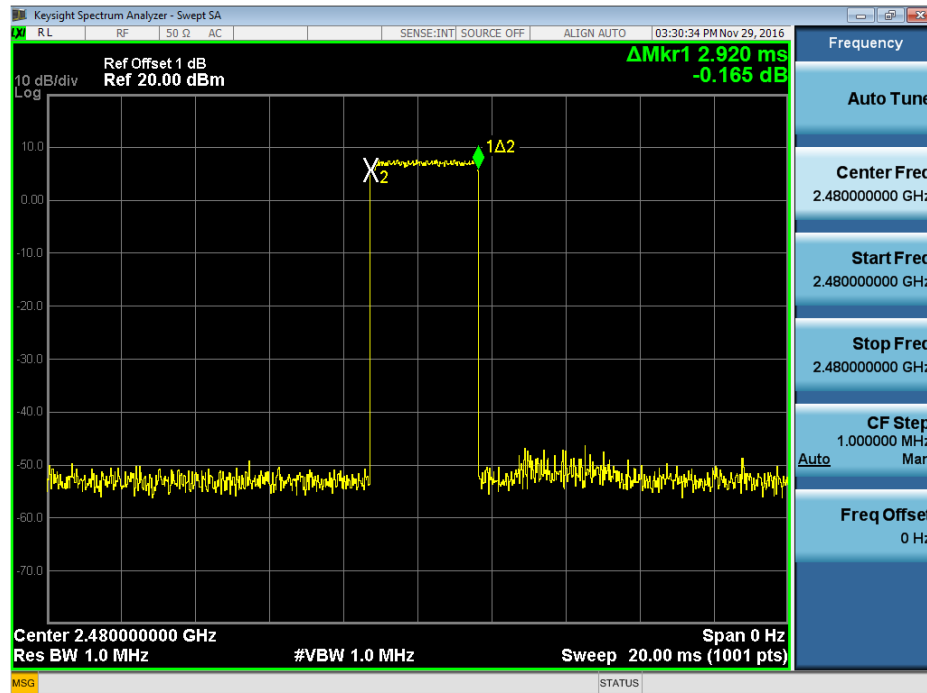
CH78-DH1



CH78-DH3



CH78-DH5

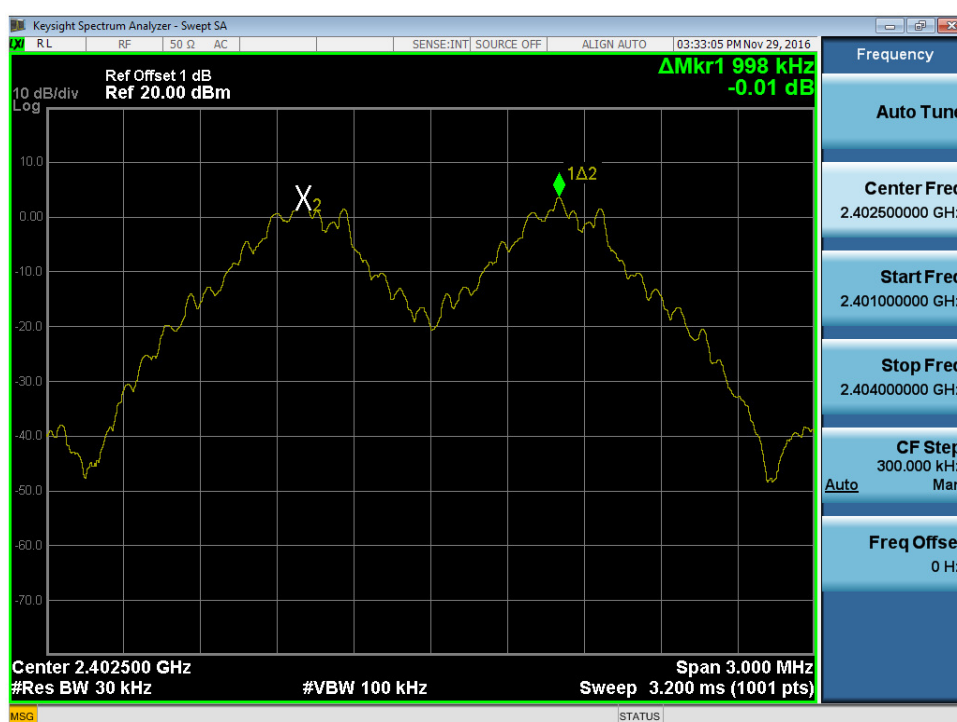


ATTACHMENT G - HOPPING CHANNEL SEPARATION MEASUREMENT

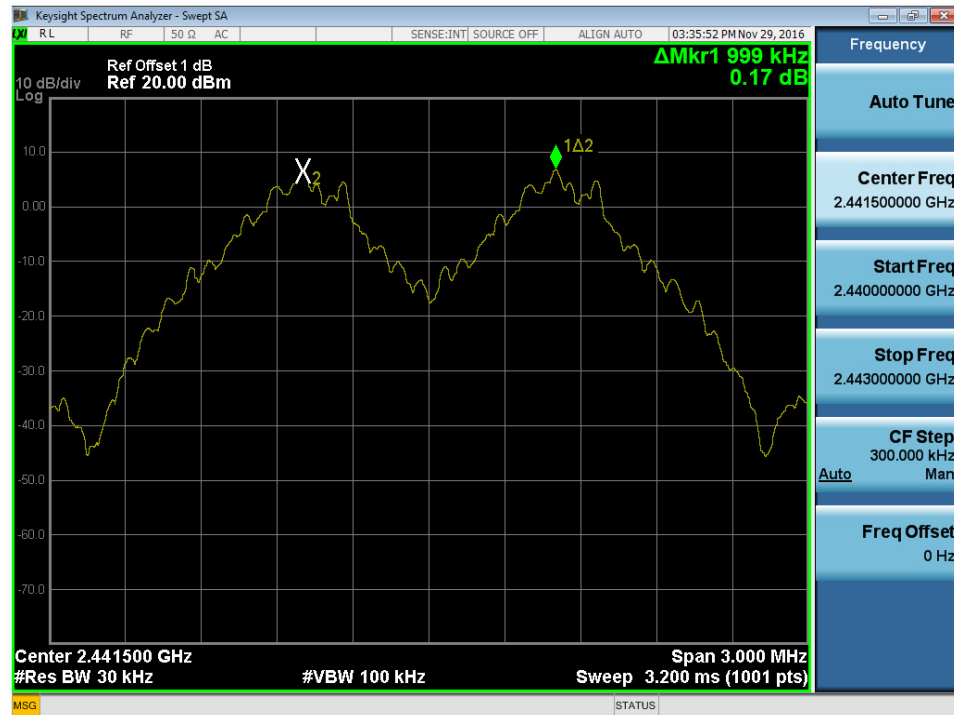
Test Mode :	Hopping on _1Mbps
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Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	0.998	0.618	Pass
2441	0.999	0.636	Pass
2480	1.002	0.619	Pass

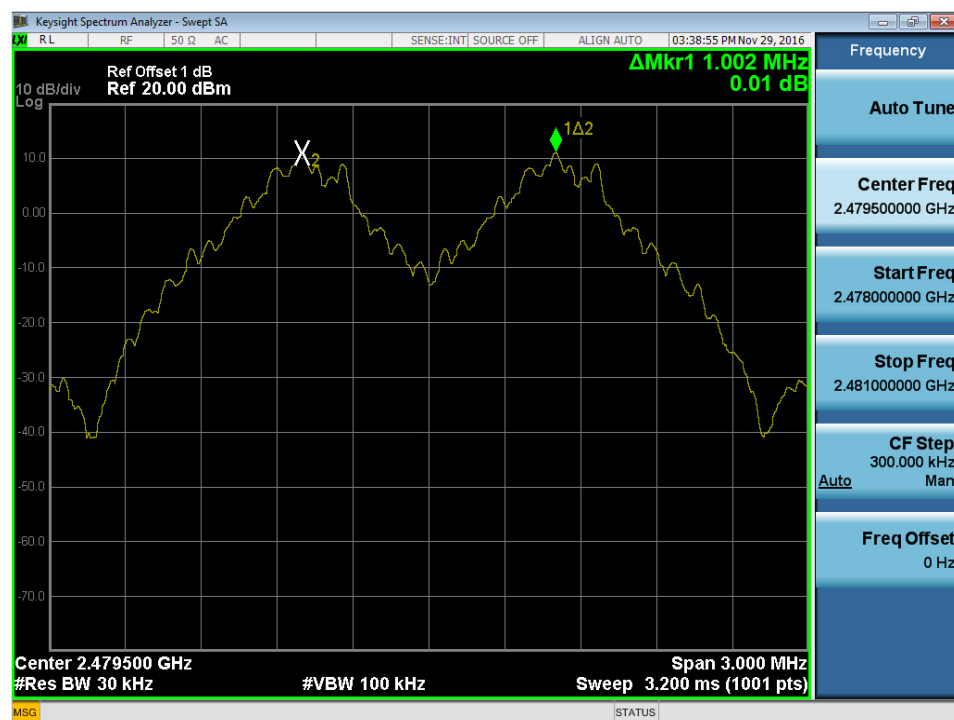
CH00



CH39



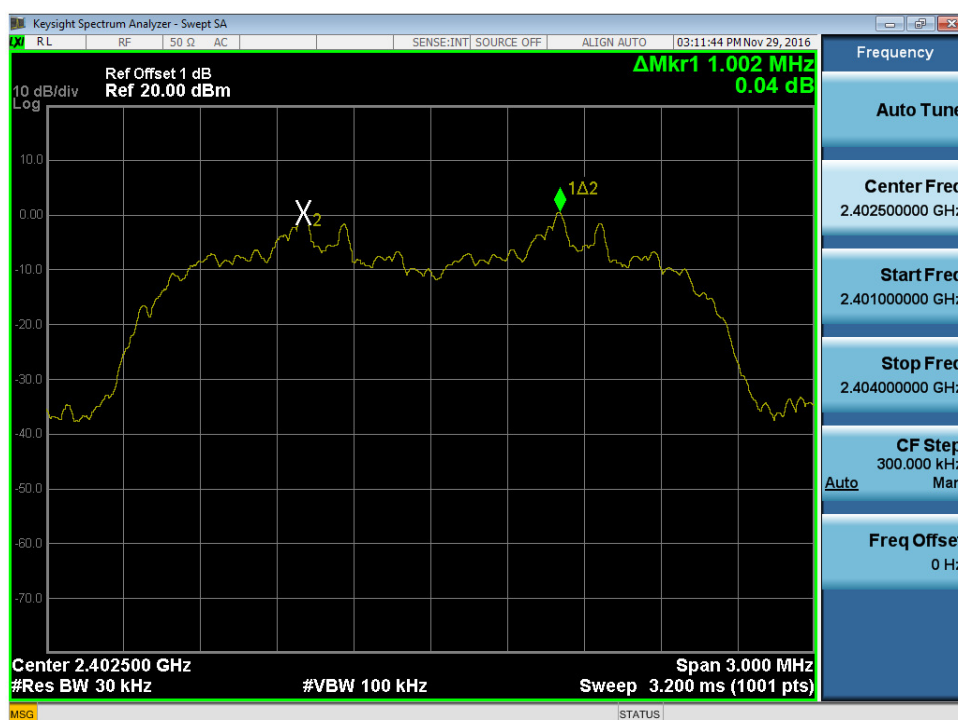
CH78



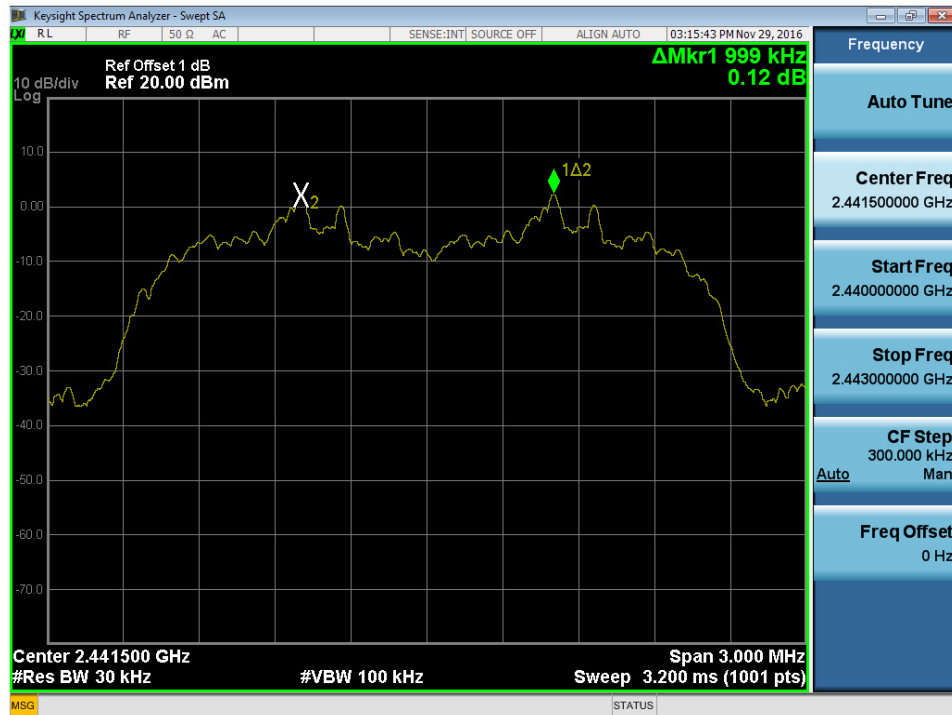
Test Mode :	Hopping on _3Mbps
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Frequency (MHz)	Channel Separation (MHz)	2/3 of 20dB Bandwidth (MHz)	Test Result
2402	1.002	0.879	Pass
2441	0.999	0.866	Pass
2480	1.002	0.860	Pass

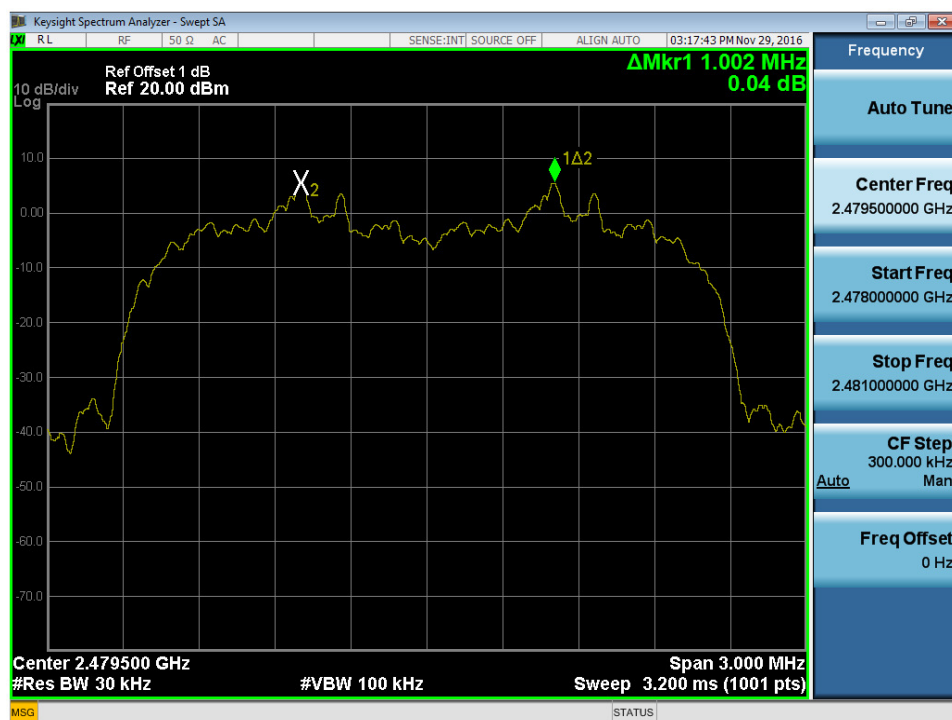
CH00



CH39



CH78



ATTACHMENT H - BANDWIDTH

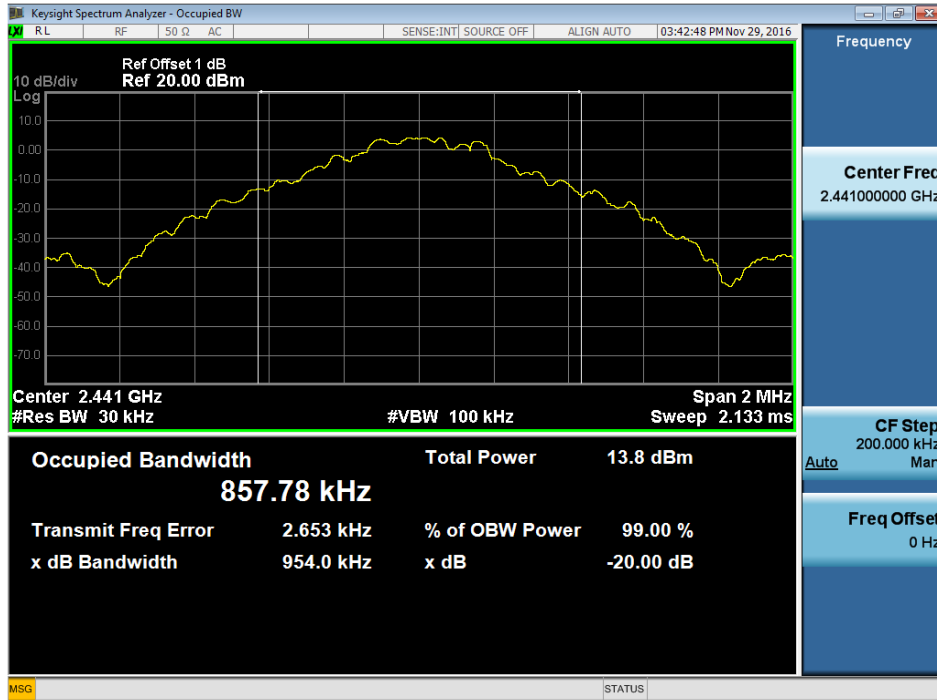
Test Mode :	TX Mode _1Mbps
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	0.927	0.857	Pass
2441	0.954	0.858	Pass
2480	0.928	0.854	Pass

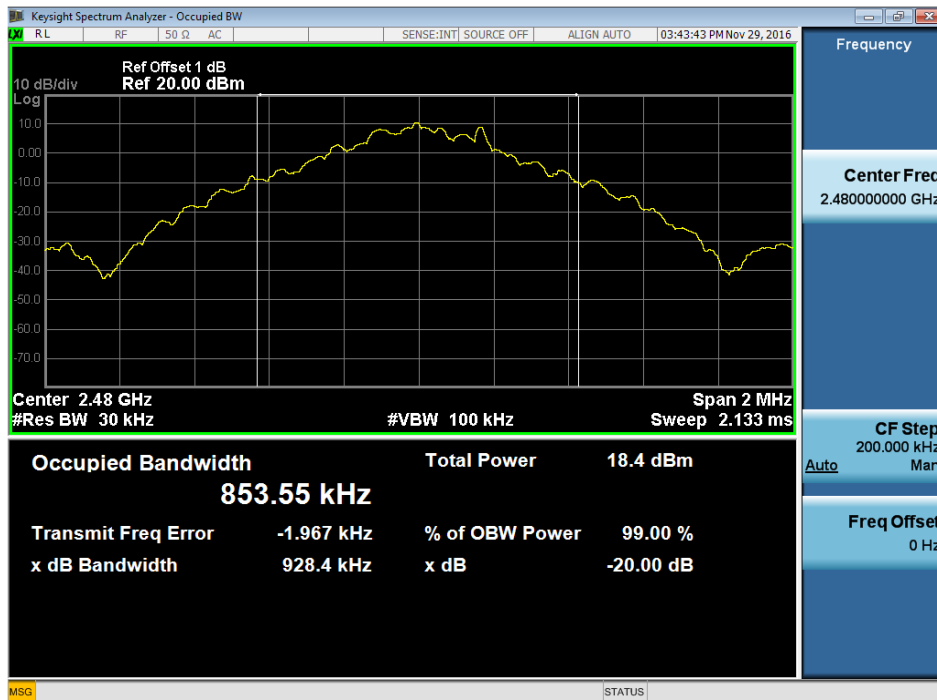
CH00



CH39



CH78



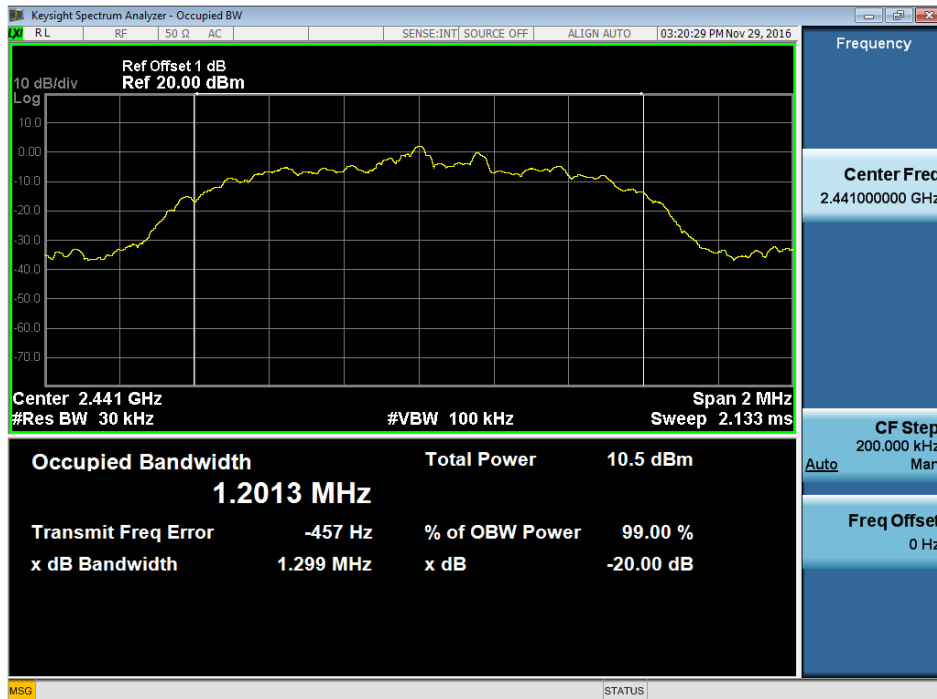
Test Mode :	TX Mode _3Mbps
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.318	1.214	Pass
2441	1.299	1.201	Pass
2480	1.290	1.186	Pass

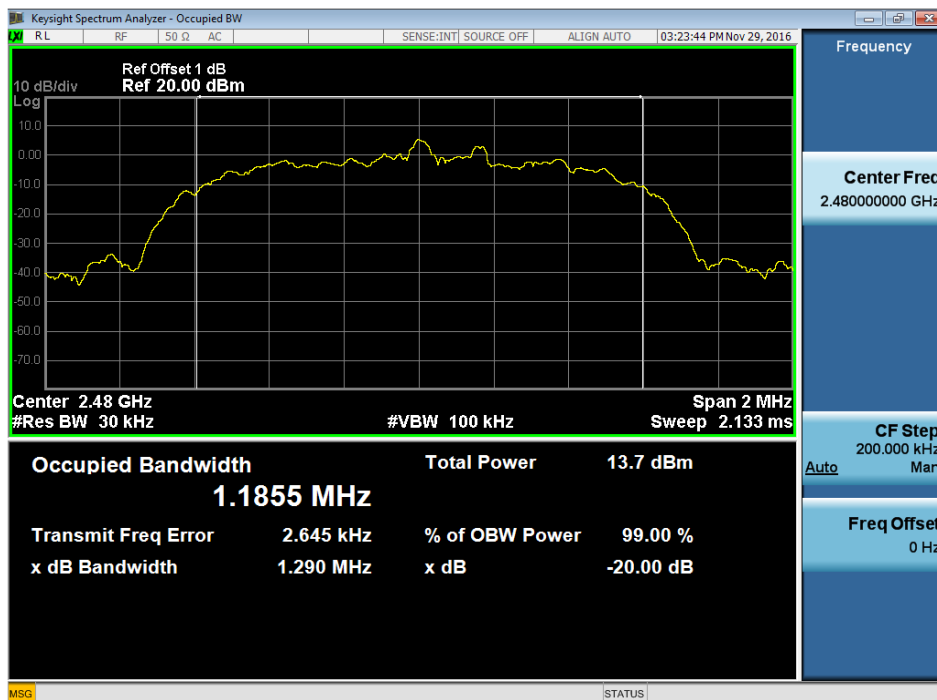
CH00



CH39



CH78

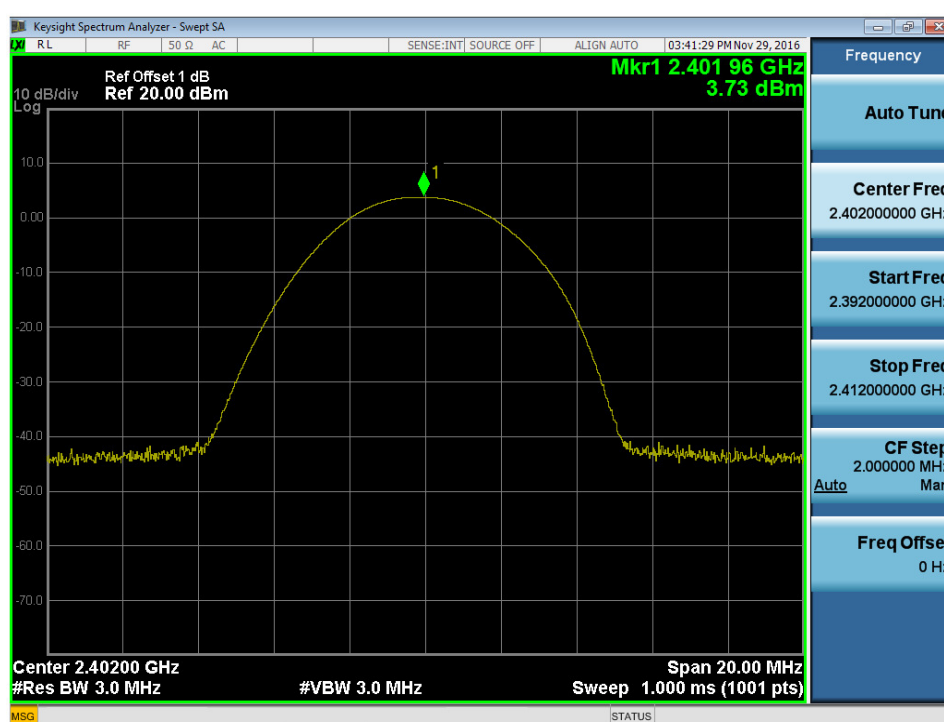


ATTACHMENT I - PEAK OUTPUT POWER

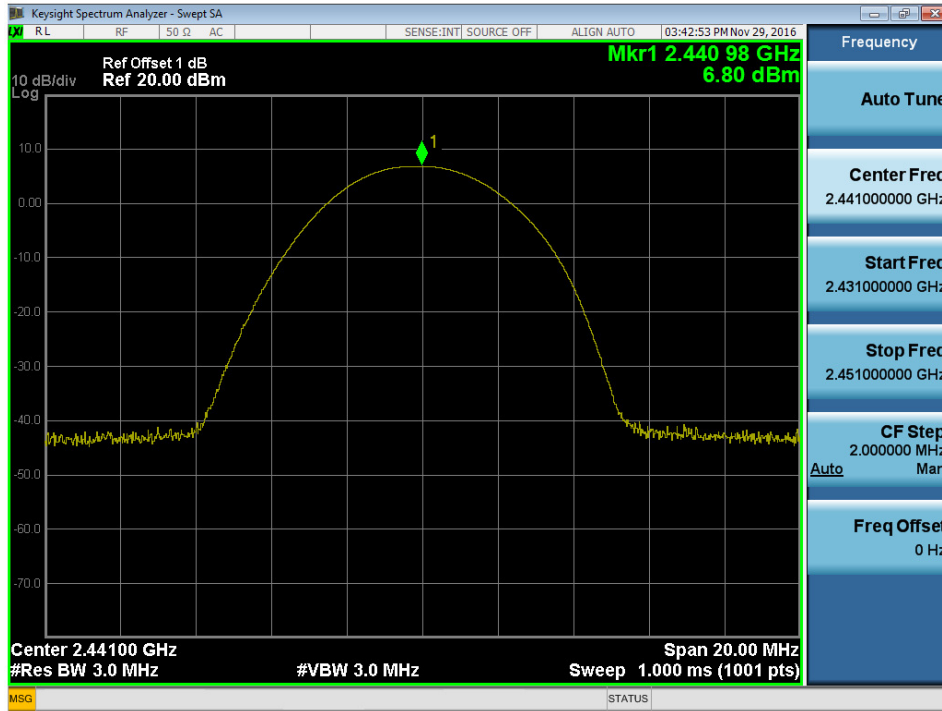
Test Mode :	TX Mode _1Mbps
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Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	3.73	0.0024	30.00	1.00	Pass
2441	6.80	0.0048	30.00	1.00	Pass
2480	11.20	0.0132	30.00	1.00	Pass

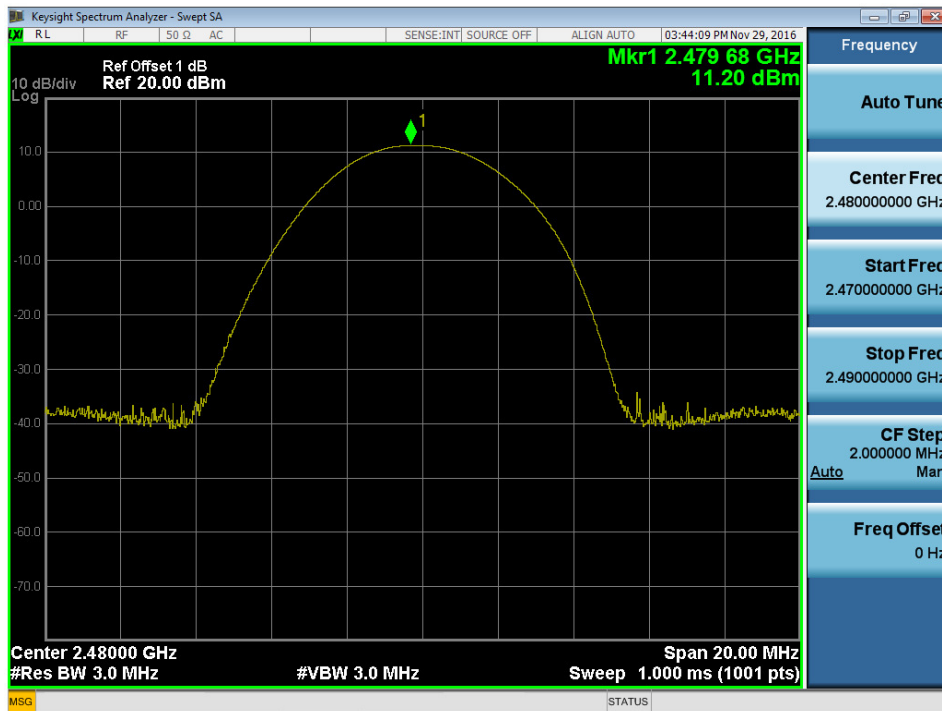
CH00



CH39



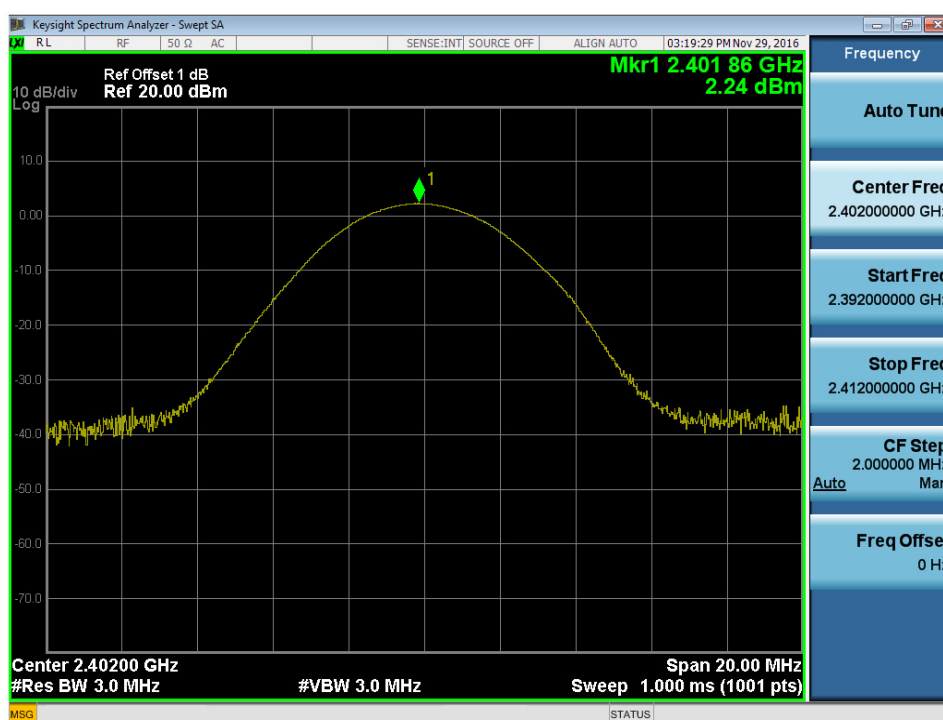
CH78



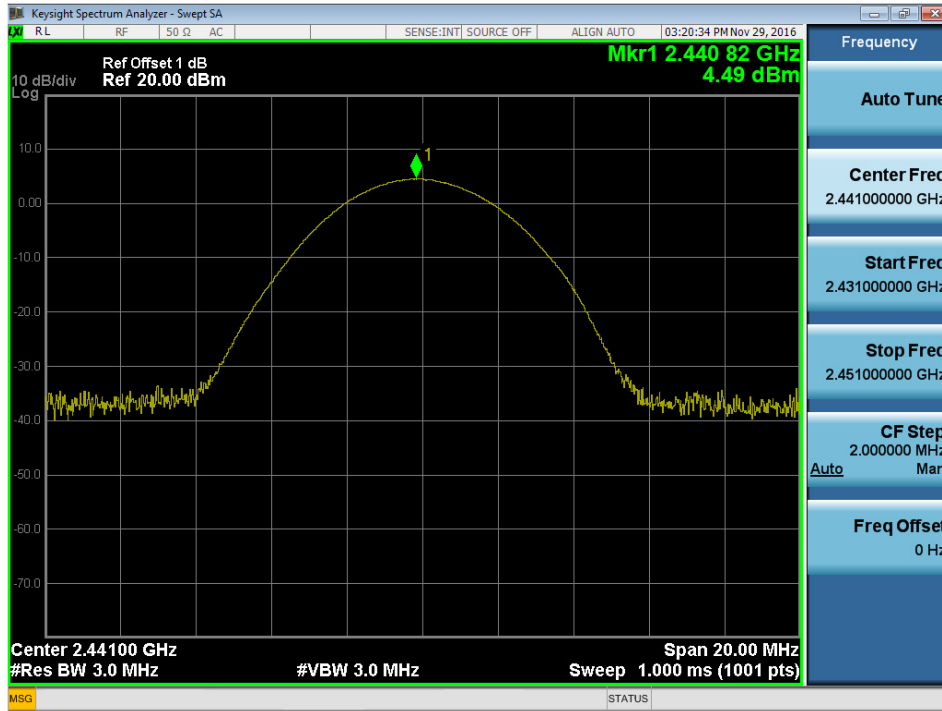
Test Mode :	TX Mode _3Mbps
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Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	2.24	0.0017	30.00	1.00	Pass
2441	4.49	0.0028	30.00	1.00	Pass
2480	8.39	0.0069	30.00	1.00	Pass

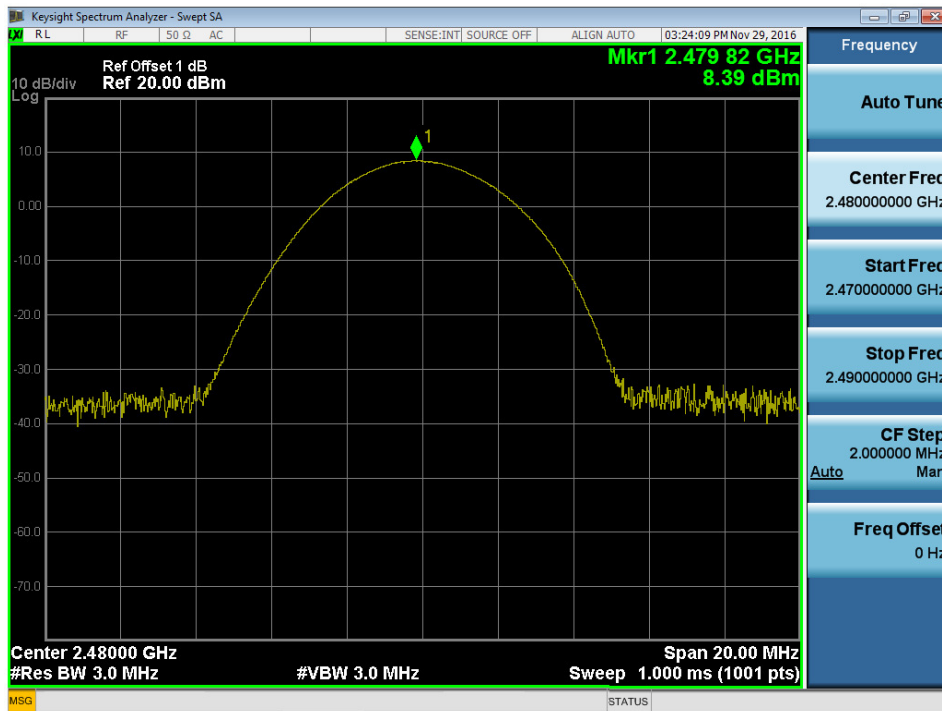
CH00



CH39

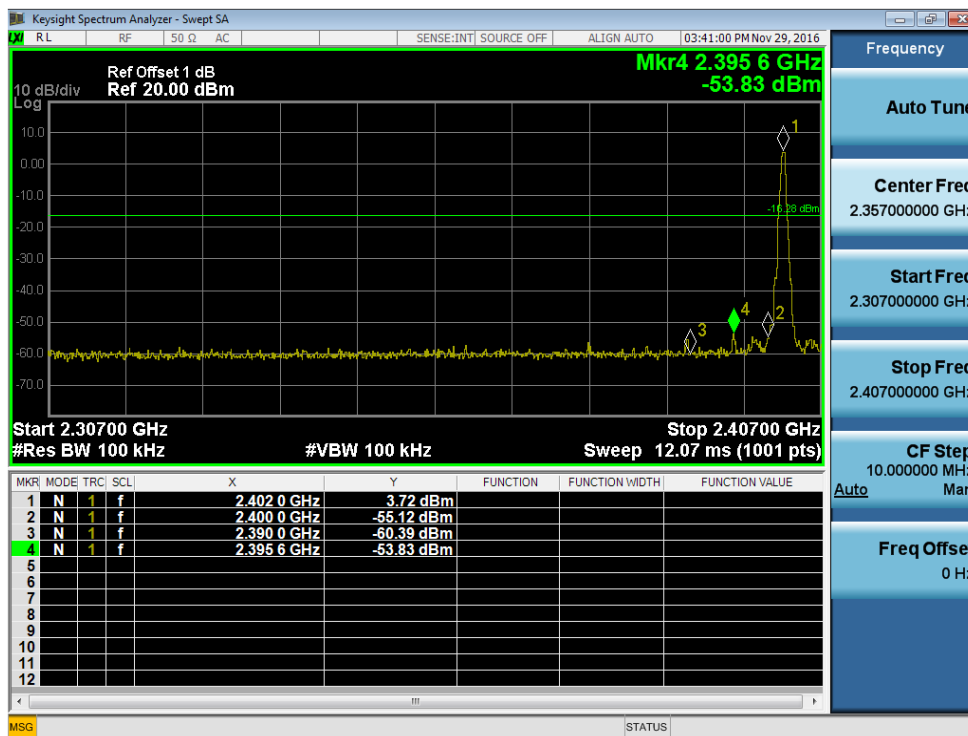


CH78

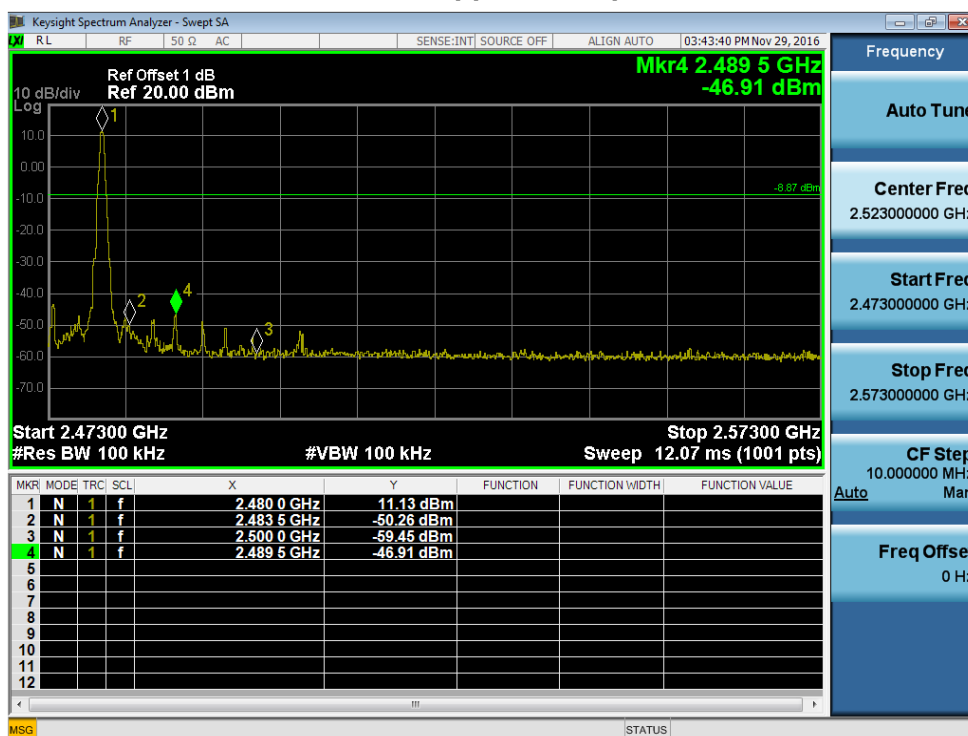


ATTACHMENT J - ANTENNA CONDUCTED SPURIOUS EMISSION

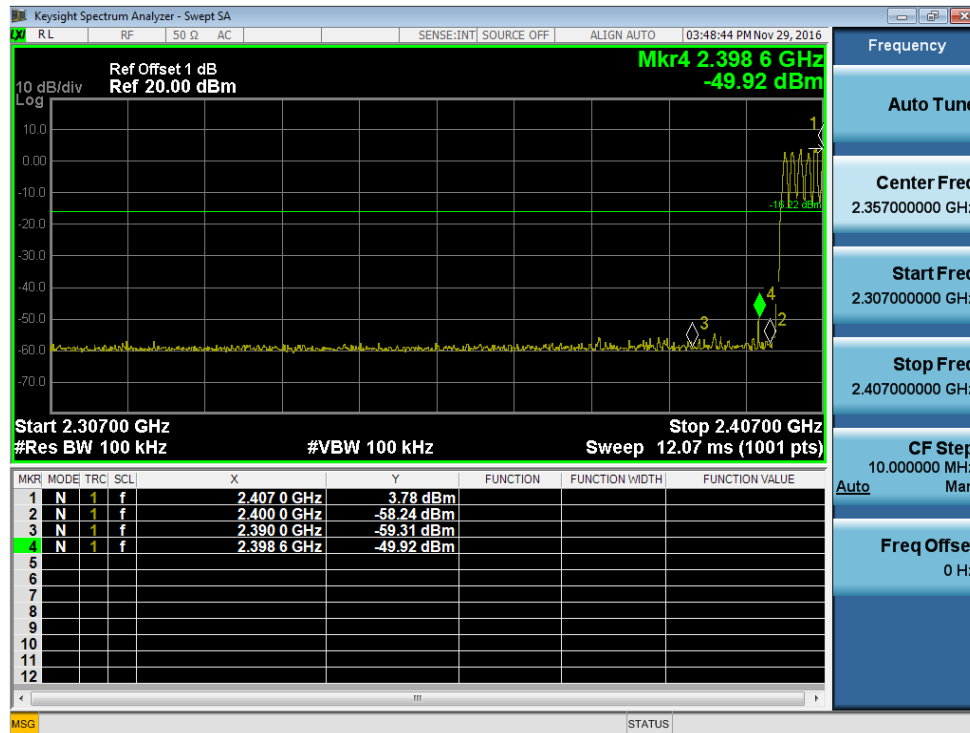
CH00 (Lower)_1Mbps



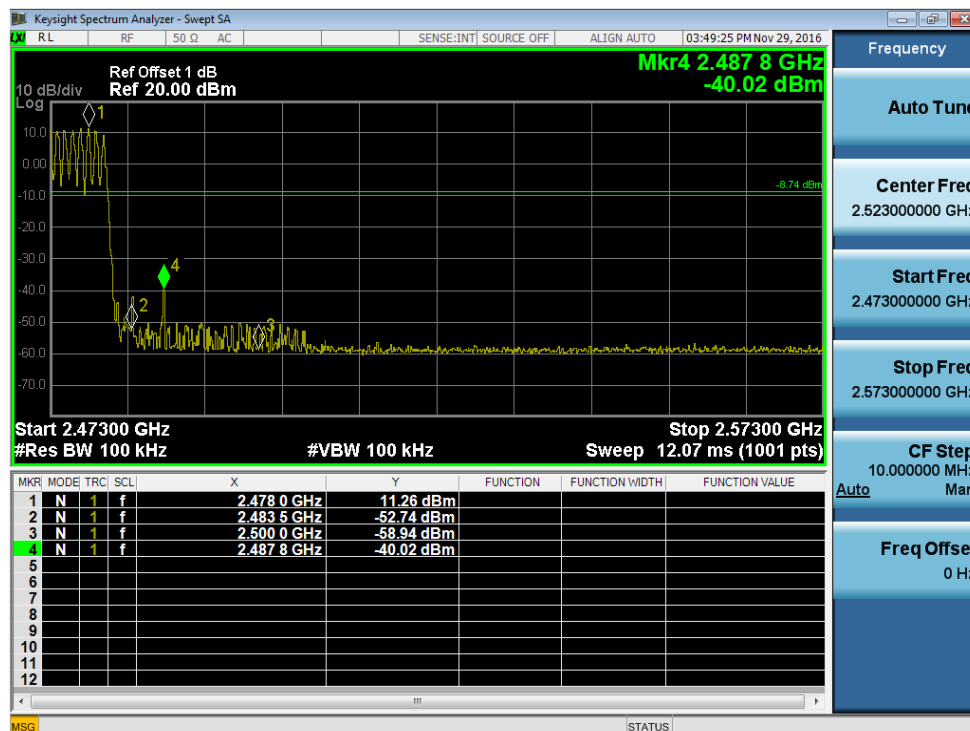
CH78 (Upper)_1Mbps



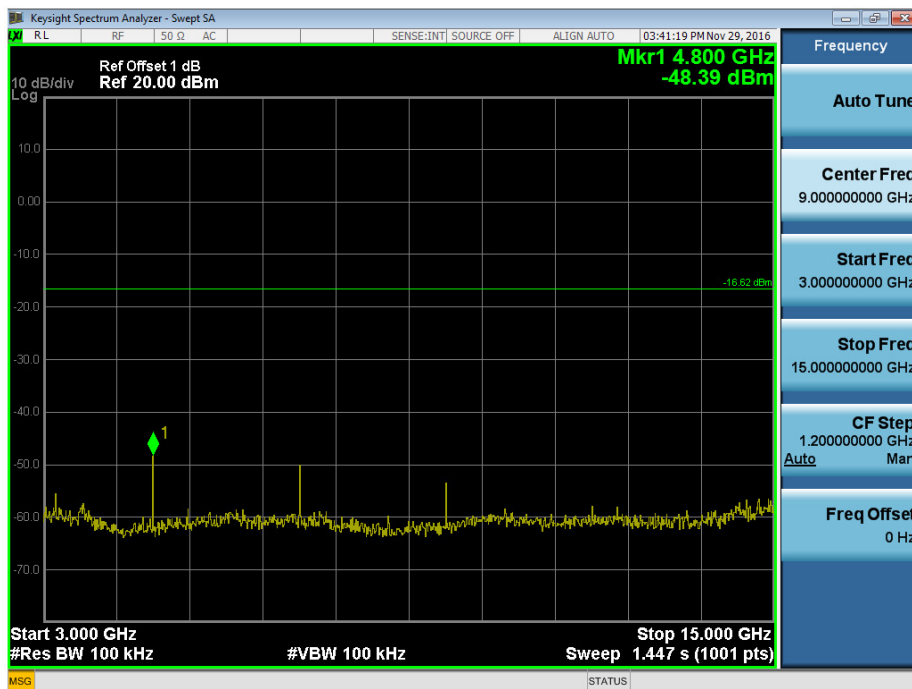
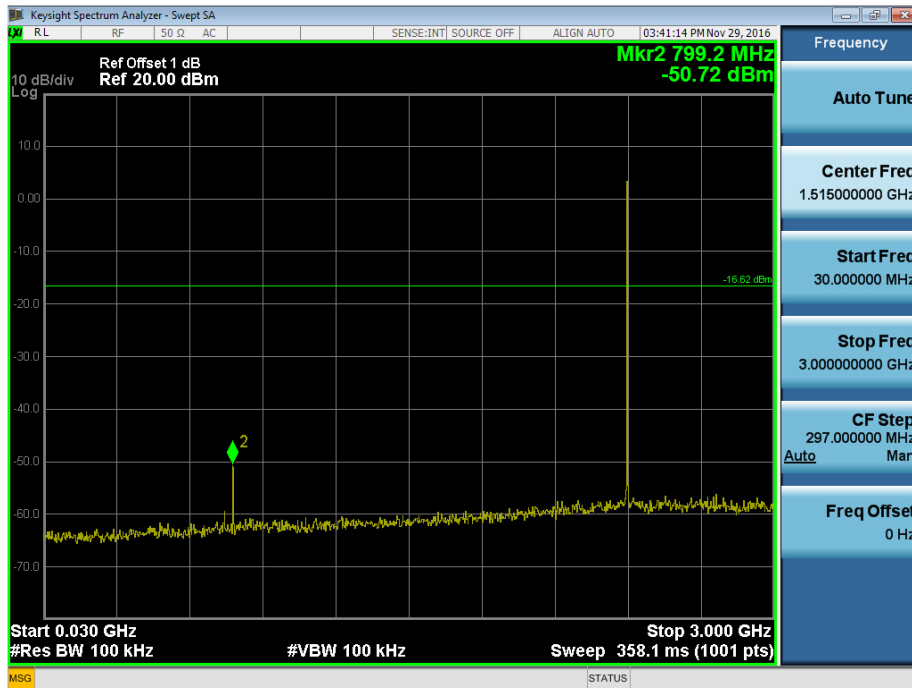
CH00 Hopping on mode (Lower)_1Mbps



CH78 Hopping on mode (Upper)_1Mbps

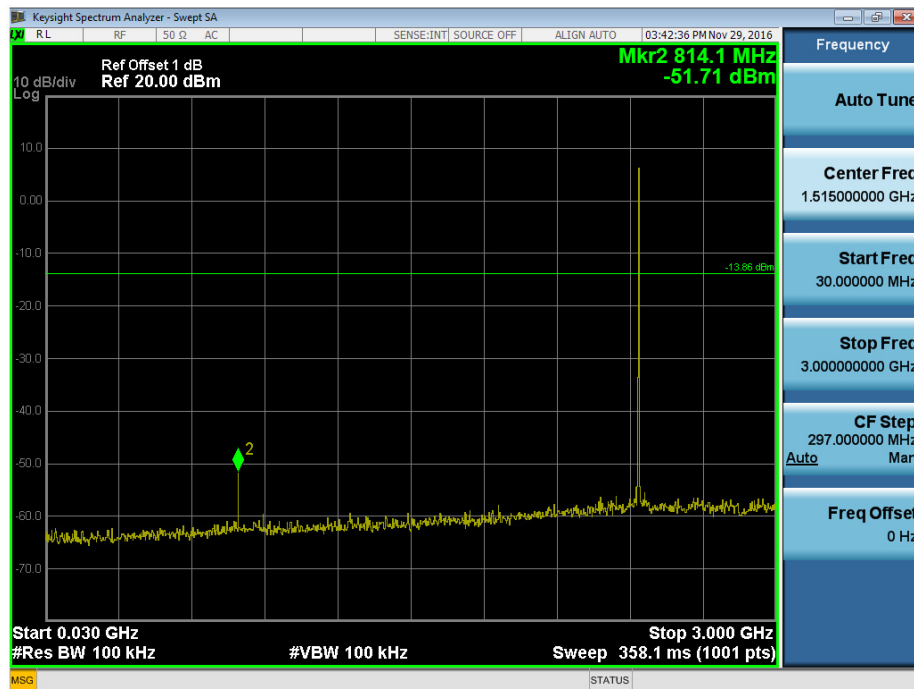


CH00 (10 Harmonic of the frequency) _1Mbps





CH39 (10 Harmonic of the frequency) _1Mbps



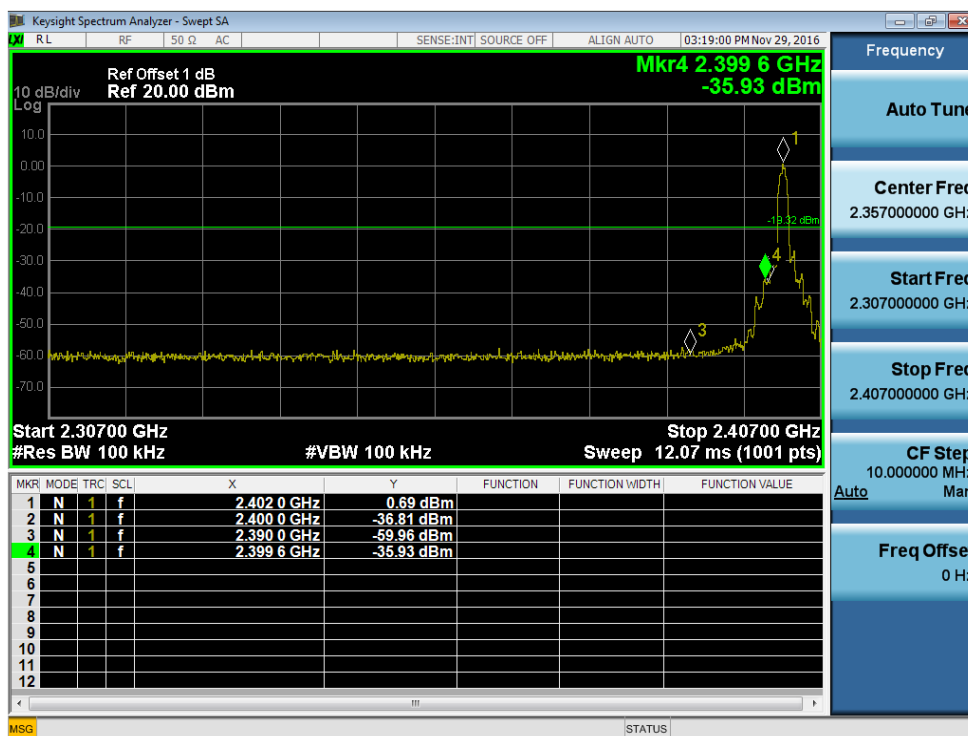


CH78 (10 Harmonic of the frequency) _1Mbps

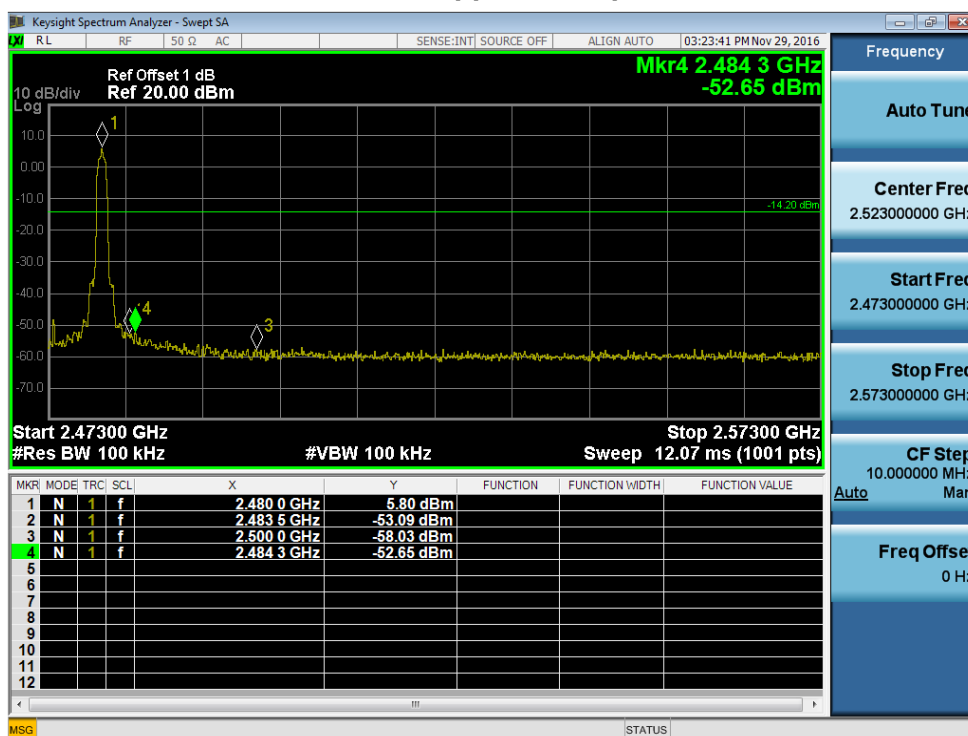




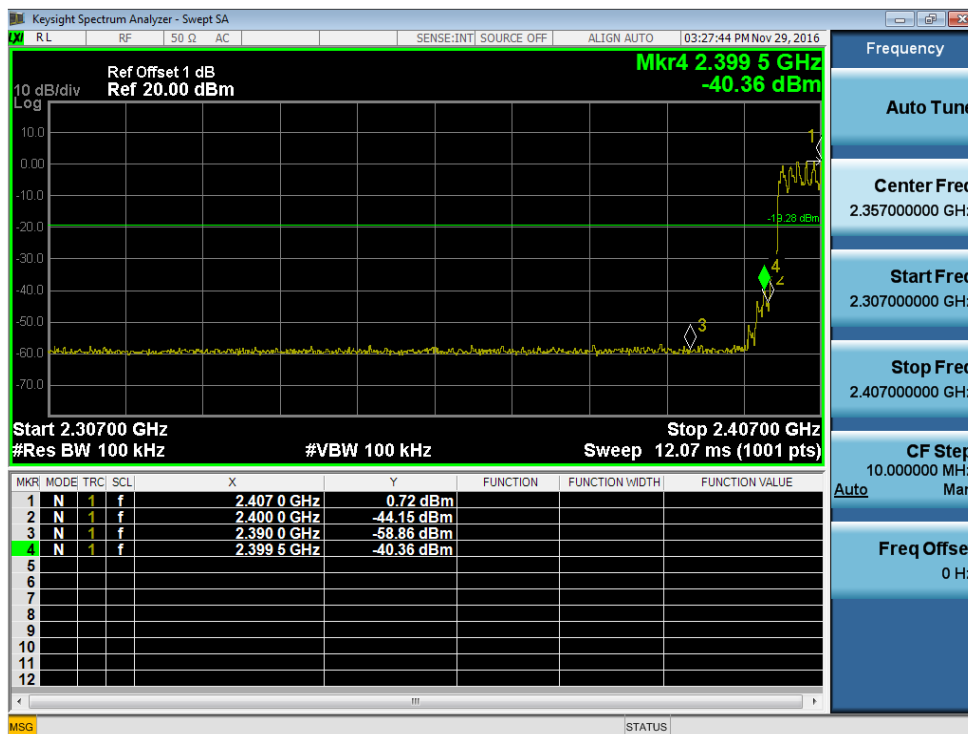
CH00 (Lower) _3Mbps



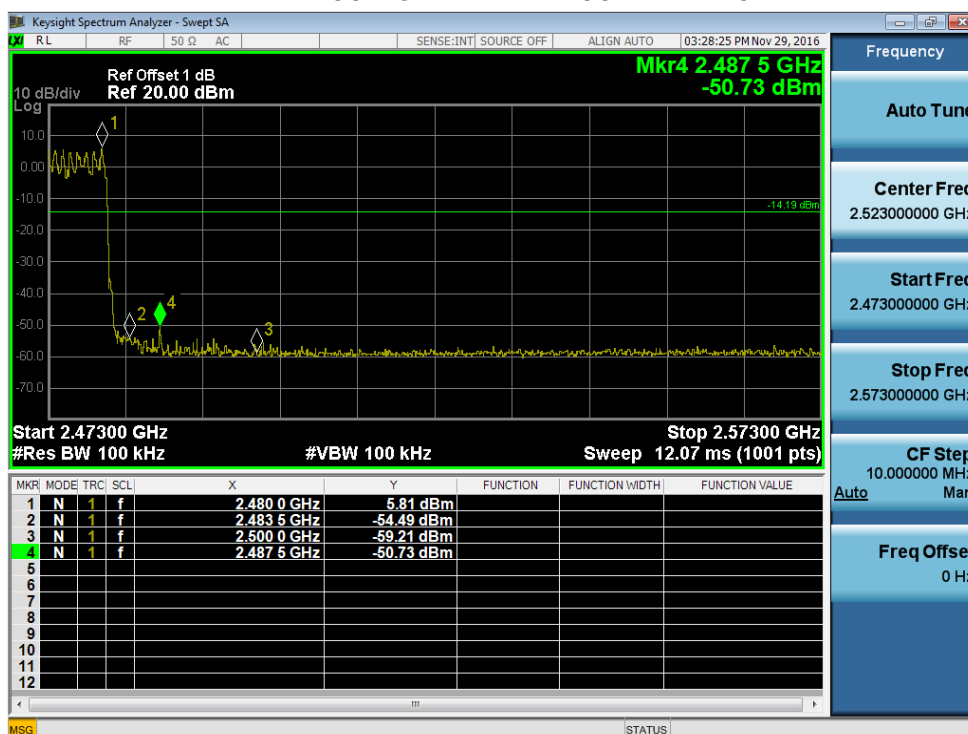
CH78 (Upper) _3Mbps



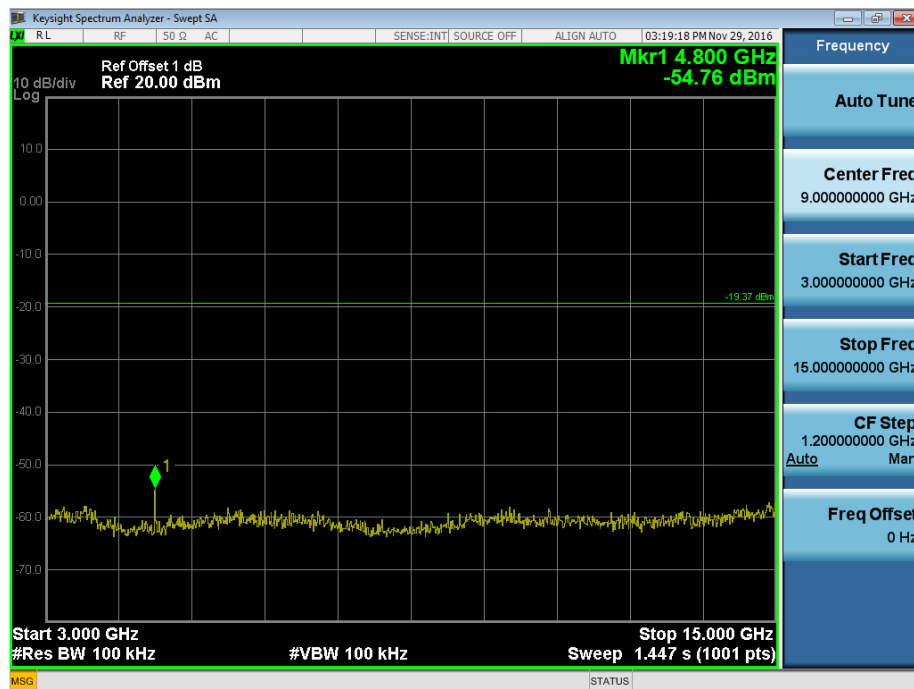
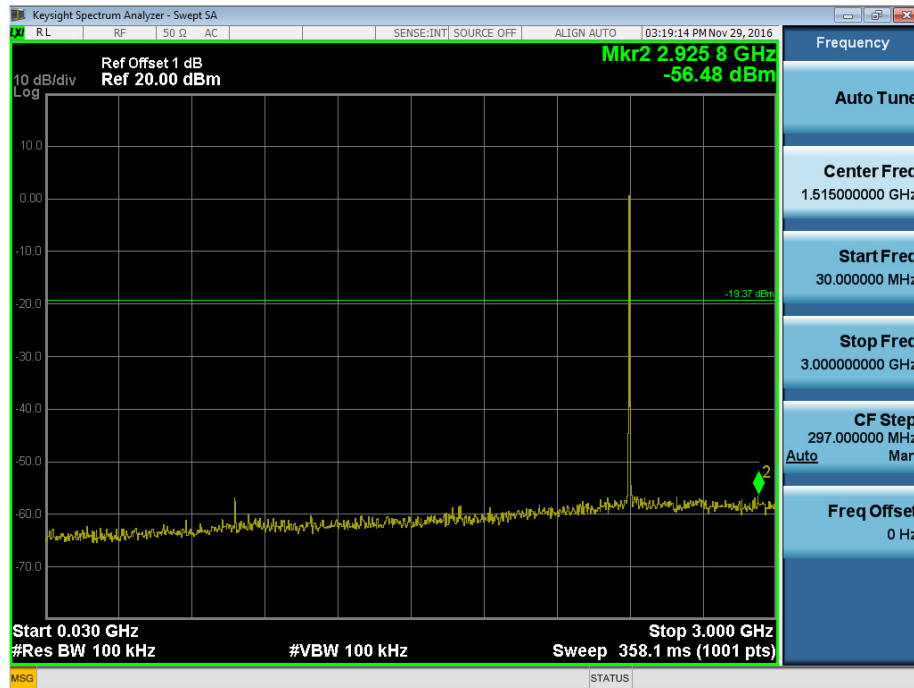
CH00 Hopping on mode (Lower)_3Mbps



CH78 Hopping on mode (Upper)_3Mbps

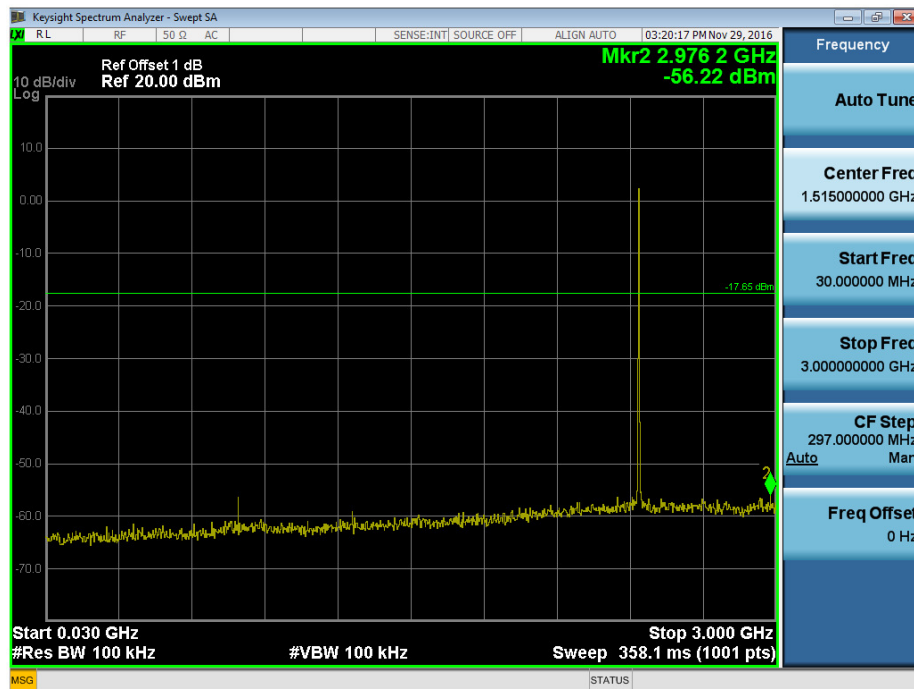


CH00 (10 Harmonic of the frequency) _3Mbps





CH39 (10 Harmonic of the frequency) _3Mbps





CH78 (10 Harmonic of the frequency) _3Mbps

