FCC Radio Test Report

FCC ID: ACJ-RP-HD610N

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

Project No.	:	1809C153
Equipment	:	Digital Wireless Stereo Headphones
Test Model	:	RP-HD610N
Series Model	:	N/A
Applicant	:	Panasonic Corporation of North America
Address	:	Two Riverfront Plaza, 9th Floor Newark, NJ 07102-5490 United States

Date of Receipt	:	Sep. 21, 2018
Date of Test	:	Sep. 26, 2018 ~ Oct. 26, 2018
Issued Date	:	Nov. 12, 2018
Tested by	:	BTL Inc.

Testing Engineer : Vincent. Tan
(Vincent Tan)

Technical Manager : David Mao
(David Mao)

Authorized Signatory : Steven Lu
(Steven Lu)

BTL INC.

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Certificate #5123.02

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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

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

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

Limitation

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

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Nov. 01, 2018
R01	Added the description of AFH.	Nov. 12, 2018

1. CERTIFICATION

Equipment	:	Digital Wireless Stereo Headphones
Brand Name	:	Panasonic
Test Model	:	RP-HD610N
Series Model	:	N/A
Applicant	:	Panasonic Corporation of North America
Manufacturer	:	Panasonic Corporation
Address	:	1-15 Matsuo-cho, Kadoma-shi, Osaka 571-8504, Japan
Factory	:	Shenzhen Grandsun Electronic Co., Ltd.
Address	:	East Park, Gaoqiao Industry Zone, Pingdi Street, Longgang, Shenzhen City, Guangdong Province, P.R.China
Date of Test	:	Sep. 26, 2018 ~ Oct. 26, 2018
Test Sample	:	Engineering Sample No.: D181009553
Standard(s)	:	FCC Part15, Subpart C (15.247)/ ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1809C153) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA 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 (a)(1)	Maximum output power	PASS	
15.247(d) 15.209 15.205	Radiated Spurious Emission	PASS	
15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS	
15.247 (a)(1)(iii)	Average Time Of Occupancy	PASS	
15.203	Antenna Requirement	PASS	

Note:

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

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China
BTL's test firm number for FCC: 854385
BTL's designation number for FCC: CN5020

2.2 MEASUREMENT UNCERTAINTY

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

The BTL measurement uncertainty as below table:

2. Conducted Measurement :

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

B. Radiated Measurement :

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

C. Other Measurement:

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

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Digital Wireless Stereo Headphones	
Brand Name	Panasonic	
Test Model	RP-HD610N	
Series Model	N/A	
Model Difference(s)	N/A	
Software Version	V1.1.3	
Hardware Version	V0.3	
Output Power (Max.)	Operation Frequency	2402MHz ~ 2480MHz
	Modulation Technology	GFSK(1Mbps) π/4-DQPSK(2Mbps) 8-DPSK(3Mbps)
	Bit Rate of Transmitter	
	Output Power Max.	1.22 dBm(1Mbps) 3.75 dBm(3Mbps)
Power Source	#1 Supplied from USB port for charging. #2 Battery supplied. Brand / Model: future power/ FT703437P	
Power Rating	#1 EUT I/P: DC 5V, 500mA #2 DC 3.7V, 800mAh	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. This product has the mode of BT AFH, which was considered during testing, but this mode is not the worst case mode, and this report only shows the worst case mode.

3. 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		

4. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	N/A	N/A	Internal	N/A	1.09

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

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:

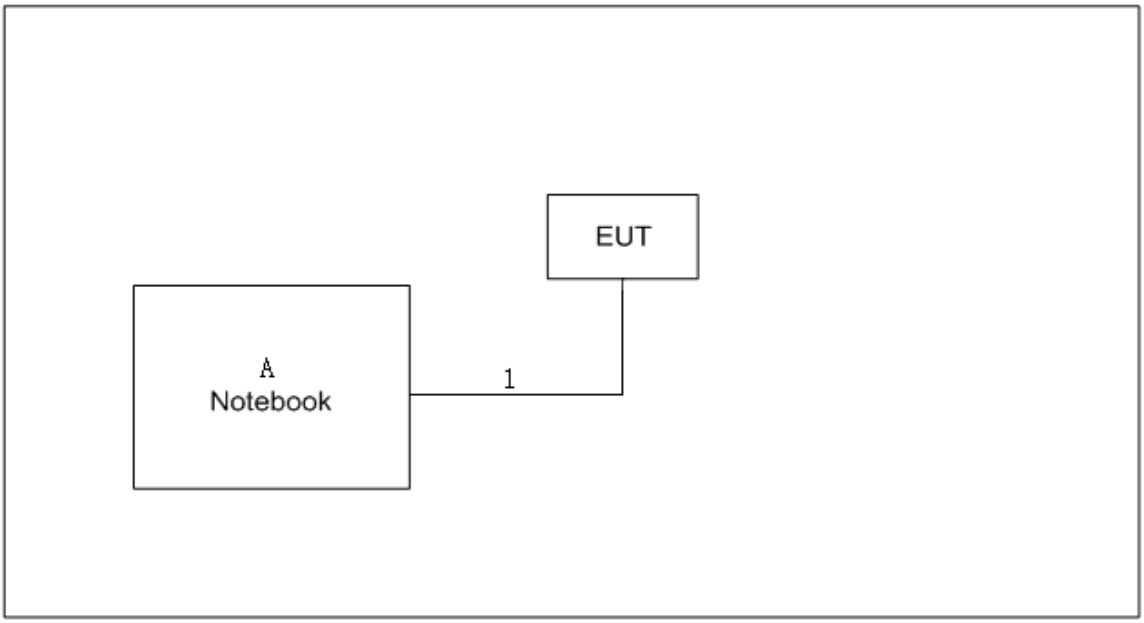
(1) The measurements are performed at the high, middle, low available channels.
(2) The measurements for Hopping Channel Separation, Bandwidth and Peak Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

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	Blue Test3		
Frequency (MHz)	2402	2441	2480
Parameters(1Mbps)	23,32	23,32	23,32
Parameters(3Mbps)	23,50	23,50	23,50

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 DESCRIPTION OF SUPPORT UNITS

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

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
A	Notebook	Lenovo	INSPIRON 1420	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.8m	USB Cable

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150 kHz-30 MHz)

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

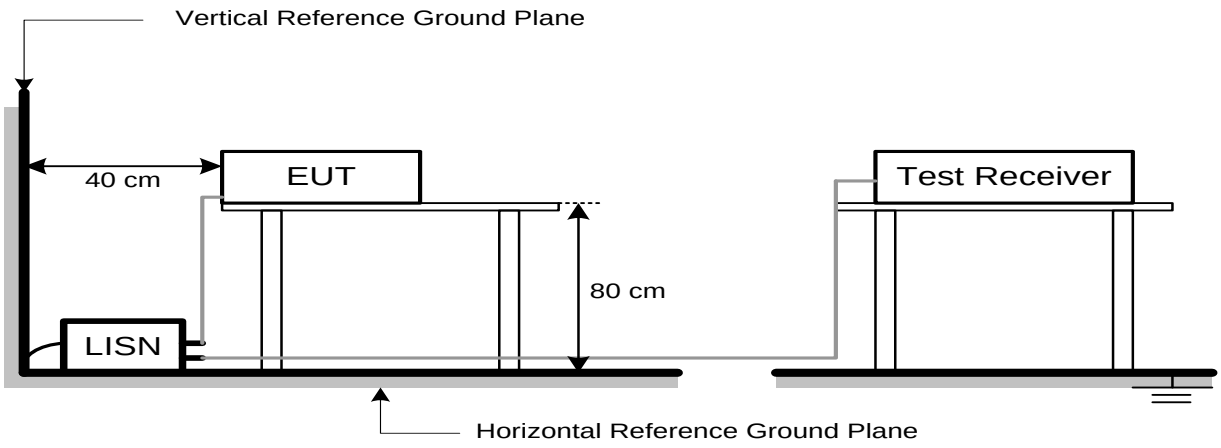
4.1.2 TEST PROCEDURE

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



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: 27°C Relative Humidity: 39% Test Voltage: AC 120V/60Hz

4.1.7 TEST RESULTS

Please refer to the Appendix A.

Remark:

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

(2) Measuring frequency range from 150 kHz to 30 MHz.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS

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
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

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

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	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

4.2.2 TEST PROCEDURE

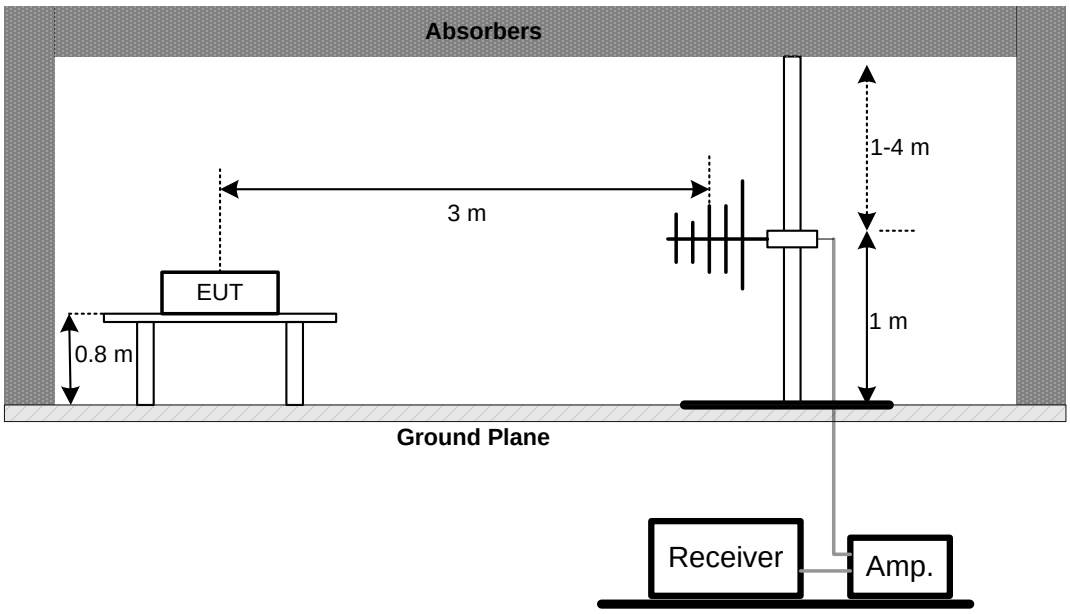
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance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

4.2.3 DEVIATION FROM TEST STANDARD

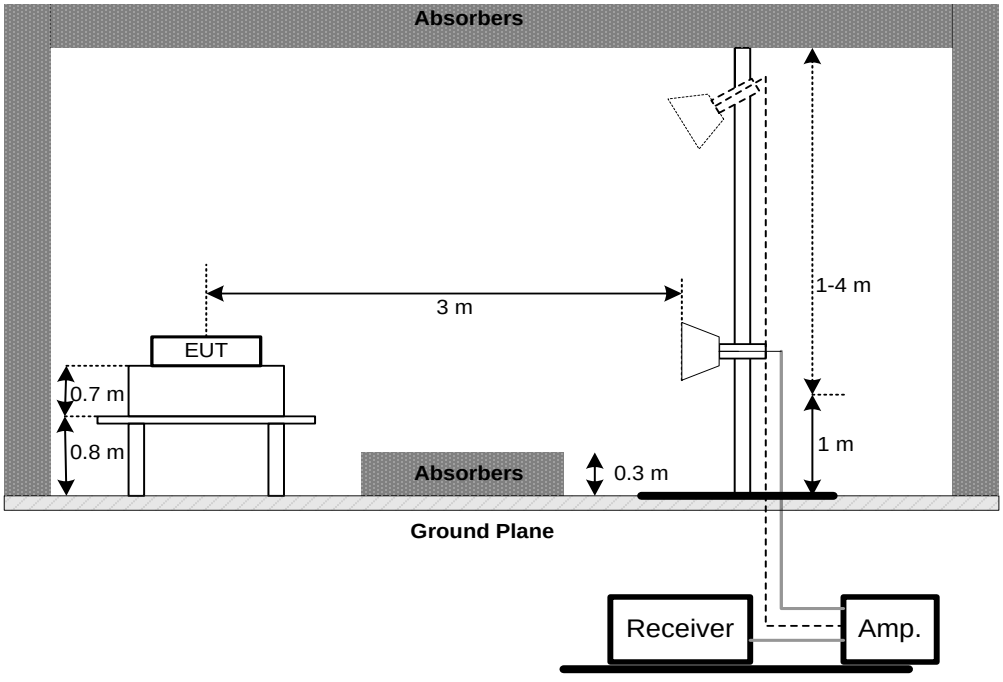
No deviation

4.2.4 TEST SETUP

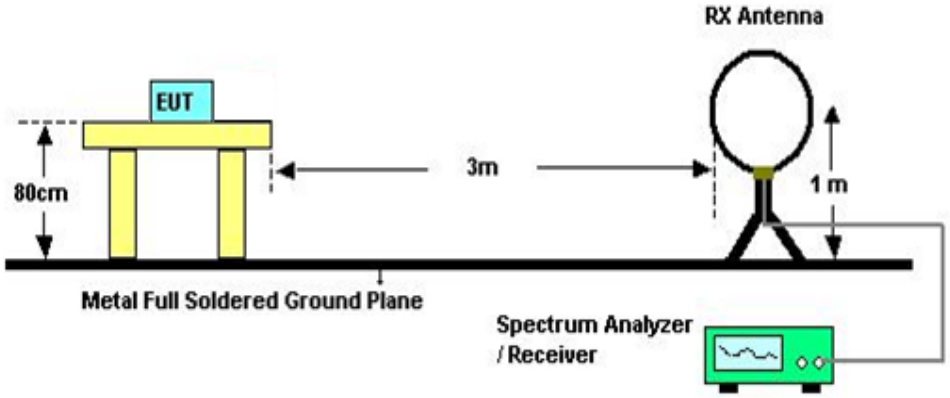
(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



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



(C) For Radiated Emissions 9 kHz-30 MHz



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

4.2.7 TEST RESULTS (9 kHz TO 30 MHz)

Please refer to the Appendix B

Remark:

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

4.2.8 TEST RESULTS (30 MHz TO 1000 MHz)

Please refer to the Appendix C.

4.2.9 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 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

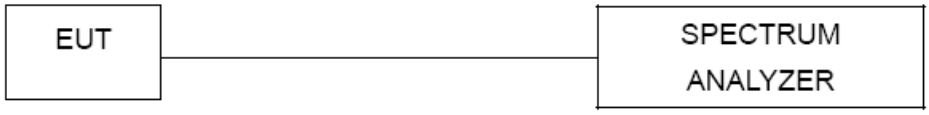
5.1.1 TEST PROCEDURE

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.

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: 26°C Relative Humidity: 48% Test Voltage: DC 5V

5.1.6 TEST RESULTS

Please refer to the Appendix E

6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

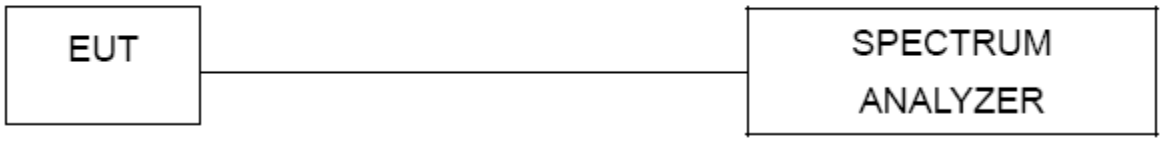
6.1.1 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz
c. Use a video trigger with the trigger level set to enable triggering only on full pulses
d. Sweep Time is more than once pulse time
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span
f. Measure the maximum time duration of one single pulse
g. Set the EUT for DH5, DH3 and DH1 packet transmitting
h. Measure the maximum time duration of one single pulse
i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds
j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 5.06 x 31.6 = 160 within 31.6 seconds
k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times 10.12 x 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: 26°C Relative Humidity: 48% Test Voltage: DC 5V

6.1.6 TEST RESULTS

Please refer to the Appendix F

7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

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

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

7.1.1 TEST PROCEDURE

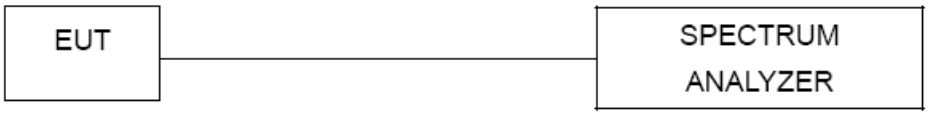
a. The EUT must have its hopping function enabled

b. Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ 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: 26°C Relative Humidity: 48% Test Voltage: DC 5V

7.1.5 TEST RESULTS

Please refer to the Appendix 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

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= 30 kHz, VBW=100 kHz, 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: 26°C Relative Humidity: 48% Test Voltage: DC 5V

8.1.6 TEST RESULTS

Please refer to the Appendix H

9. MAXIMUM OUTPUT POWER

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)	Maximum Output Power	0.125Watt or 21dBm	2400-2483.5	PASS

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

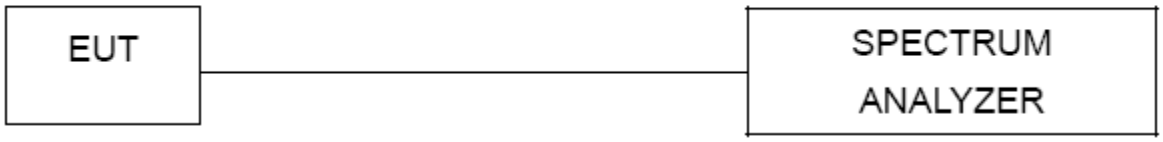
9.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 1 MHz/3 MHz, VBW= 1 MHz/3 MHz, 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: 26°C Relative Humidity: 48% Test Voltage: DC 5V

9.1.6 TEST RESULTS

Please refer to the Appendix 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 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)).

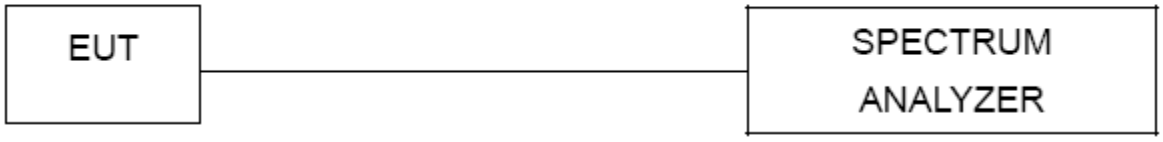
10.1.1 TEST PROCEDURE

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

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: 26°C Relative Humidity: 48% Test Voltage:DC 5V

10.1.6 TEST RESULTS

Please refer to the Appendix J

11. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019
2	LISN	EMCO	3816/2	52765	Mar. 11, 2019
3	50Ω Terminator	SHX	TF2-3G-A	8122901	Mar. 11, 2019
4	TWO-LINE V-NETWORK	R&S	ENV216	101447	Mar. 11, 2019
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Mar. 23, 2019

Radiated Emission Measurement-9 kHz TO 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EM	EM-6876-1	230	Feb. 07, 2019
2	Cable	N/A	RG 213/U	C-102	Jun. 01, 2019
3	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

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

Radiated Emission Measurement - Above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 11, 2019
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2019
3	Amplifier	Agilent	8449B	3008A02274	Mar. 11, 2019
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 11, 2019
5	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	mitron	B10-01-01-12M	18072744	Jul. 30, 2019
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Number of Hopping Channel					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Average Time of Occupancy					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Hopping Channel Separation Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Peak Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

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

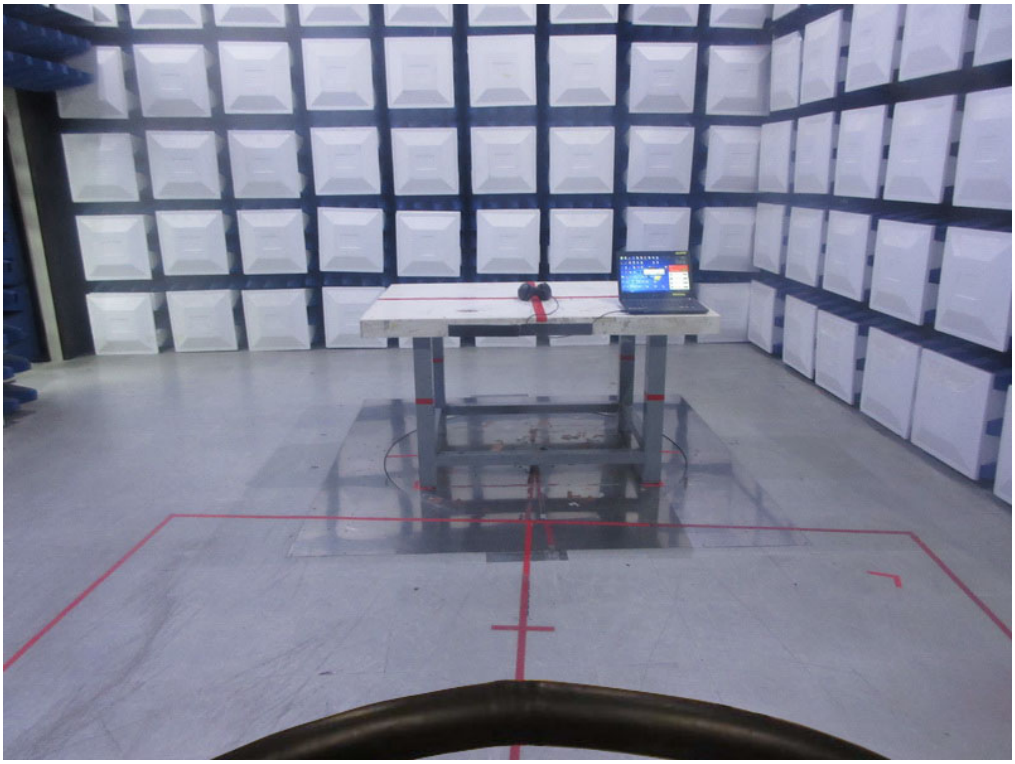
12. EUT TEST PHOTO

Conducted Measurement Photos_ USB port

Conducted Measurement Photos_Adapter

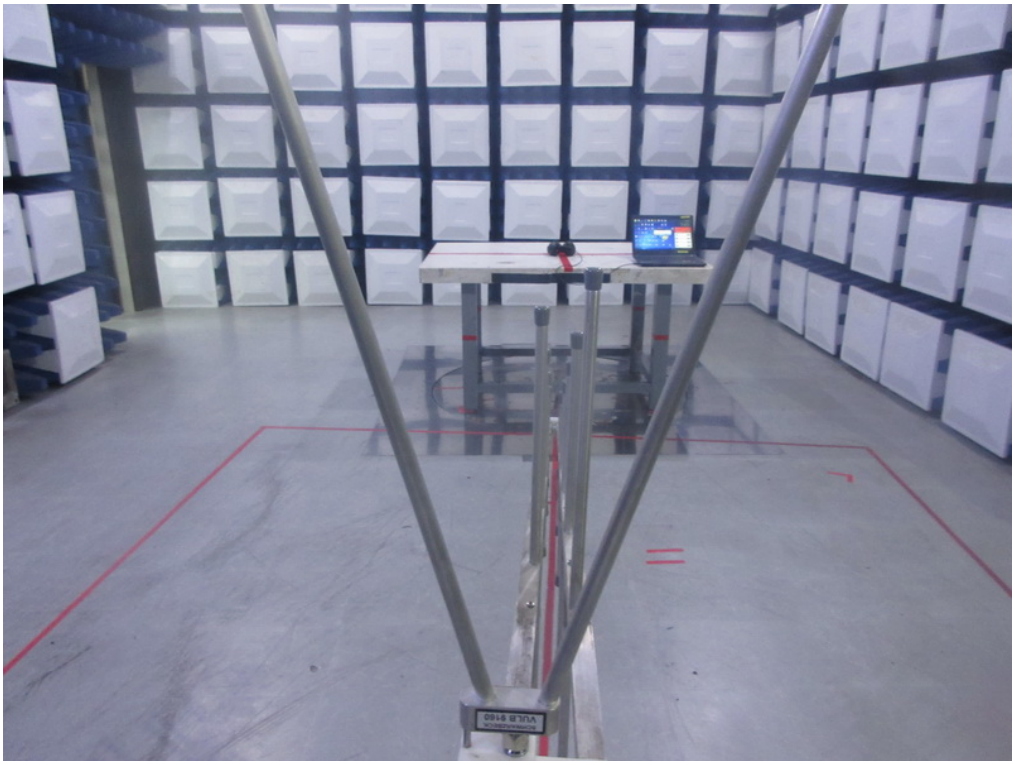
Radiated Measurement Photos

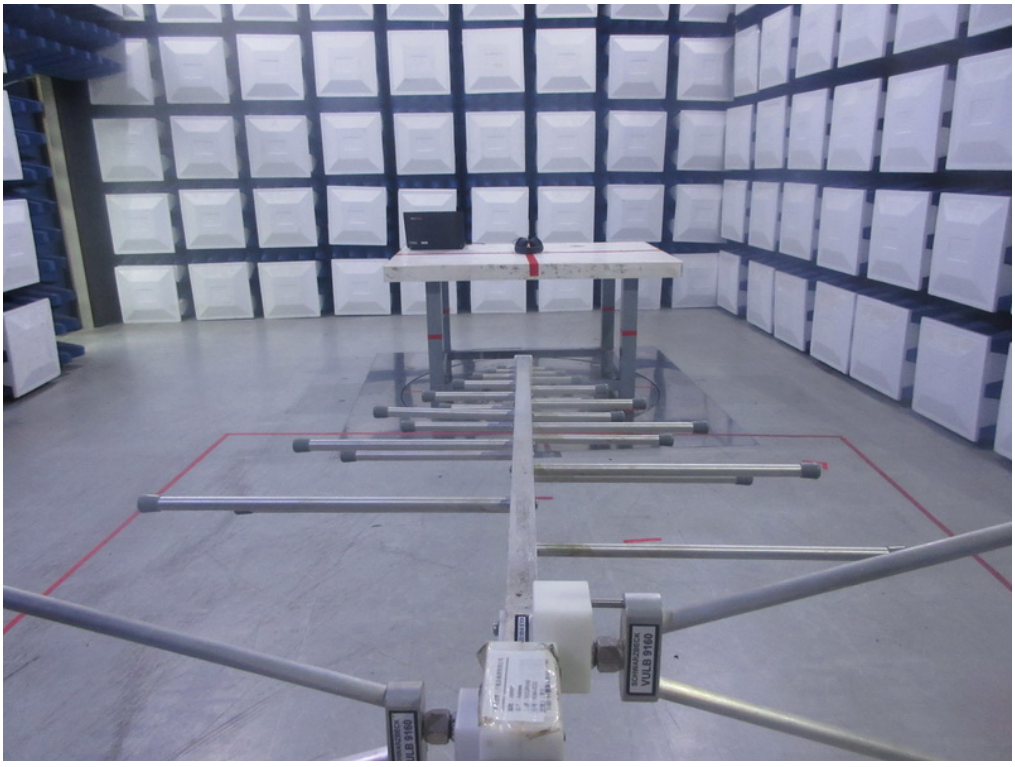
9 kHz to 30 MHz



Radiated Measurement Photos

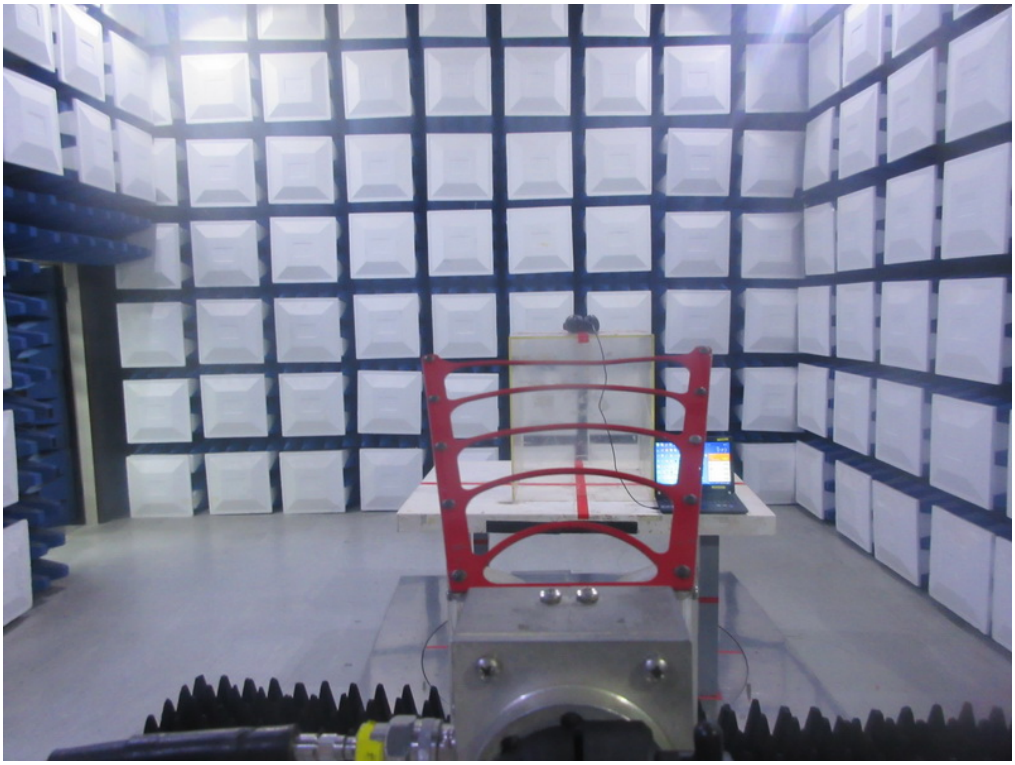
30 MHz to 1000 MHz

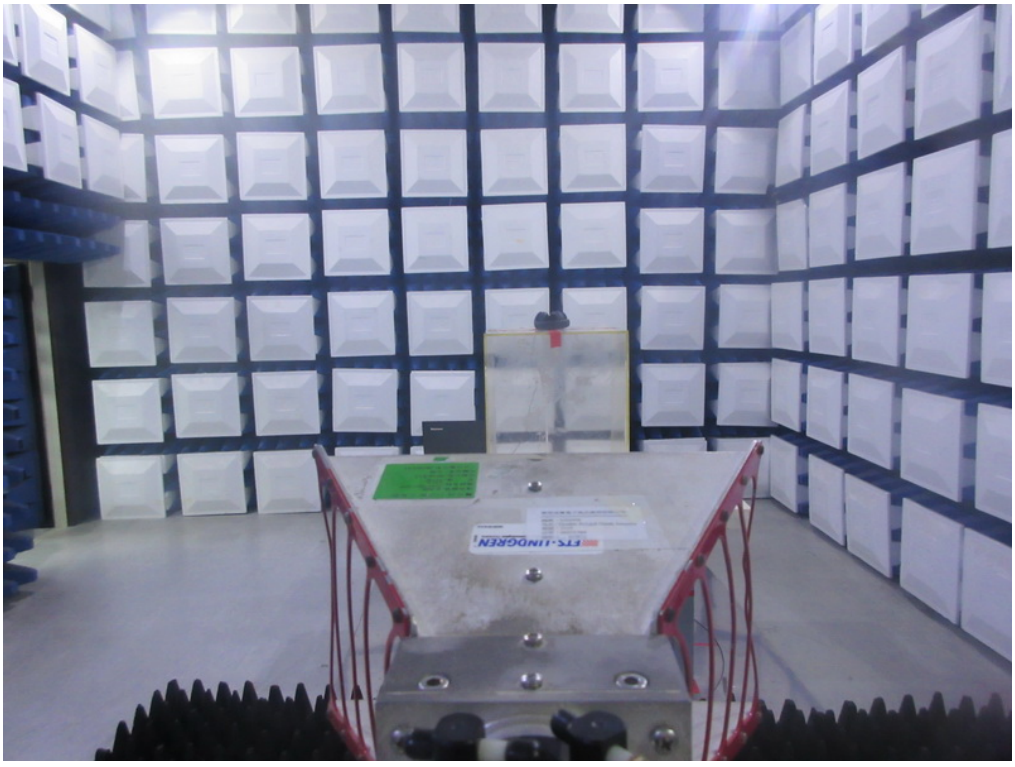




Radiated Measurement Photos

Above 1000 MHz

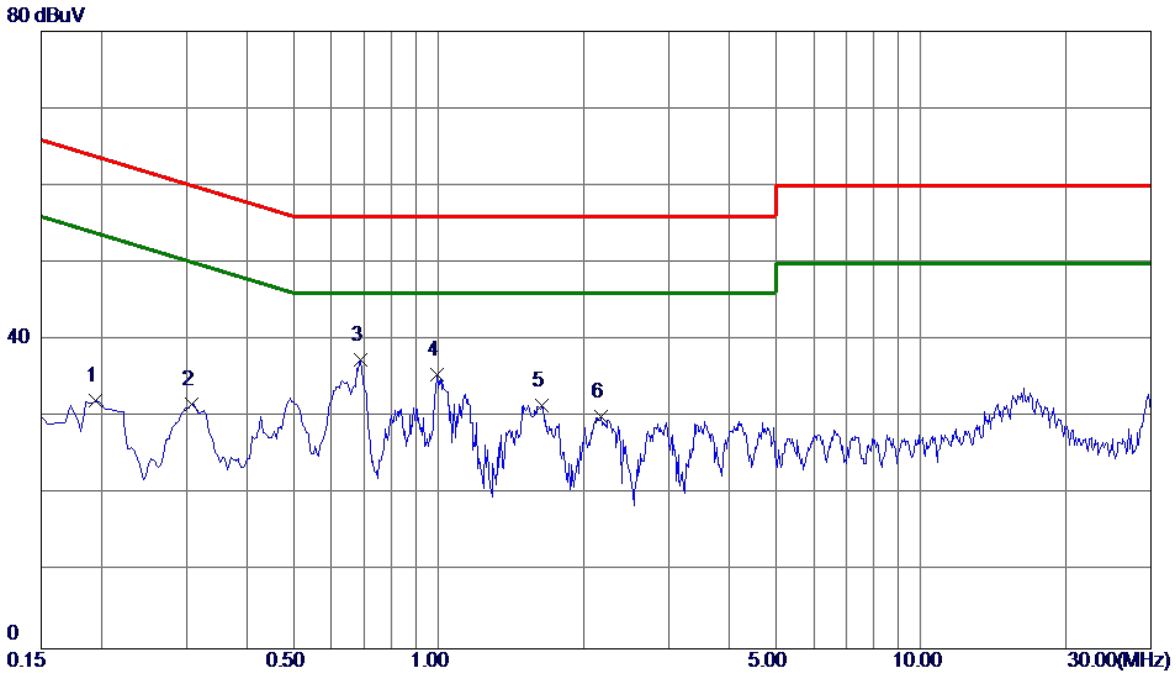




APPENDIX A - CONDUCTED EMISSION

Test Mode:	TX Mode(Supplied from USB port.)

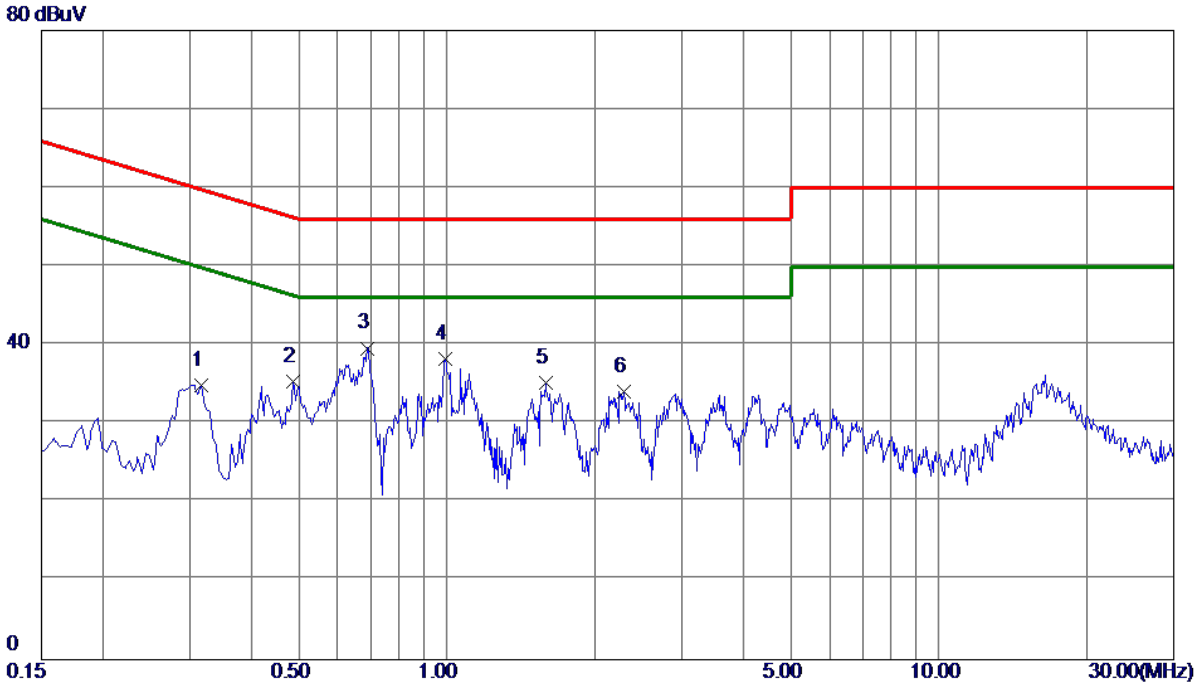
Line



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1949	22.33	9.82	32.15	63.83	-31.68	Peak	
2	0.3075	21.79	9.82	31.61	60.04	-28.43	Peak	
3 *	0.6900	27.51	9.87	37.38	56.00	-18.62	Peak	
4	0.9915	25.57	9.92	35.49	56.00	-20.51	Peak	
5	1.6395	21.58	9.97	31.55	56.00	-24.45	Peak	
6	2.1705	20.00	10.01	30.01	56.00	-25.99	Peak	

Test Mode:	TX Mode(Supplied from USB port.)

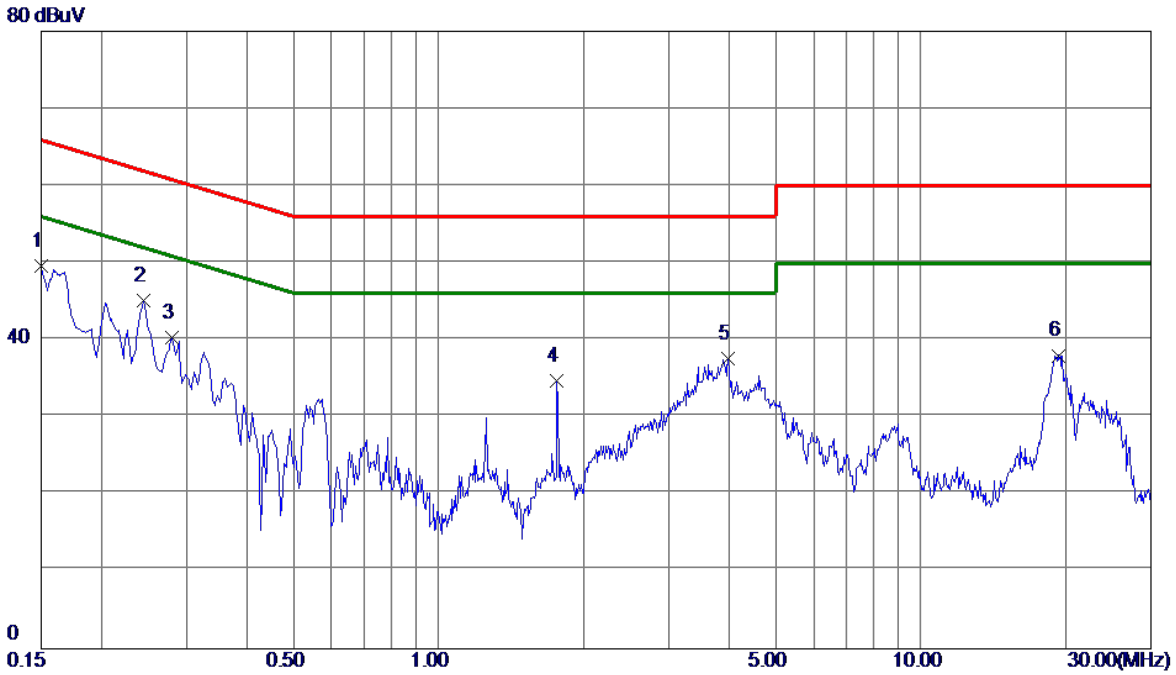
Neutral



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.3165	25.00	9.94	34.94	59.80	-24.86	Peak	
2	0.4875	25.36	9.94	35.30	56.21	-20.91	Peak	
3 *	0.6900	29.57	10.03	39.60	56.00	-16.40	Peak	
4	0.9915	28.06	10.12	38.18	56.00	-17.82	Peak	
5	1.5900	24.99	10.16	35.15	56.00	-20.85	Peak	
6	2.2875	23.94	10.20	34.14	56.00	-21.86	Peak	

Test Mode:	TX Mode (Supplied from adapter.)

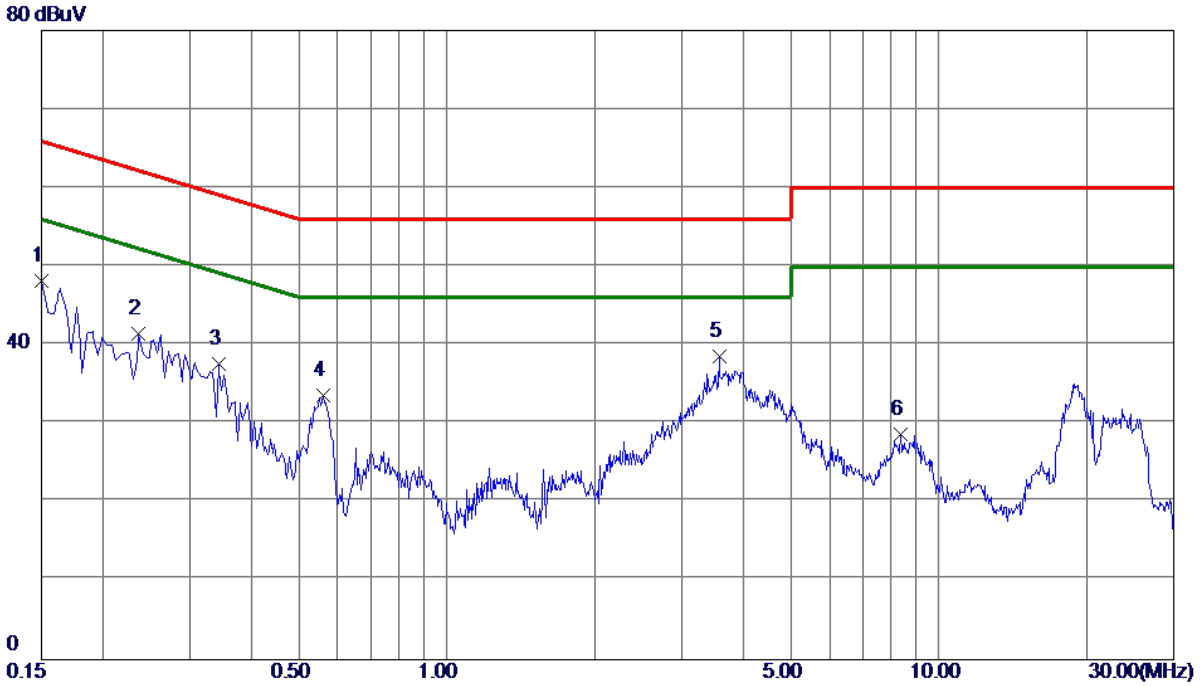
Line



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1500	39.74	9.82	49.56	66.00	-16.44	Peak	
2	0.2445	35.34	9.82	45.16	61.94	-16.78	Peak	
3	0.2805	30.50	9.82	40.32	60.80	-20.48	Peak	
4	1.7610	24.67	9.98	34.65	56.00	-21.35	Peak	
5	3.9885	27.46	10.13	37.59	56.00	-18.41	Peak	
6	19.3200	26.87	11.13	38.00	60.00	-22.00	Peak	

Test Mode:	TX Mode(Supplied from adapter.)

Neutral

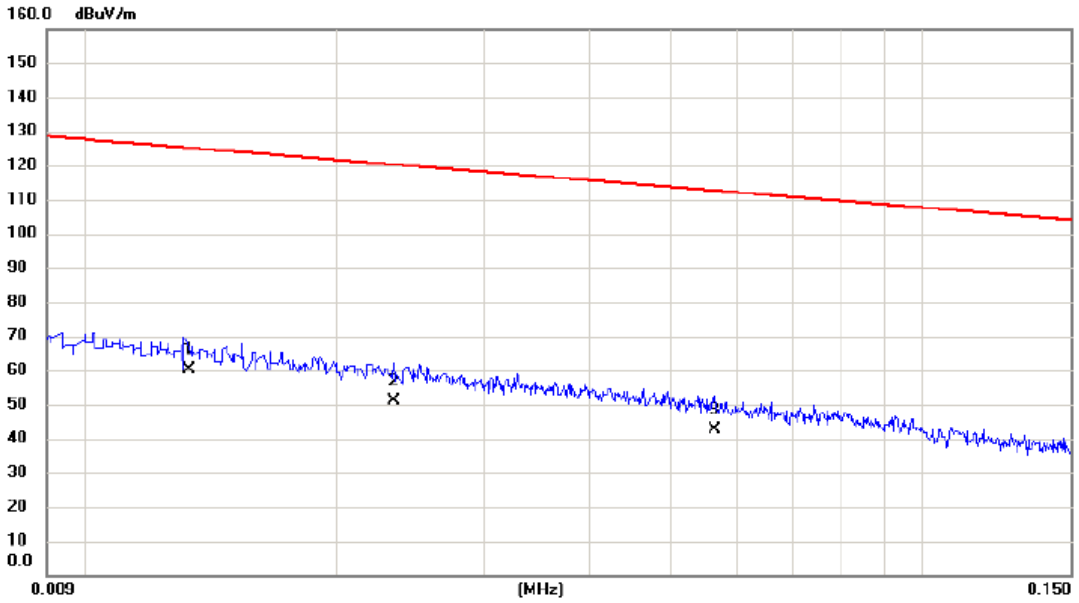


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	38.22	9.91	48.13	66.00	-17.87	Peak	
2	0.2366	31.59	9.92	41.51	62.21	-20.70	Peak	
3	0.3435	27.64	9.95	37.59	59.12	-21.53	Peak	
4	0.5595	23.70	9.96	33.66	56.00	-22.34	Peak	
5 *	3.5790	28.21	10.29	38.50	56.00	-17.50	Peak	
6	8.3625	18.04	10.66	28.70	60.00	-31.30	Peak	

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

Test Mode:	TX Mode

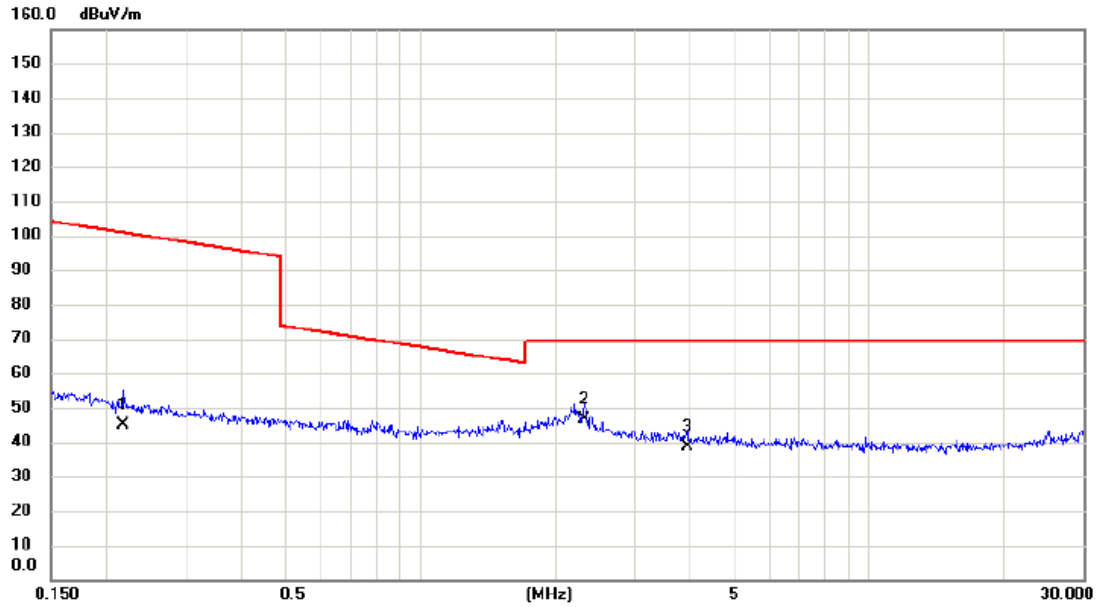
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0133	39.10	20.96	60.06	125.13	-65.07	AVG	
2		0.0234	31.10	19.96	51.06	120.22	-69.16	AVG	
3		0.0565	23.20	19.40	42.60	112.56	-69.96	AVG	

Test Mode:	TX Mode

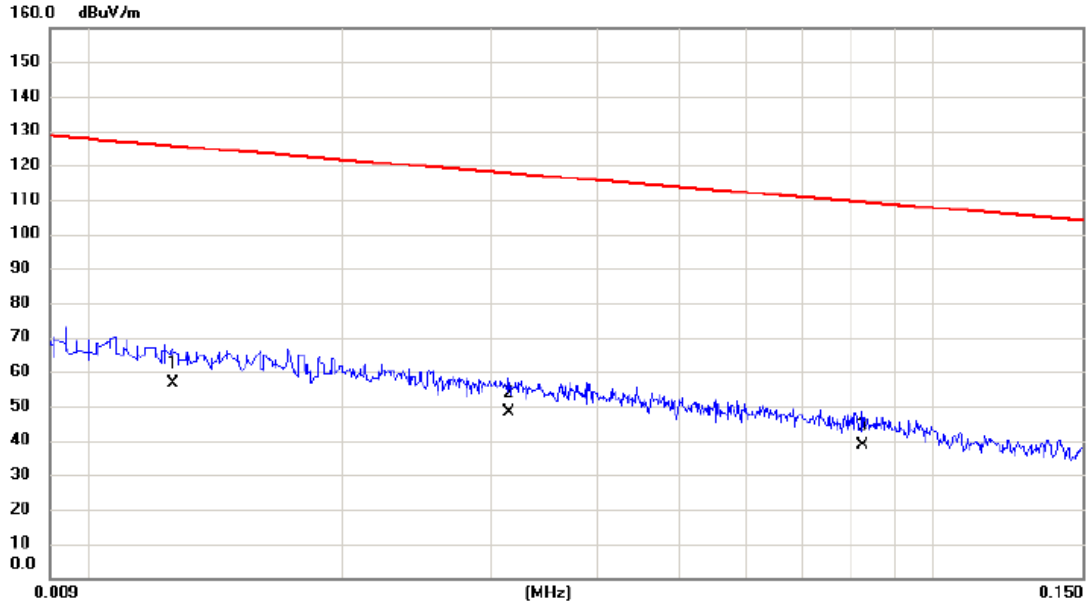
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.2174	27.70	17.12	44.82	100.86	-56.04	AVG	
2	*	2.3090	29.50	16.93	46.43	69.54	-23.11	QP	
3		3.9222	22.70	15.81	38.51	69.54	-31.03	QP	

Test Mode:	TX Mode

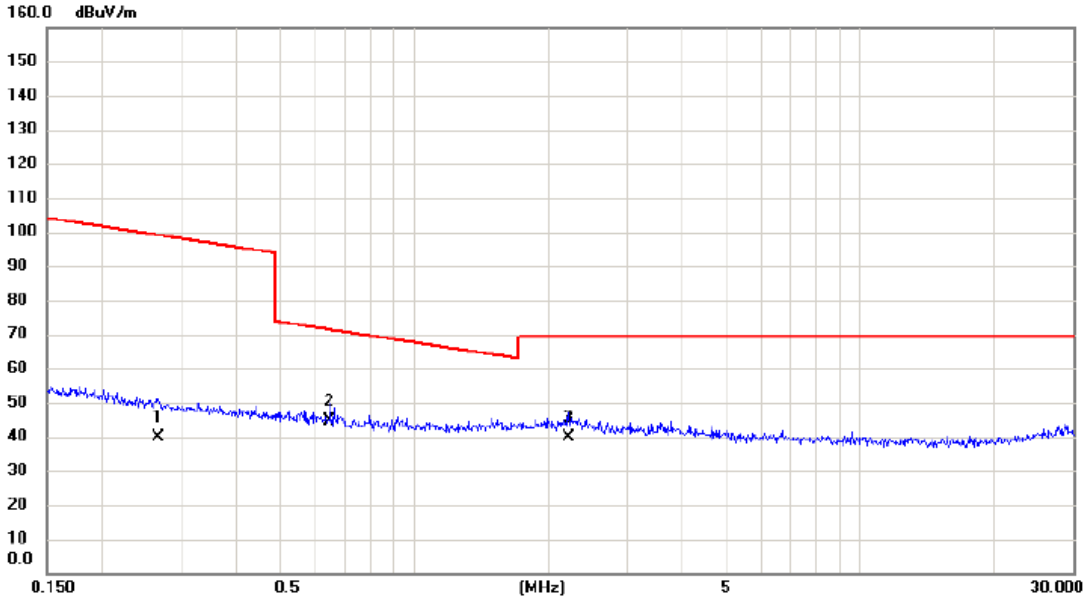
Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0126	35.60	21.06	56.66	125.60	-68.94	AVG	
2		0.0314	28.30	19.83	48.13	117.67	-69.54	AVG	
3		0.0824	19.70	18.85	38.55	109.29	-70.74	AVG	

Test Mode:	TX Mode

Ant 90°

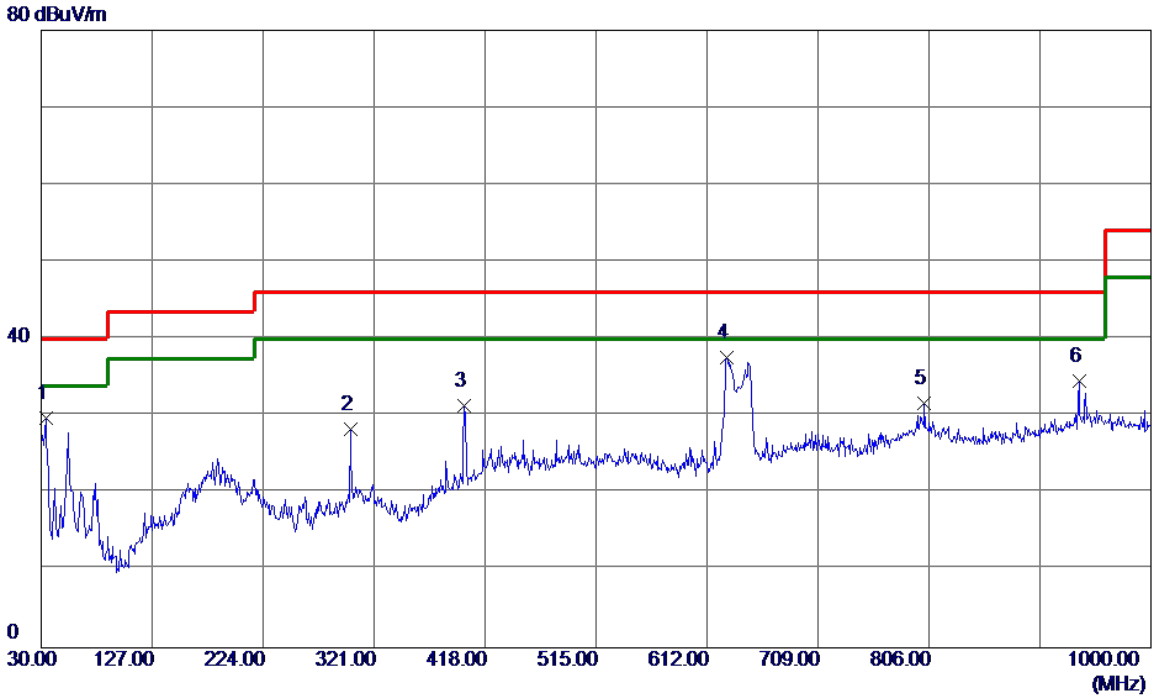


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.2672	22.90	17.05	39.95	99.07	-59.12	AVG	
2	*	0.6474	27.70	16.92	44.62	71.38	-26.76	QP	
3		2.2132	22.80	16.98	39.78	69.54	-29.76	QP	

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

Test Mode:	TX 2402 MHz _CH00_1Mbps

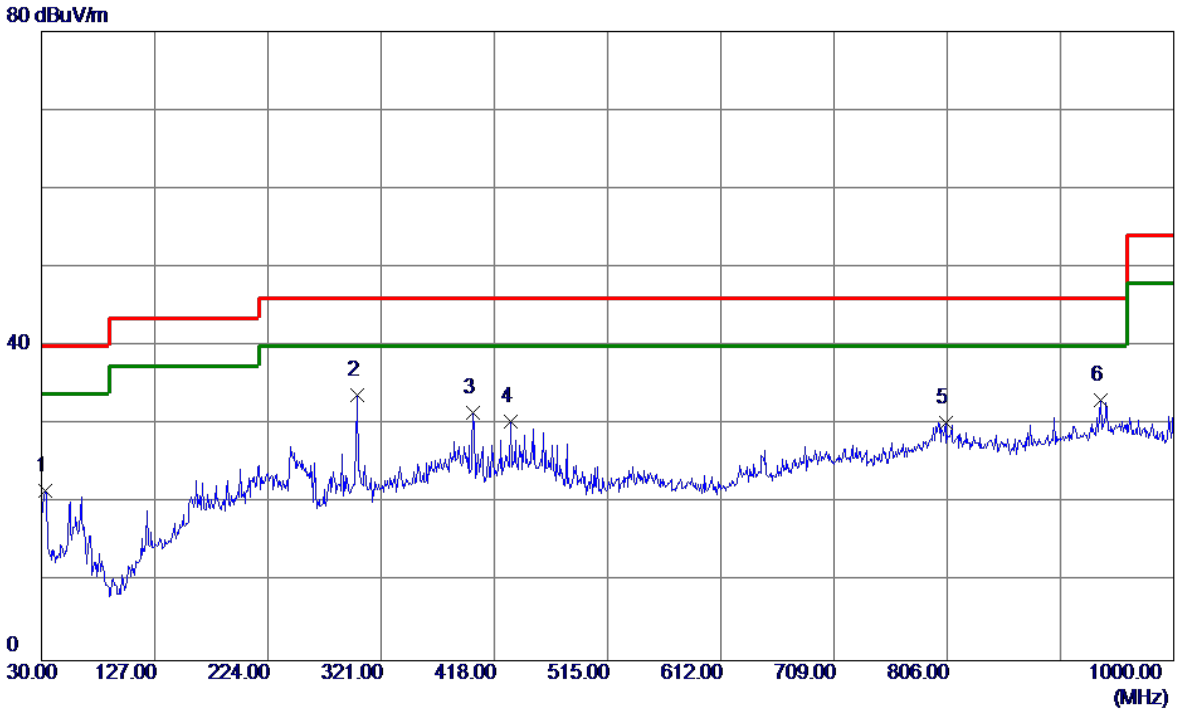
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	33.8800	44.53	-14.83	29.70	40.00	-10.30	Peak	
2	300.1450	38.63	-10.37	28.26	46.00	-17.74	Peak	
3	399.5700	40.77	-9.40	31.37	46.00	-14.63	Peak	
4 *	629.4600	43.22	-5.64	37.58	46.00	-8.42	Peak	
5	802.1200	32.73	-1.07	31.66	46.00	-14.34	Peak	
6	936.9500	33.60	0.89	34.49	46.00	-11.51	Peak	

Test Mode:	TX 2402 MHz _CH00_1Mbps

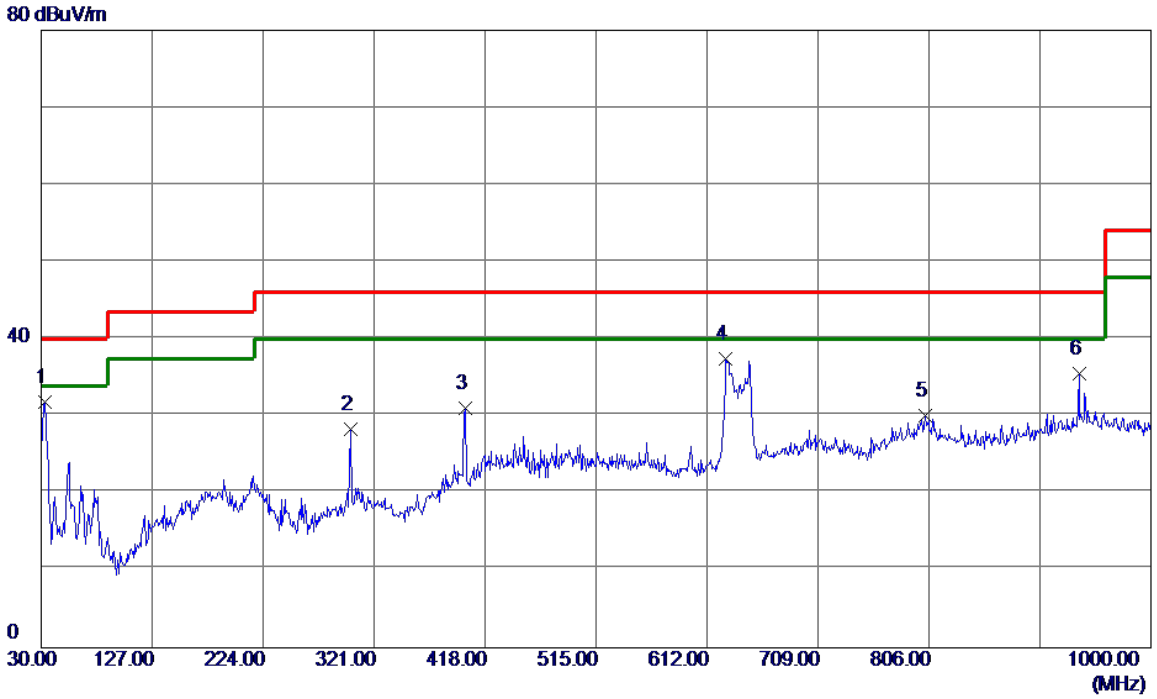
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	32.9100	36.56	-14.94	21.62	40.00	-18.38	Peak	
2 *	300.6300	44.13	-10.38	33.75	46.00	-12.25	Peak	
3	400.0550	40.86	-9.38	31.48	46.00	-14.52	Peak	
4	432.0650	38.49	-8.11	30.38	46.00	-15.62	Peak	
5	804.5450	31.39	-1.11	30.28	46.00	-15.72	Peak	
6	936.9500	32.17	0.89	33.06	46.00	-12.94	Peak	

Test Mode:	TX 2441 MHz _CH39_1Mbps

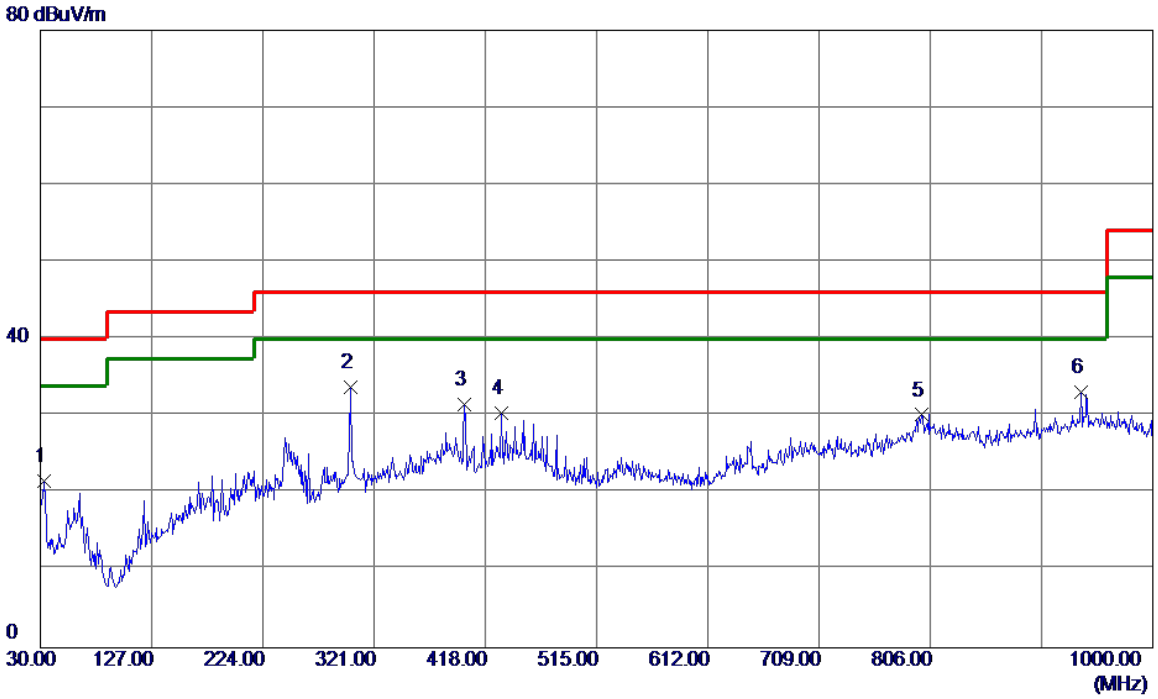
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	32.9100	46.75	-14.94	31.81	40.00	-8.19	Peak	
2	300.1450	38.72	-10.37	28.35	46.00	-17.65	Peak	
3	400.5400	40.45	-9.36	31.09	46.00	-14.91	Peak	
4	628.4900	43.10	-5.66	37.44	46.00	-8.56	Peak	
5	803.0900	31.18	-1.09	30.09	46.00	-15.91	Peak	
6	936.9500	34.66	0.89	35.55	46.00	-10.45	Peak	

Test Mode:	TX 2441 MHz _CH39_1Mbps

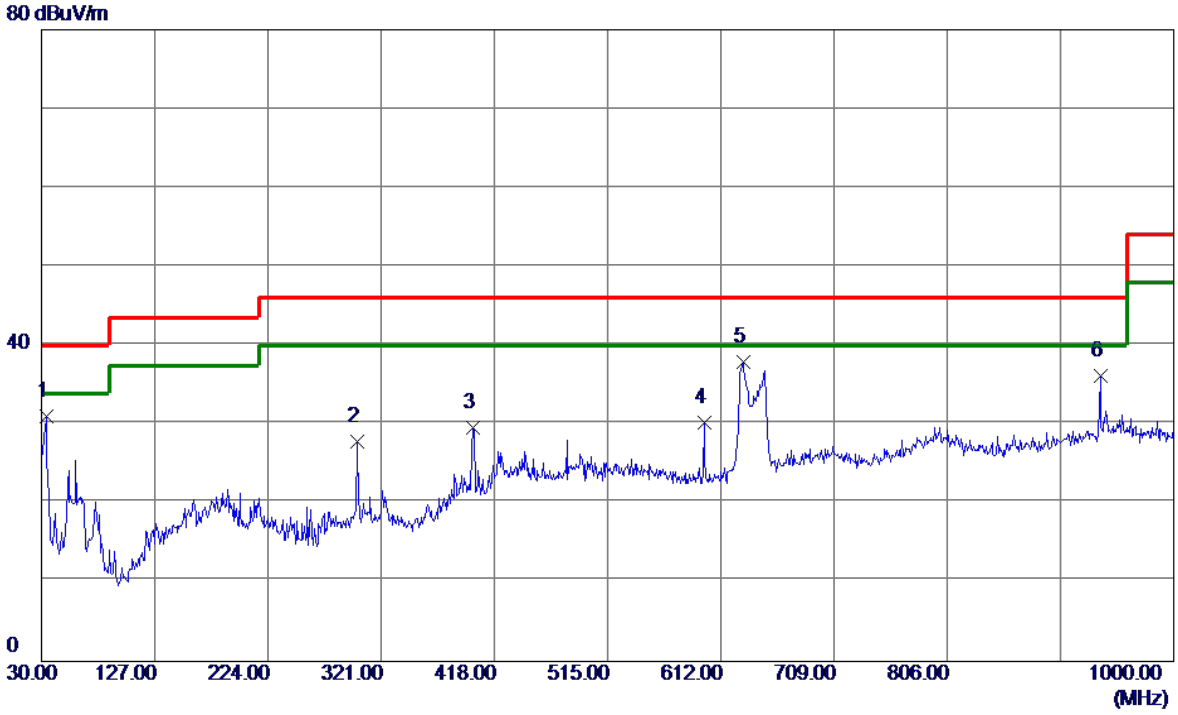
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	32.9100	36.56	-14.94	21.62	40.00	-18.38	Peak	
2 *	300.6300	44.13	-10.38	33.75	46.00	-12.25	Peak	
3	400.0550	40.86	-9.38	31.48	46.00	-14.52	Peak	
4	432.0650	38.49	-8.11	30.38	46.00	-15.62	Peak	
5	798.7250	31.28	-1.12	30.16	46.00	-15.84	Peak	
6	936.9500	32.17	0.89	33.06	46.00	-12.94	Peak	

Test Mode:	TX 2480 MHz _CH78_1Mbps

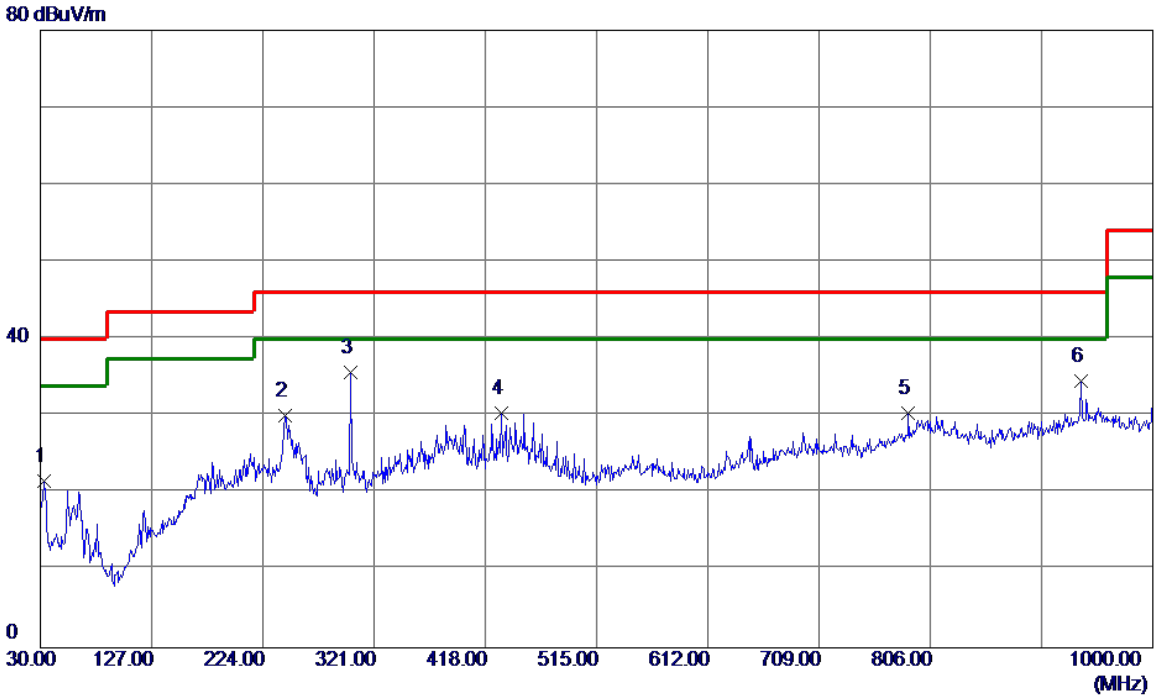
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	34.3650	45.94	-14.85	31.09	40.00	-8.91	Peak	
2	300.1450	38.25	-10.37	27.88	46.00	-18.12	Peak	
3	400.0550	39.03	-9.38	29.65	46.00	-16.35	Peak	
4	597.4500	36.52	-6.26	30.26	46.00	-15.74	Peak	
5 *	630.9150	43.47	-5.60	37.87	46.00	-8.13	Peak	
6	936.9500	35.29	0.89	36.18	46.00	-9.82	Peak	

Test Mode:	TX 2480 MHz _CH78_1Mbps

Horizontal

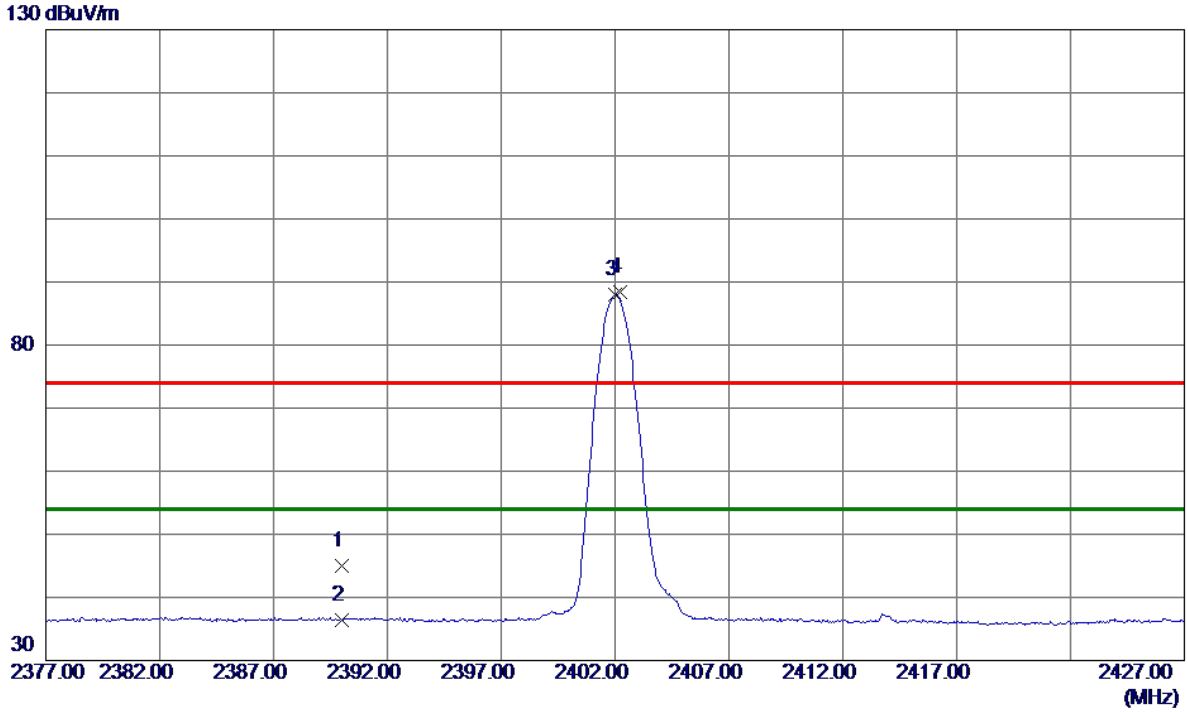


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	32.9100	36.47	-14.94	21.53	40.00	-18.47	Peak	
2	243.8850	44.53	-14.52	30.01	46.00	-15.99	Peak	
3 *	300.1450	46.02	-10.37	35.65	46.00	-10.35	Peak	
4	432.0650	38.52	-8.11	30.41	46.00	-15.59	Peak	
5	787.0850	32.21	-1.82	30.39	46.00	-15.61	Peak	
6	936.9500	33.67	0.89	34.56	46.00	-11.44	Peak	

APPENDIX D - RADIATED EMISSION (ABOVE 1000 MHZ)

Test Mode:	TX 2402 MHz _CH00_1Mbps

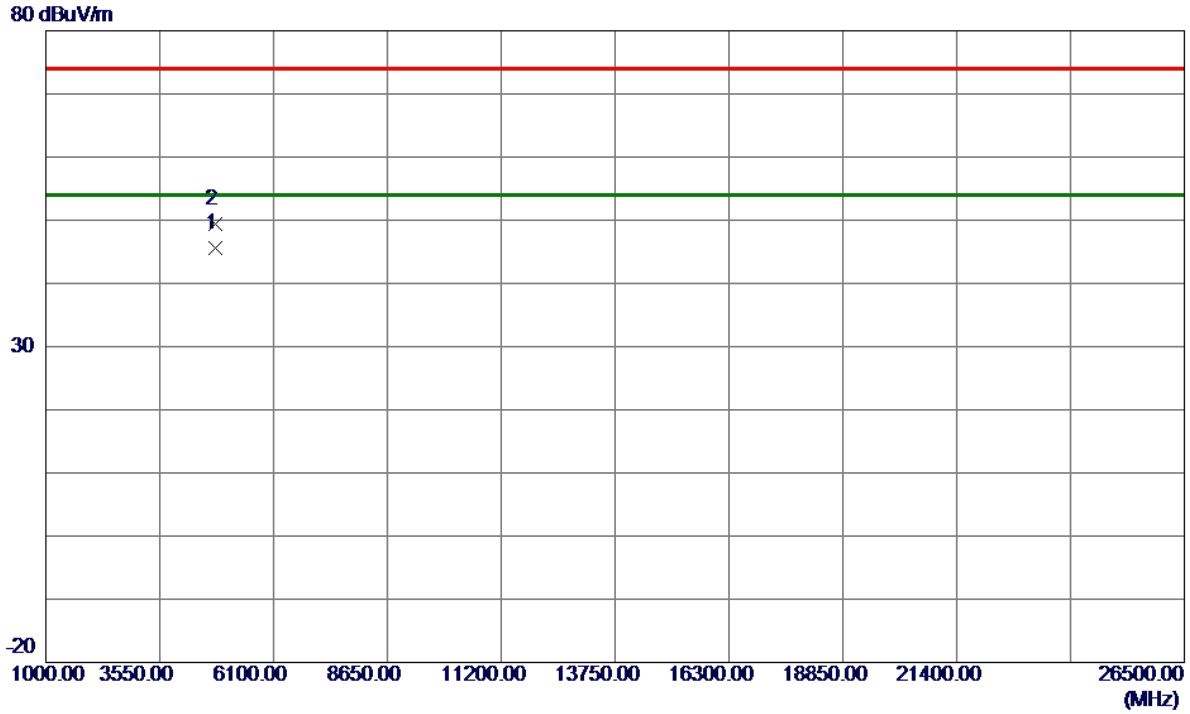
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	38.39	6.62	45.01	74.00	-28.99	Peak	
2	2390.0000	29.80	6.62	36.42	54.00	-17.58	AVG	
3 *	2402.0250	81.34	6.62	87.96	54.00	33.96	AVG	No Limit
4	2402.2000	81.82	6.62	88.44	74.00	14.44	Peak	No Limit

Test Mode:	TX 2402 MHz _CH00_1Mbps

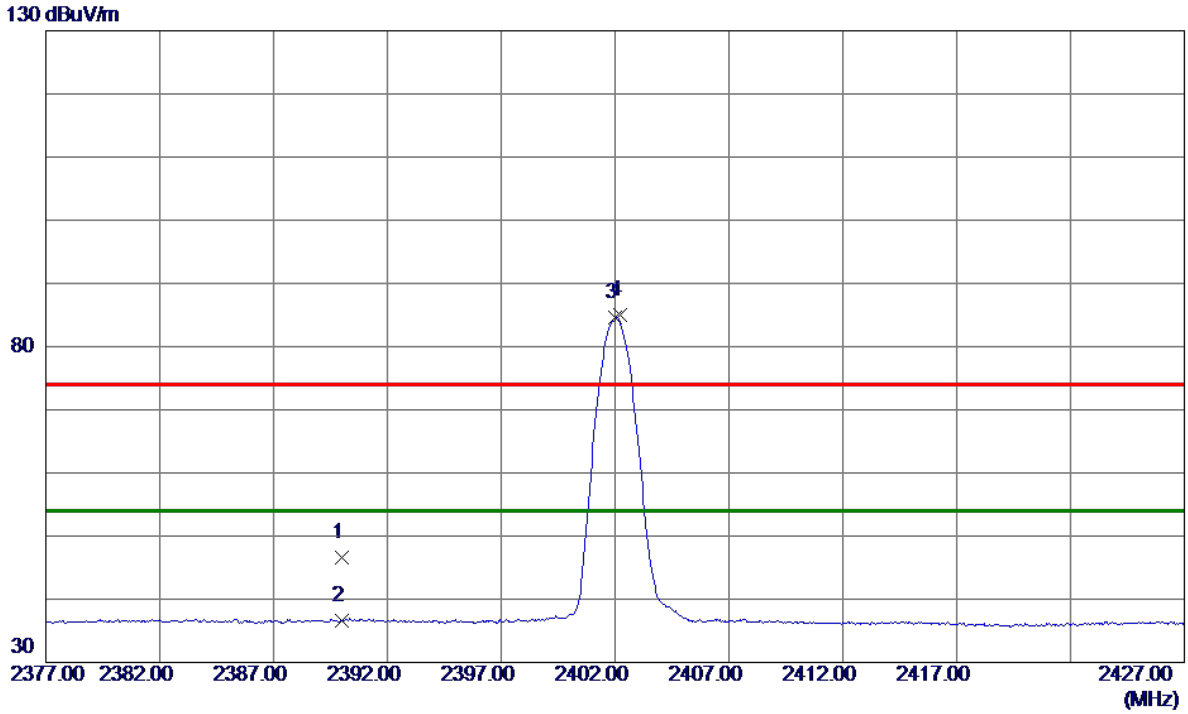
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4804.0379	42.08	3.53	45.61	54.00	-8.39	AVG	
2	4804.3250	45.86	3.53	49.39	74.00	-24.61	Peak	

Test Mode:	TX 2402 MHz _CH00_1Mbps

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	40.02	6.62	46.64	74.00	-27.36	Peak	
2	2390.0000	30.01	6.62	36.63	54.00	-17.37	AVG	
3 *	2402.0250	77.97	6.62	84.59	54.00	30.59	AVG	No Limit
4	2402.2000	78.44	6.62	85.06	74.00	11.06	Peak	No Limit

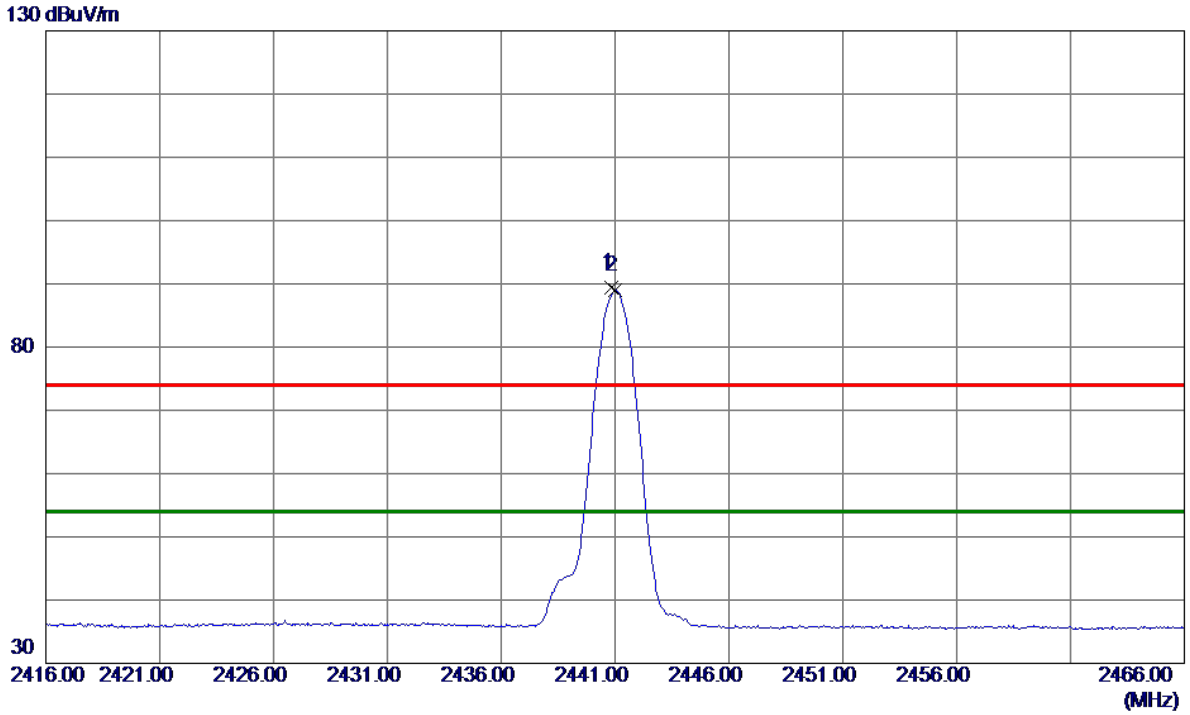
Test Mode:	TX 2402 MHz _CH00_1Mbps

Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4804.0230	44.26	3.53	47.79	74.00	-26.21	Peak	
2 *	4804.0280	39.36	3.53	42.89	54.00	-11.11	AVG	

Test Mode:	TX 2441 MHz _CH39_1Mbps

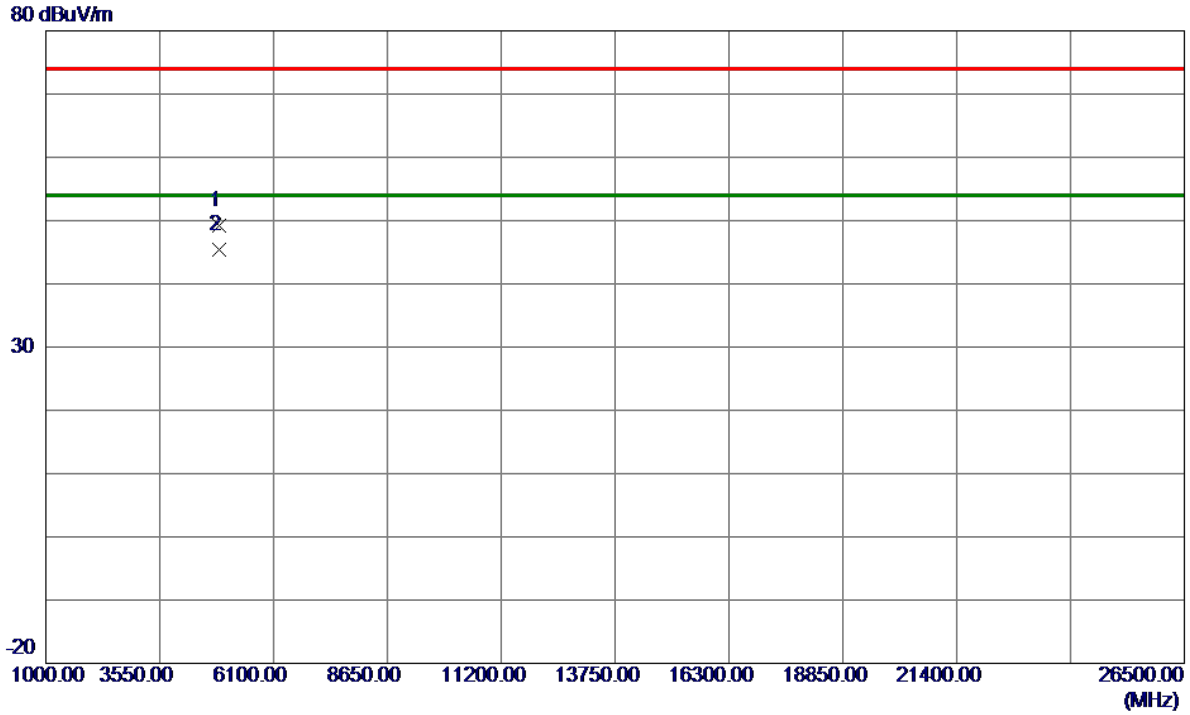
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8500	82.80	6.61	89.41	74.00	15.41	Peak	No Limit
2 *	2441.0250	82.37	6.61	88.98	54.00	34.98	AVG	No Limit

Test Mode:	TX 2441 MHz _CH39_1Mbps

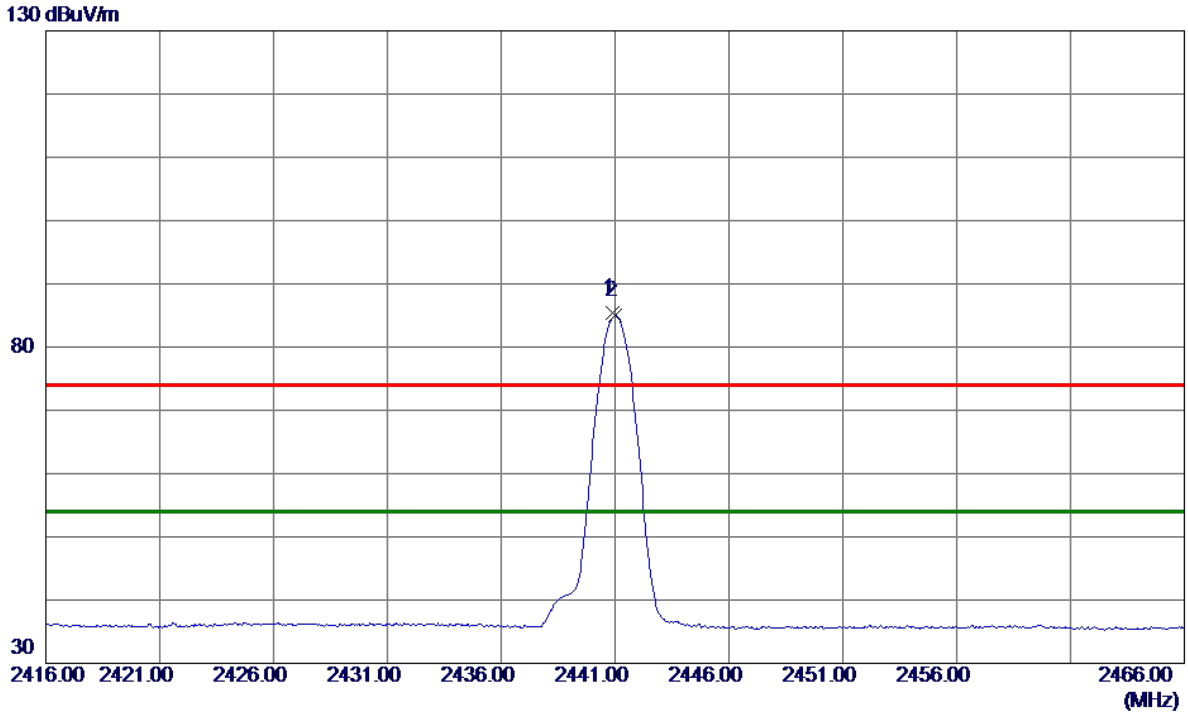
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4882.0330	45.42	3.70	49.12	74.00	-24.88	Peak	
2 *	4882.0419	41.66	3.70	45.36	54.00	-8.64	AVG	

Test Mode:	TX 2441 MHz _CH39_1Mbps

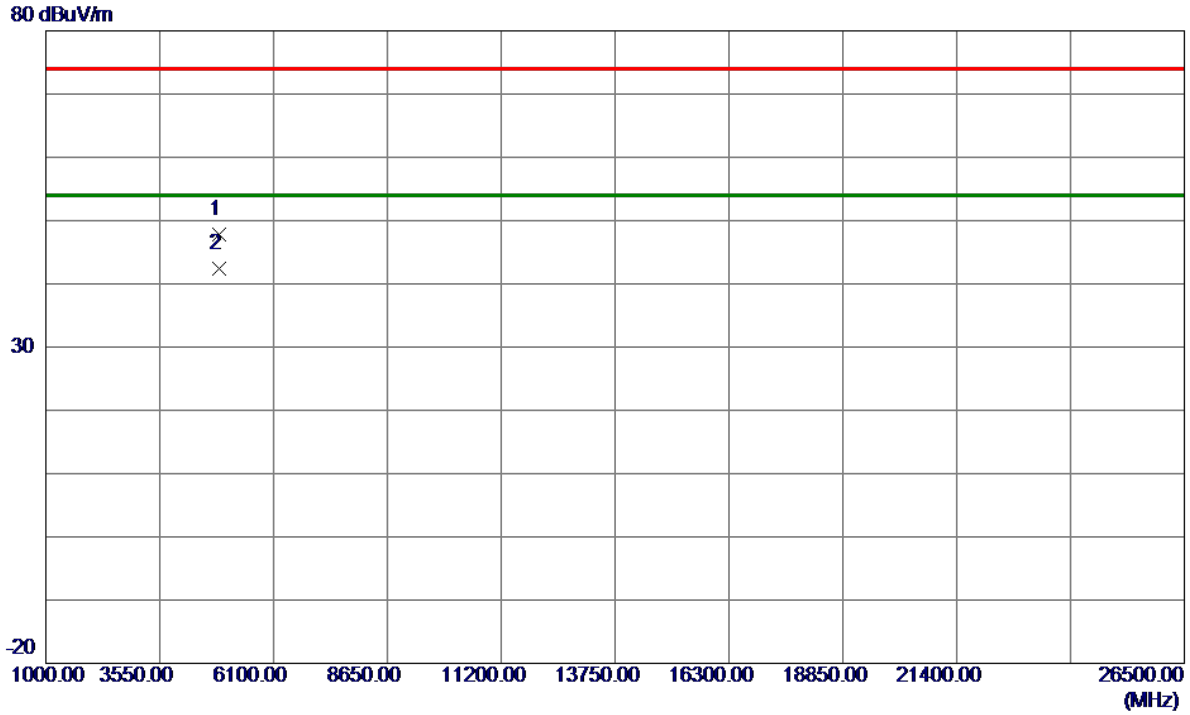
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8750	78.82	6.61	85.43	74.00	11.43	Peak	No Limit
2 *	2441.0250	78.38	6.61	84.99	54.00	30.99	AVG	No Limit

Test Mode:	TX 2441 MHz _CH39_1Mbps

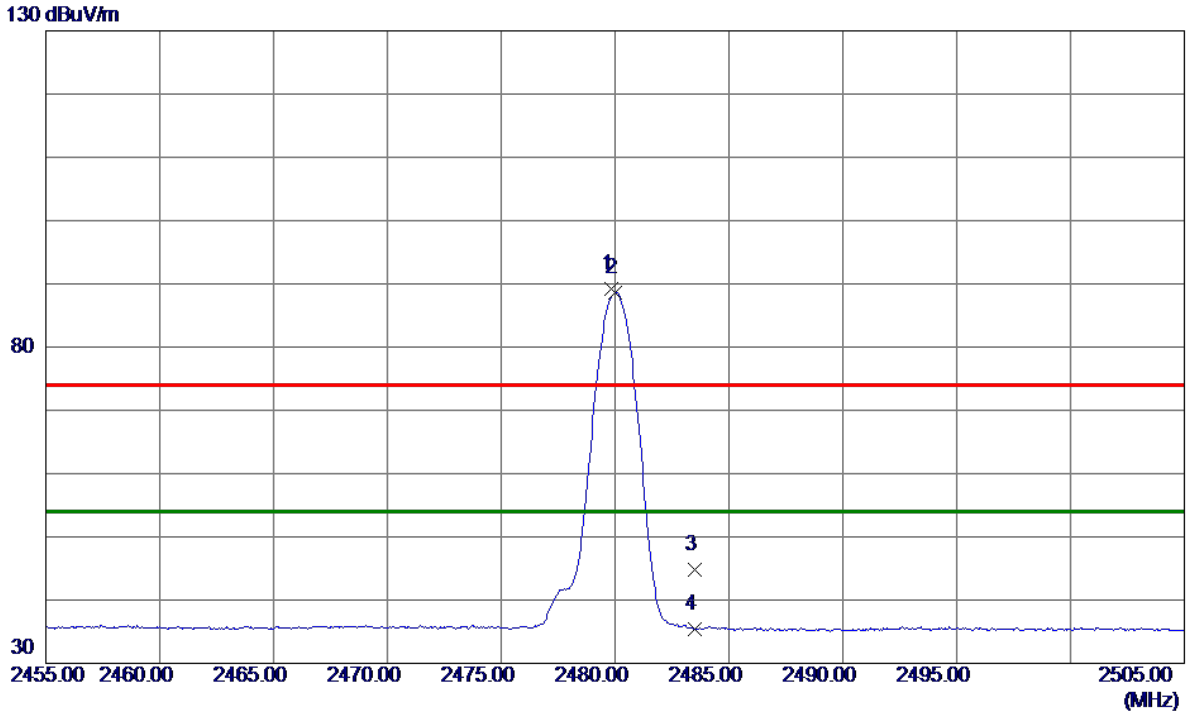
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4881.7300	44.18	3.70	47.88	74.00	-26.12	Peak	
2 *	4882.0379	38.66	3.70	42.36	54.00	-11.64	AVG	

Test Mode:	TX 2480 MHz _CH78_1Mbps

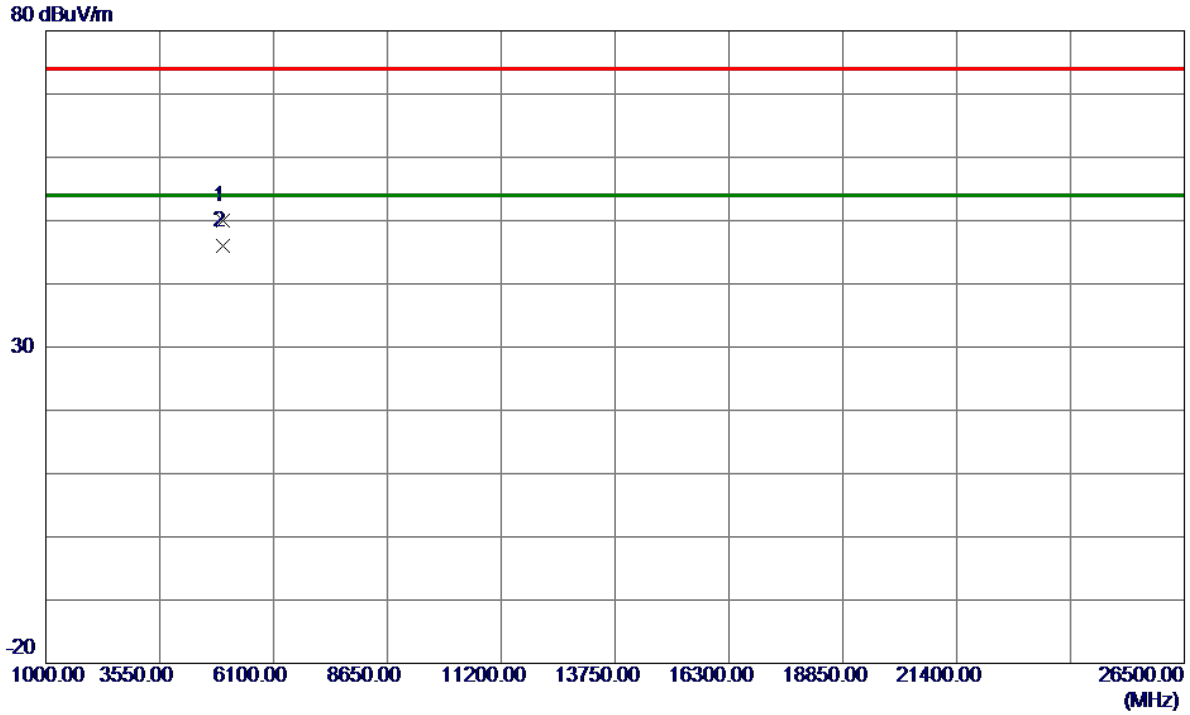
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.8500	82.51	6.61	89.12	74.00	15.12	Peak	No Limit
2 *	2480.0000	82.02	6.61	88.63	54.00	34.63	AVG	No Limit
3	2483.5000	38.20	6.61	44.81	74.00	-29.19	Peak	
4	2483.5000	28.80	6.61	35.41	54.00	-18.59	AVG	

Test Mode:	TX 2480 MHz _CH78_1Mbps

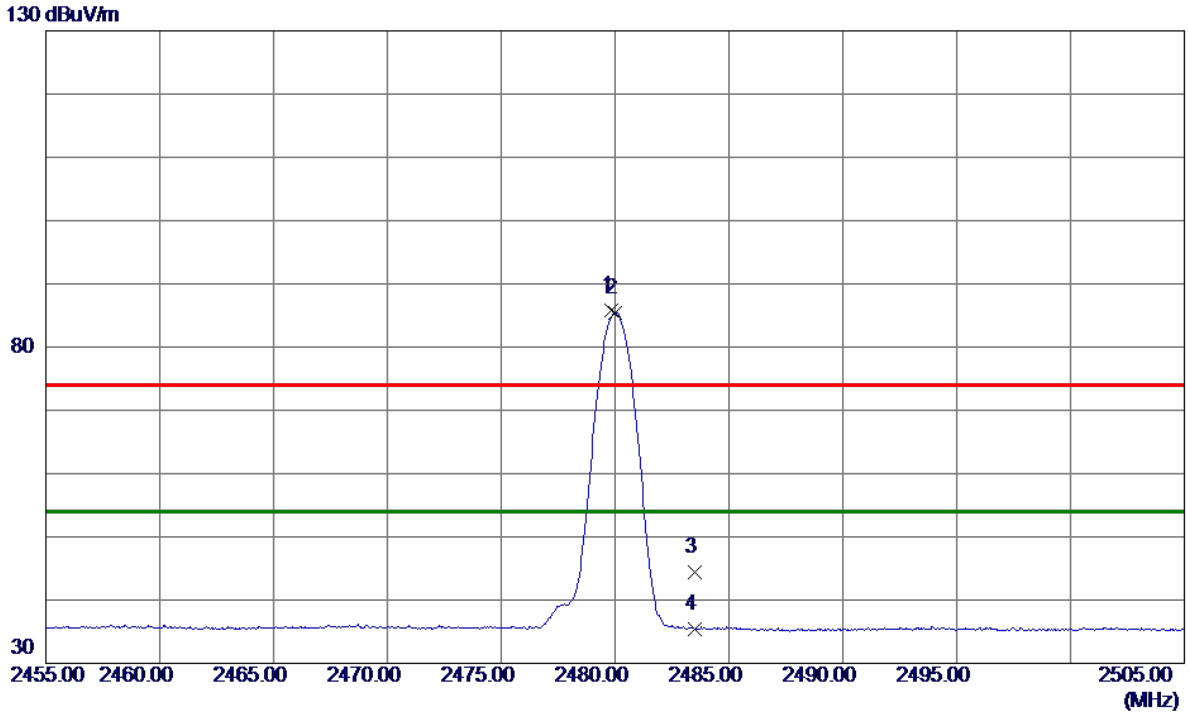
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4959.6250	46.17	3.87	50.04	74.00	-23.96	Peak	
2 *	4960.0600	42.11	3.87	45.98	54.00	-8.02	AVG	

Test Mode:	TX 2480 MHz _CH78_1Mbps

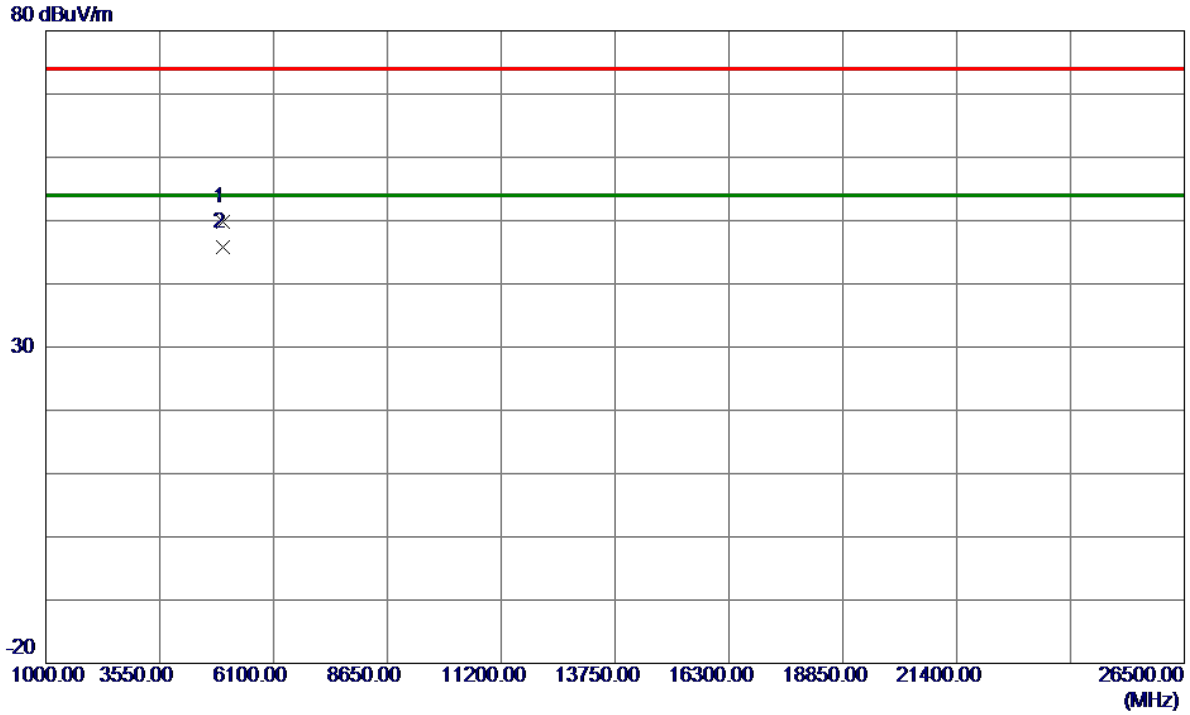
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.8500	79.26	6.61	85.87	74.00	11.87	Peak	No Limit
2 *	2480.0250	78.84	6.61	85.45	54.00	31.45	AVG	No Limit
3	2483.5000	37.80	6.61	44.41	74.00	-29.59	Peak	
4	2483.5000	28.75	6.61	35.36	54.00	-18.64	AVG	

Test Mode:	TX 2480 MHz _CH78_1Mbps

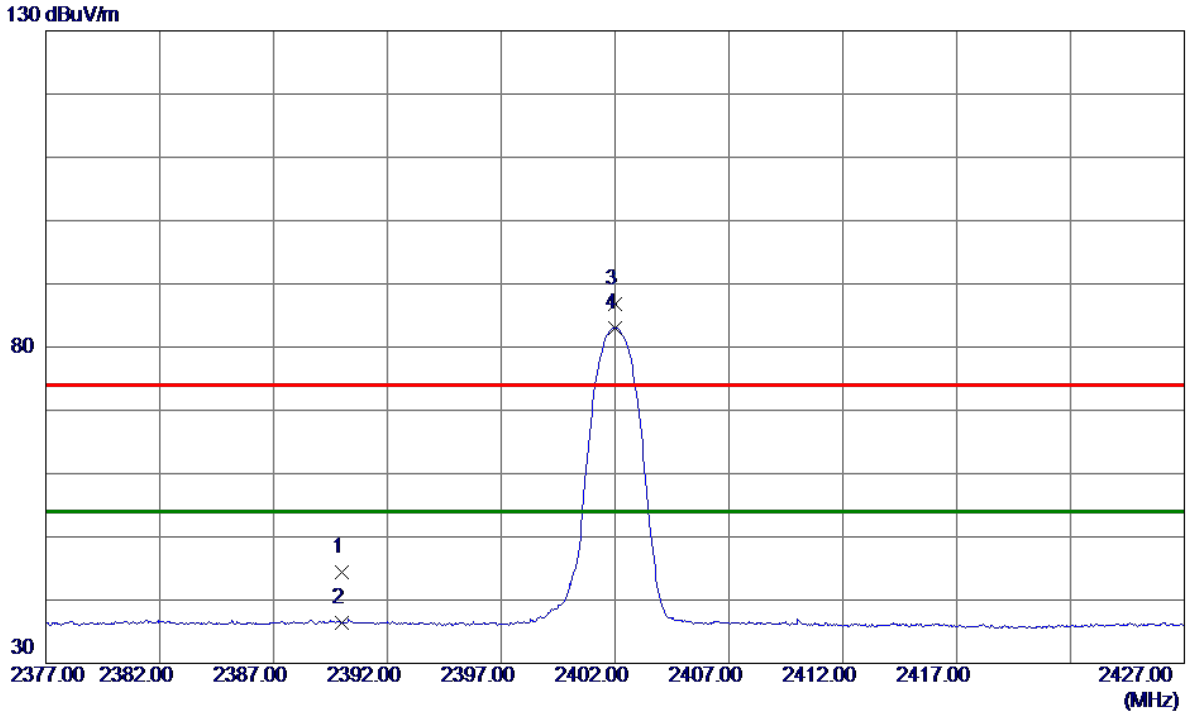
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4959.6900	45.99	3.87	49.86	74.00	-24.14	Peak	
2 *	4960.0550	41.93	3.87	45.80	54.00	-8.20	AVG	

Test Mode:	TX 2402 MHz _CH00_3Mbps

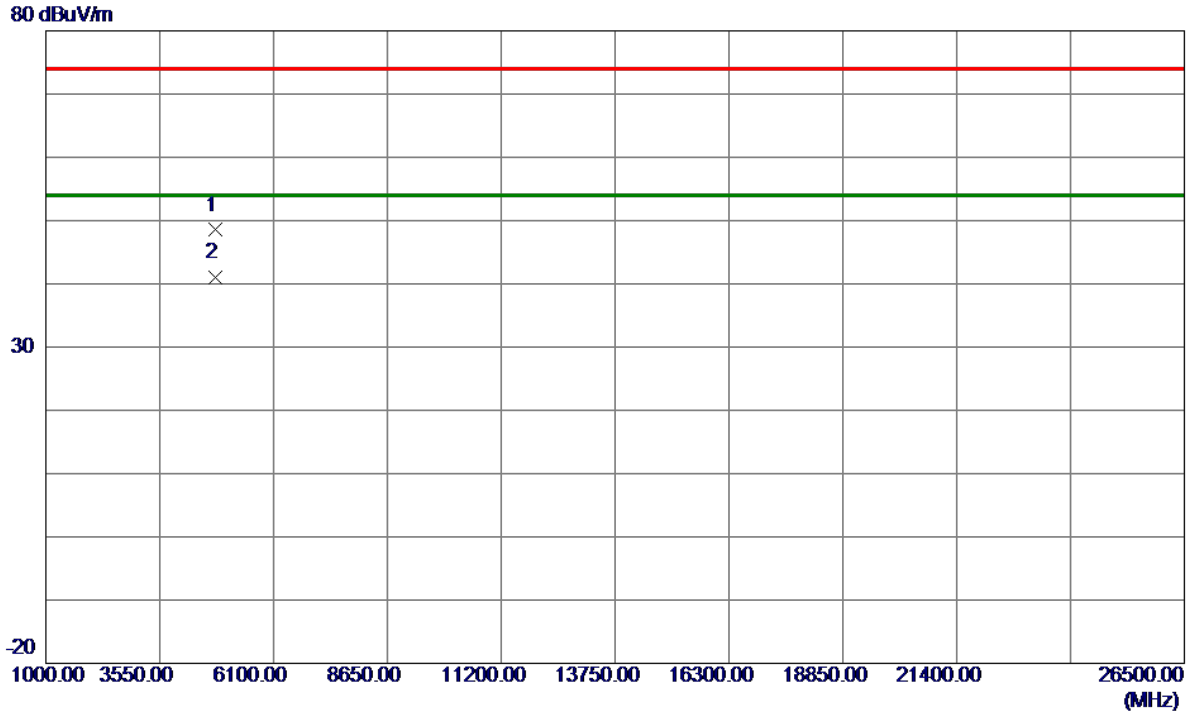
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	37.71	6.62	44.33	74.00	-29.67	Peak	
2	2390.0000	29.76	6.62	36.38	54.00	-17.62	AVG	
3	2401.9750	80.27	6.62	86.89	74.00	12.89	Peak	No Limit
4 *	2401.9750	76.40	6.62	83.02	54.00	29.02	AVG	No Limit

Test Mode:	TX 2402 MHz _CH00_3Mbps

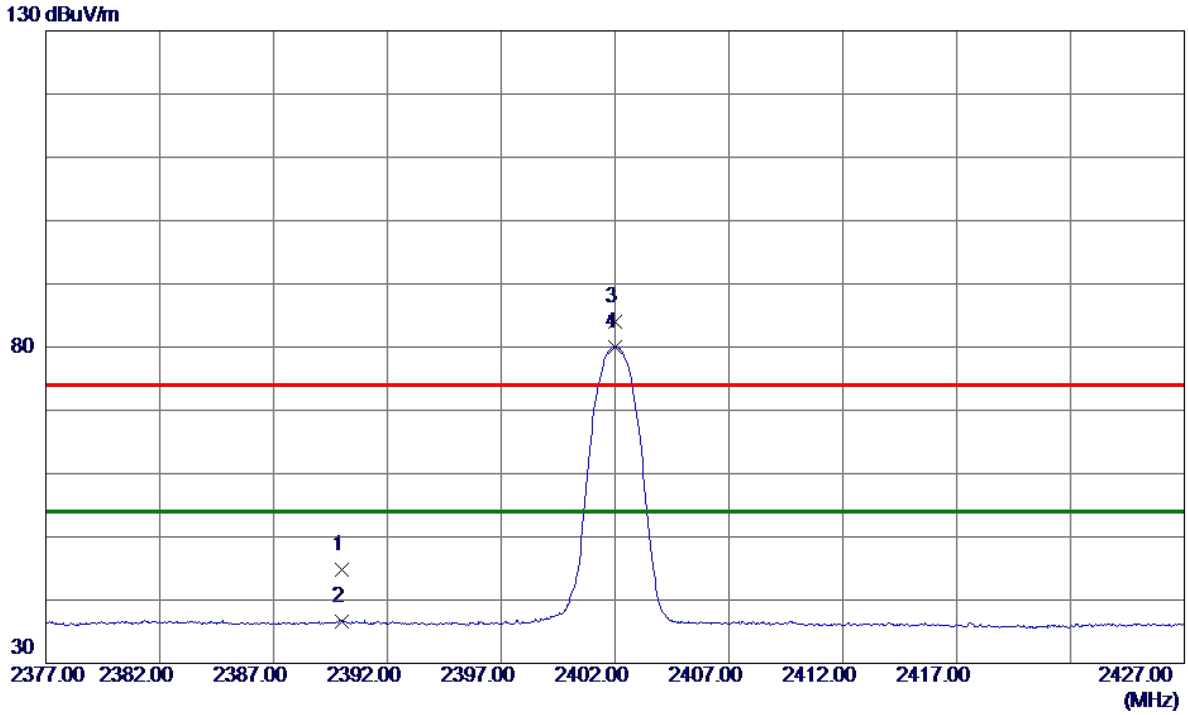
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4803.9350	44.97	3.53	48.50	74.00	-25.50	Peak	
2 *	4803.9620	37.45	3.53	40.98	54.00	-13.02	AVG	

Test Mode:	TX 2402 MHz _CH00_3Mbps

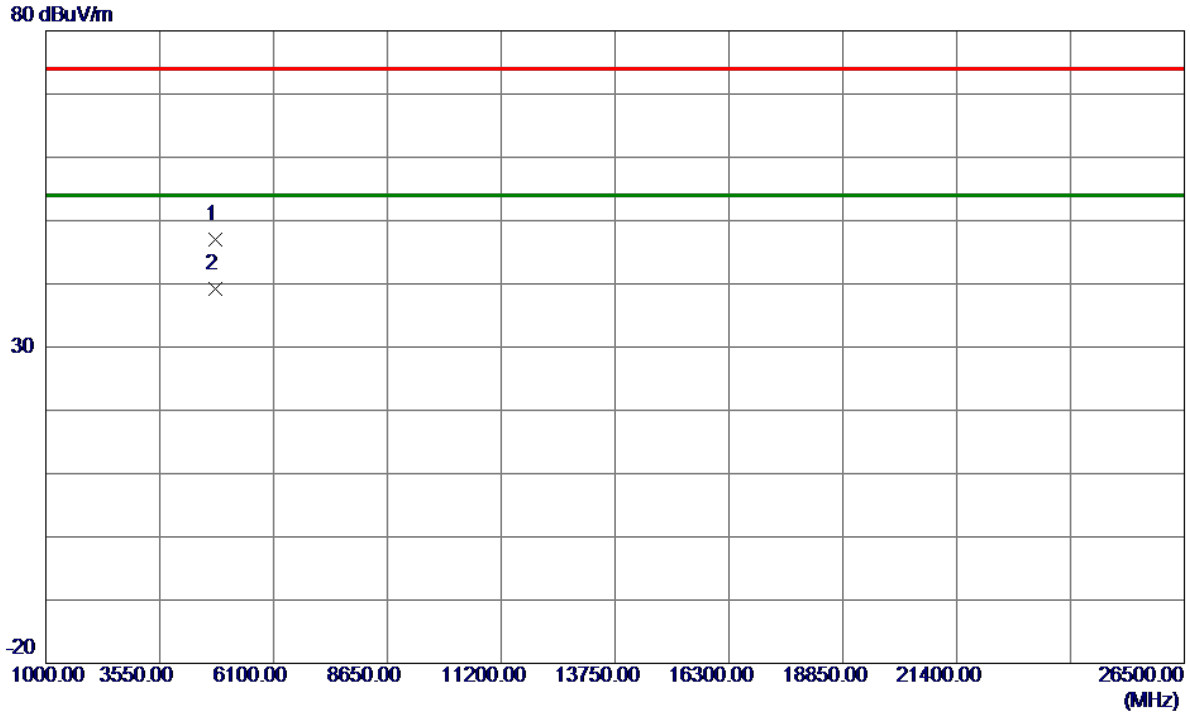
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	38.10	6.62	44.72	74.00	-29.28	Peak	
2	2390.0000	30.01	6.62	36.63	54.00	-17.37	AVG	
3	2402.0250	77.33	6.62	83.95	74.00	9.95	Peak	No Limit
4 *	2402.0250	73.41	6.62	80.03	54.00	26.03	AVG	No Limit

Test Mode:	TX 2402 MHz _CH00_3Mbps

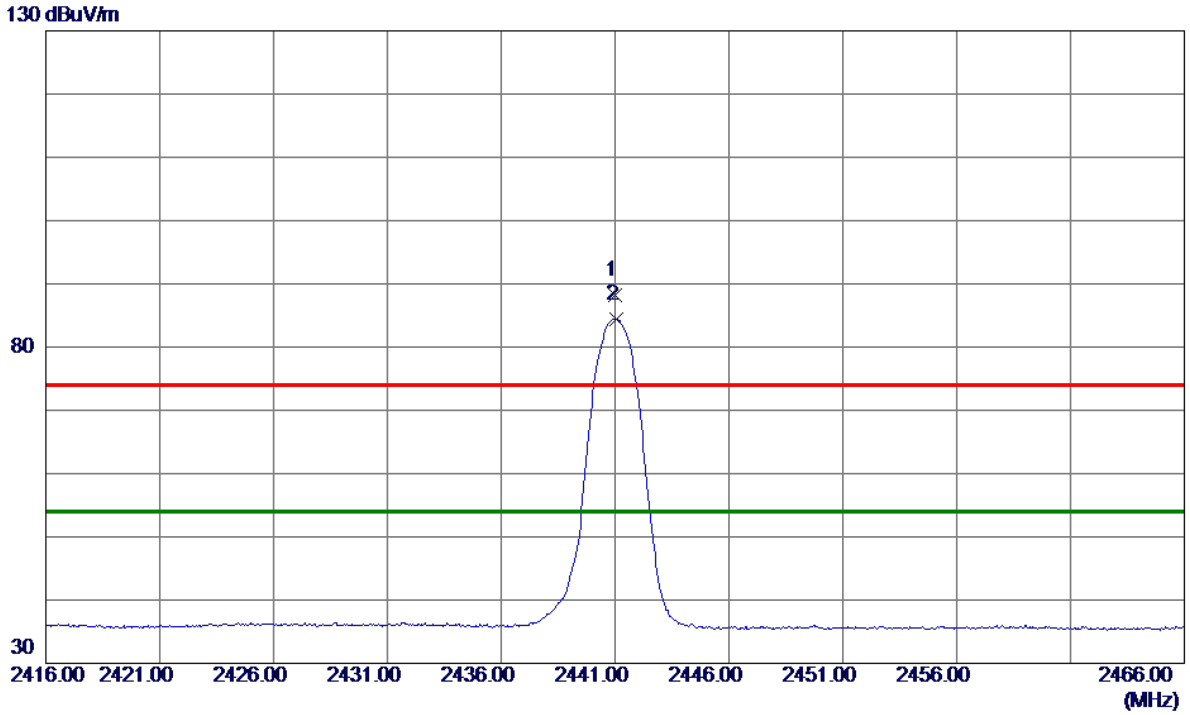
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4803.8200	43.49	3.53	47.02	74.00	-26.98	Peak	
2 *	4804.0730	35.74	3.53	39.27	54.00	-14.73	AVG	

Test Mode:	TX 2441 MHz _CH39_3Mbps

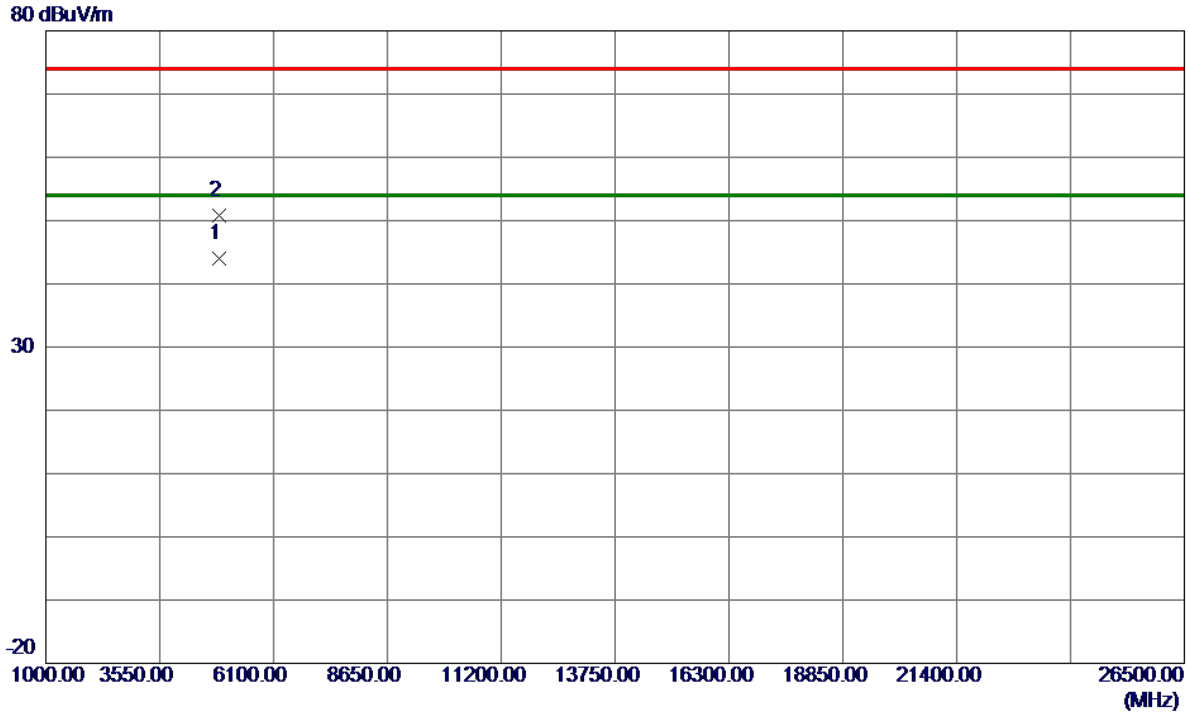
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2441.0000	81.63	6.61	88.24	74.00	14.24	Peak	No Limit
2 *	2441.0500	77.79	6.61	84.40	54.00	30.40	AVG	No Limit

Test Mode:	TX 2441 MHz _CH39_3Mbps

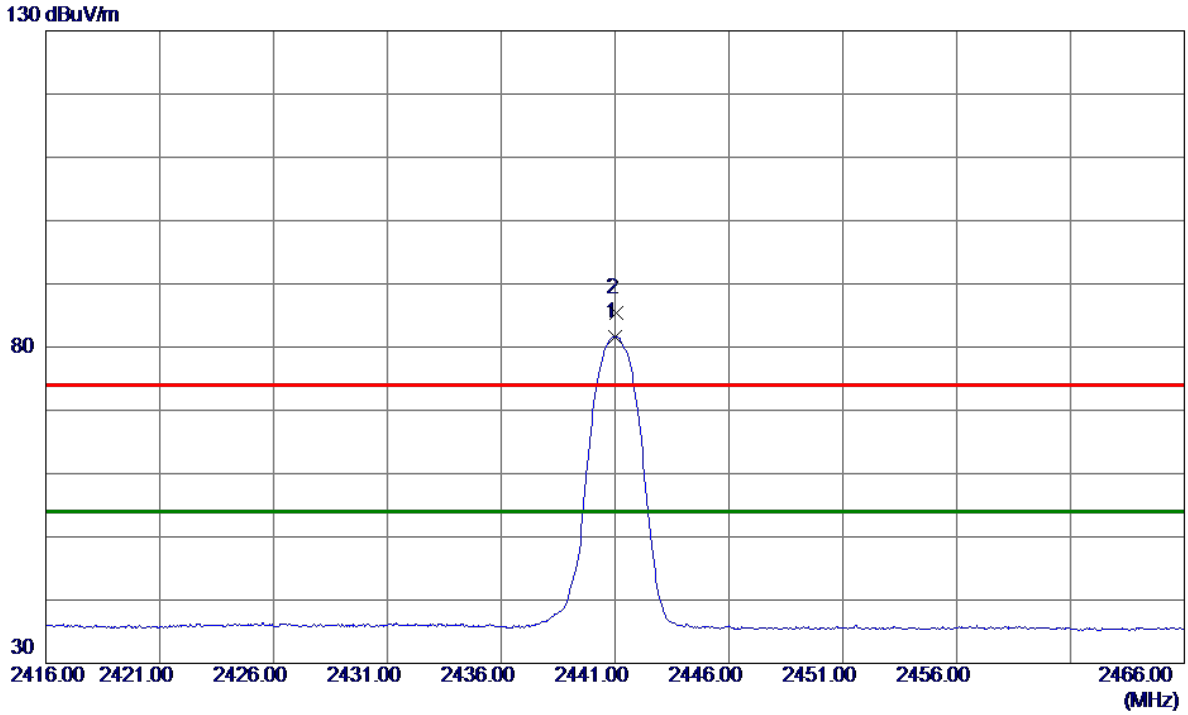
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4881.9450	40.39	3.70	44.09	54.00	-9.91	AVG	
2	4881.9900	47.09	3.70	50.79	74.00	-23.21	Peak	

Test Mode:	TX 2441 MHz _CH39_3Mbps

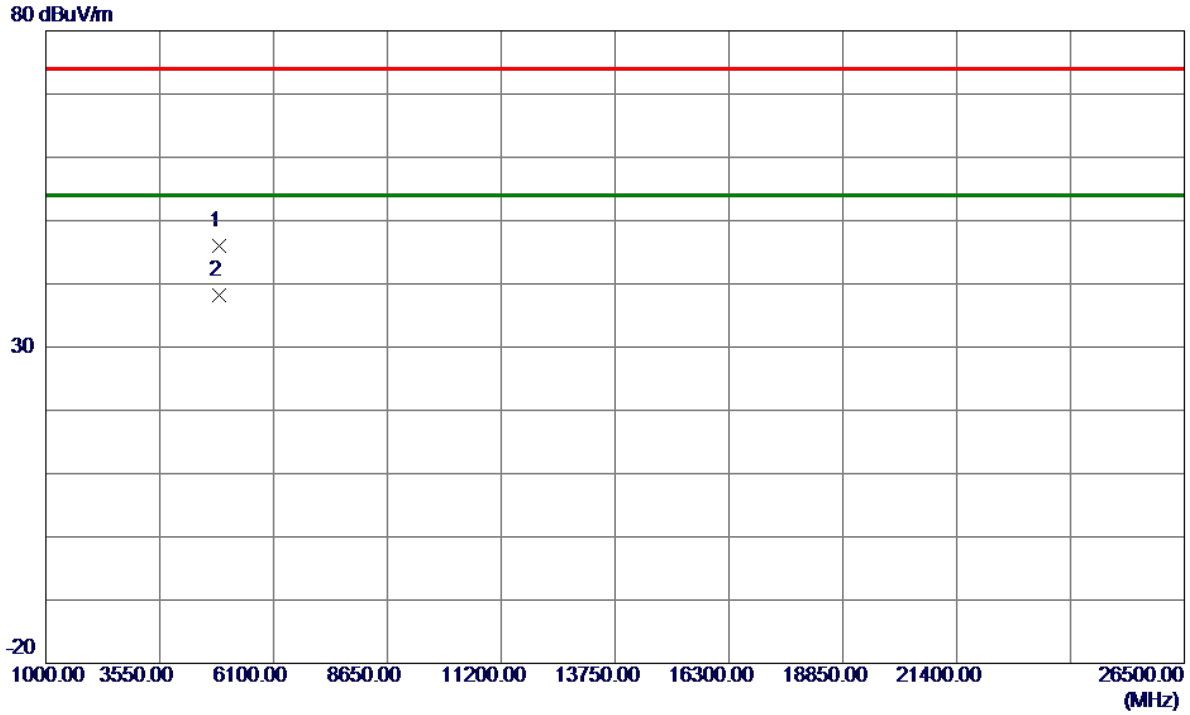
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2441.0250	75.00	6.61	81.61	54.00	27.61	AVG	No Limit
2	2441.0750	78.83	6.61	85.44	74.00	11.44	Peak	No Limit

Test Mode:	TX 2441 MHz _CH39_3Mbps

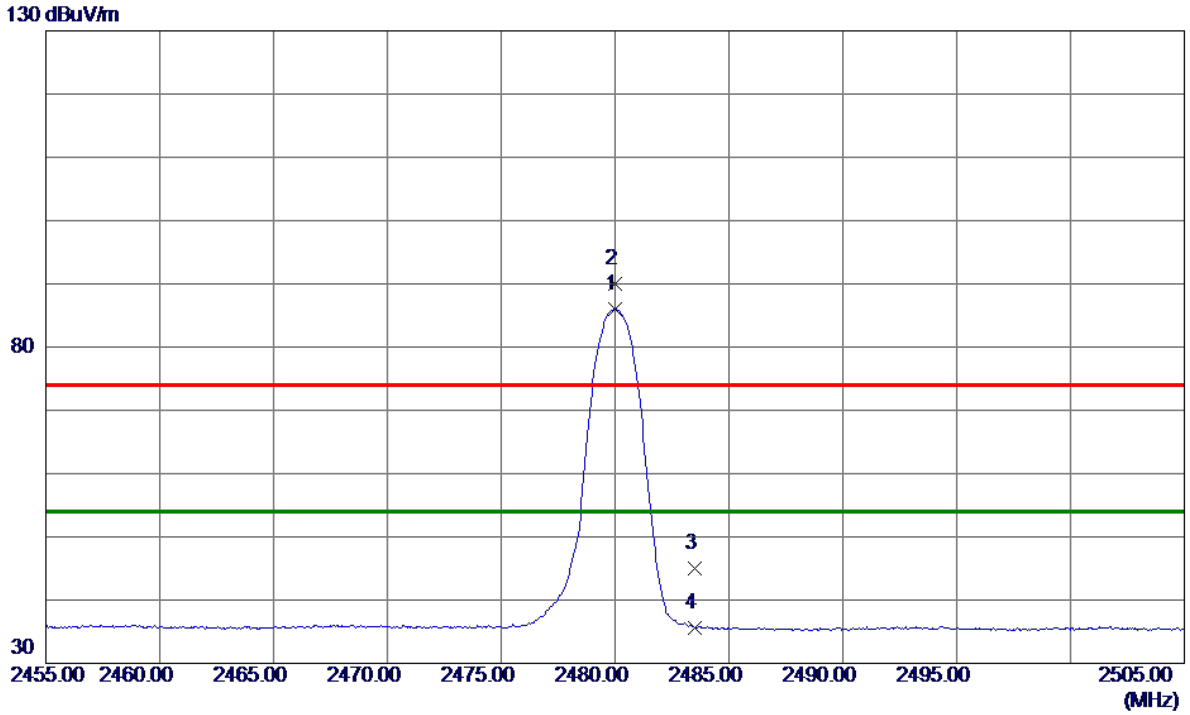
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4881.7030	42.36	3.70	46.06	74.00	-27.94	Peak	
2 *	4882.1020	34.44	3.70	38.14	54.00	-15.86	AVG	

Test Mode:	TX 2480 MHz _CH78_3Mbps

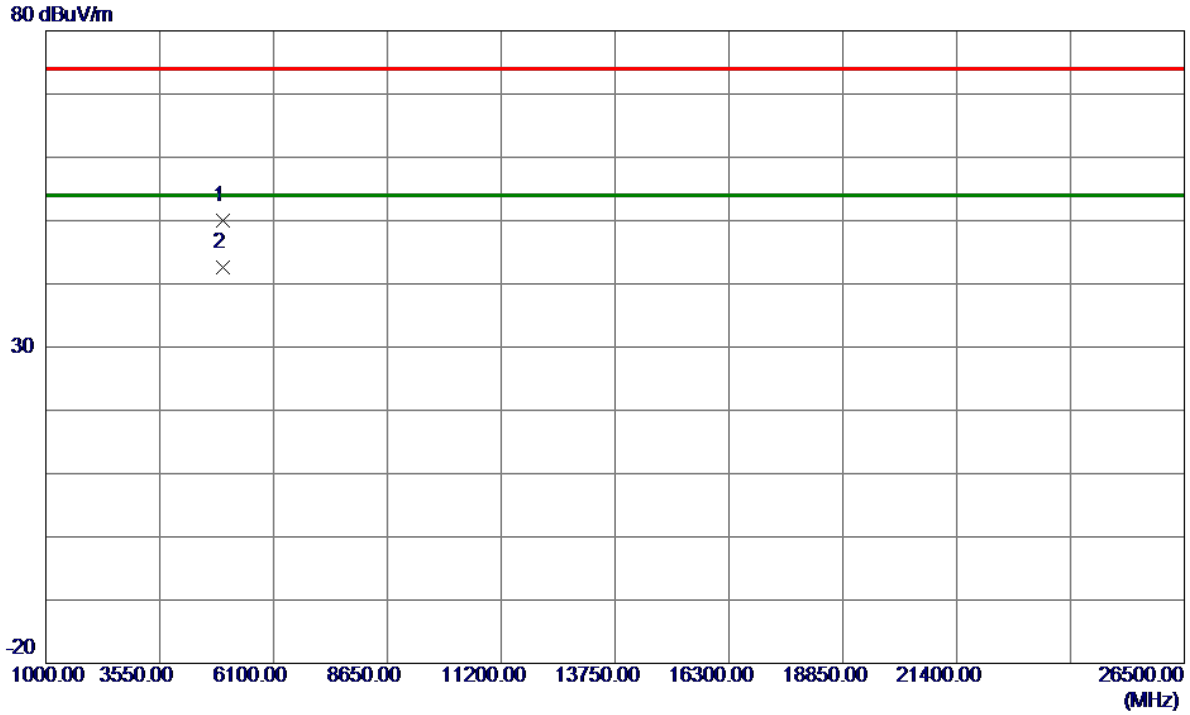
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2479.9750	79.35	6.61	85.96	54.00	31.96	AVG	No Limit
2	2480.0000	83.29	6.61	89.90	74.00	15.90	Peak	No Limit
3	2483.5000	38.43	6.61	45.04	74.00	-28.96	Peak	
4	2483.5000	28.95	6.61	35.56	54.00	-18.44	AVG	

Test Mode:	TX 2480 MHz _CH78_3Mbps

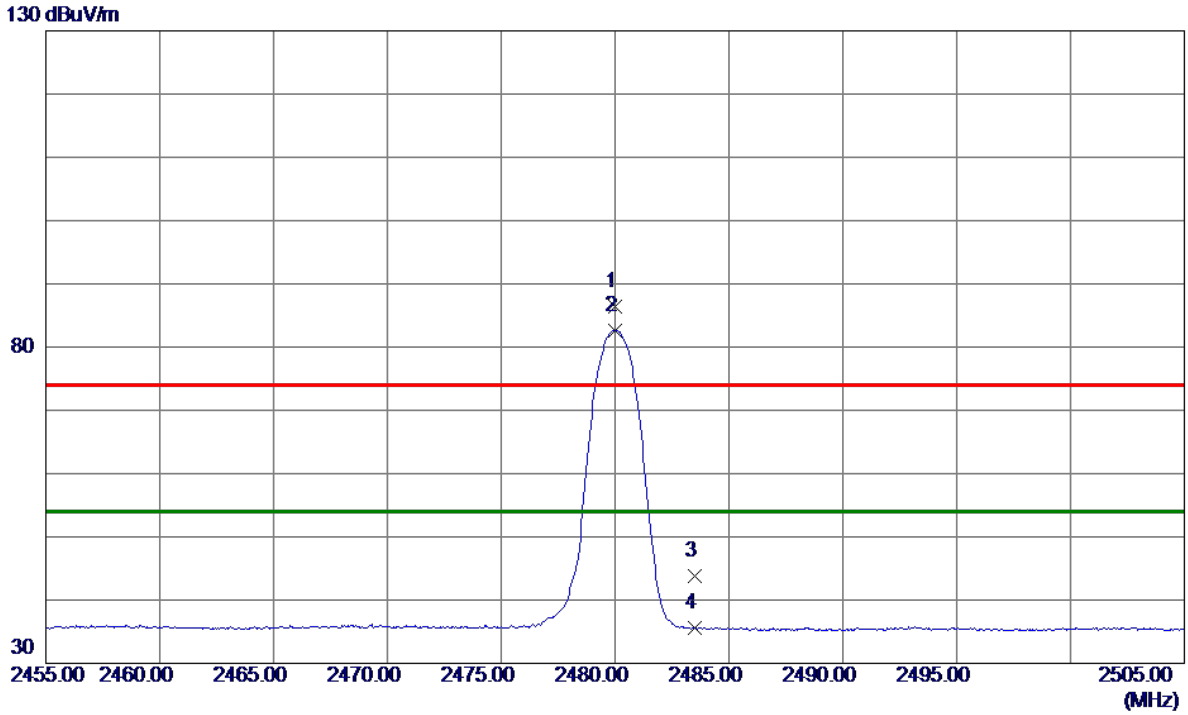
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4959.8769	46.17	3.87	50.04	74.00	-23.96	Peak	
2 *	4959.9770	38.65	3.87	42.52	54.00	-11.48	AVG	

Test Mode:	TX 2480 MHz _CH78_3Mbps

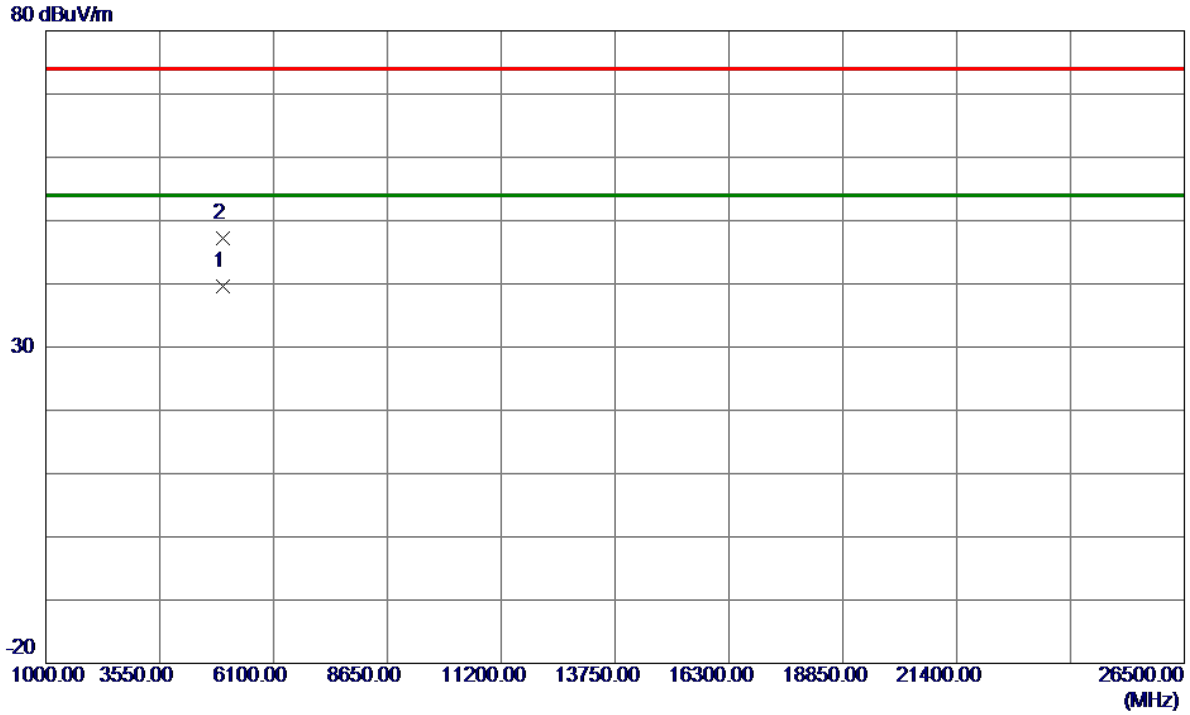
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2480.0000	79.82	6.61	86.43	74.00	12.43	Peak	No Limit
2 *	2480.0000	76.00	6.61	82.61	54.00	28.61	AVG	No Limit
3	2483.5000	37.27	6.61	43.88	74.00	-30.12	Peak	
4	2483.5000	28.91	6.61	35.52	54.00	-18.48	AVG	

Test Mode:	TX 2480 MHz _CH78_3Mbps

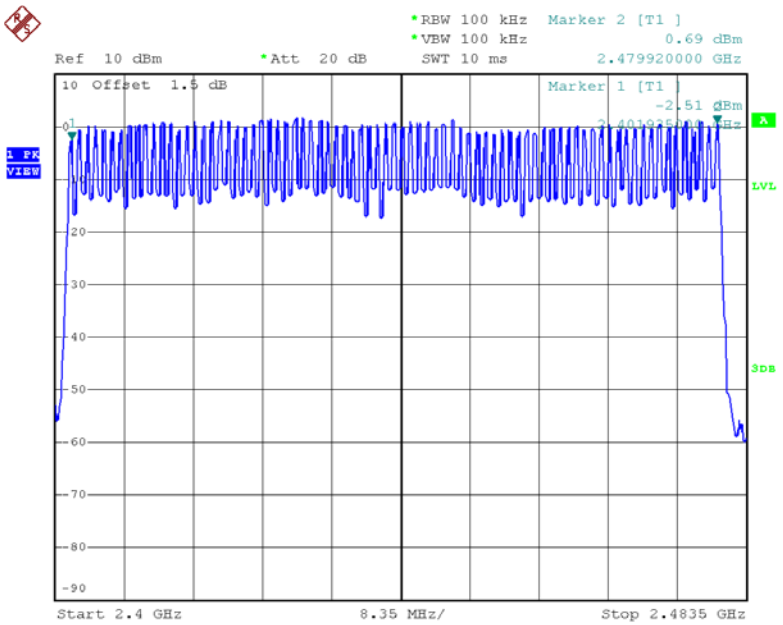
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4960.1080	35.74	3.87	39.61	54.00	-14.39	AVG	
2	4960.2220	43.26	3.87	47.13	74.00	-26.87	Peak	

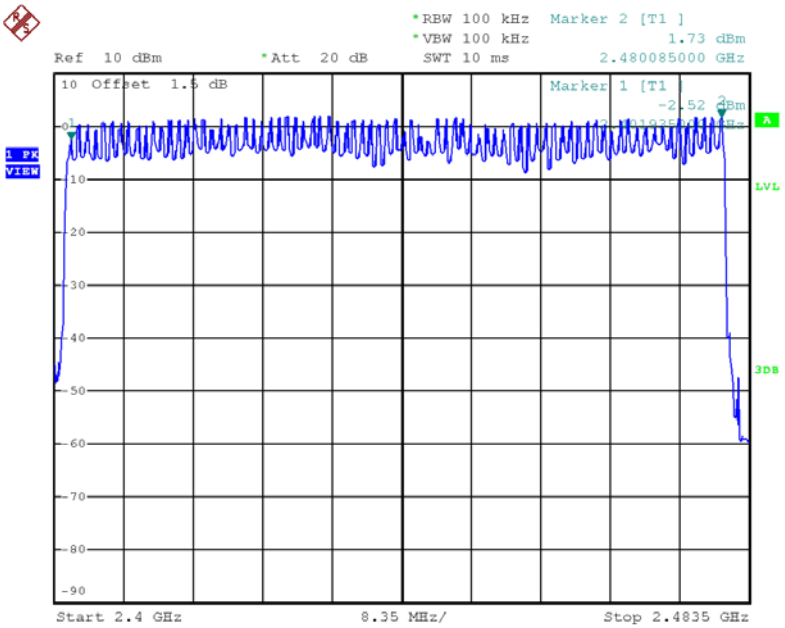
APPENDIX E - NUMBER OF HOPPING CHANNEL

Test Mode	Hopping Mode_1Mbps
Number of Hopping Channel	79



Date: 8.OCT.2018 10:17:43

Test Mode	Hopping Mode_3Mbps
Number of Hopping Channel	79



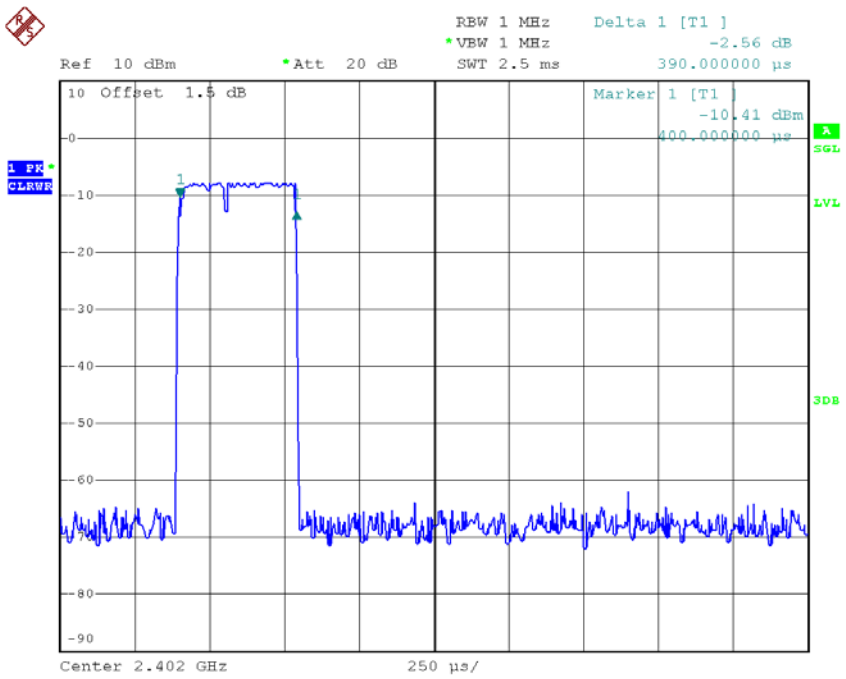
Date: 25.OCT.2018 12:47:44

APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode:	TX Mode_1Mbps

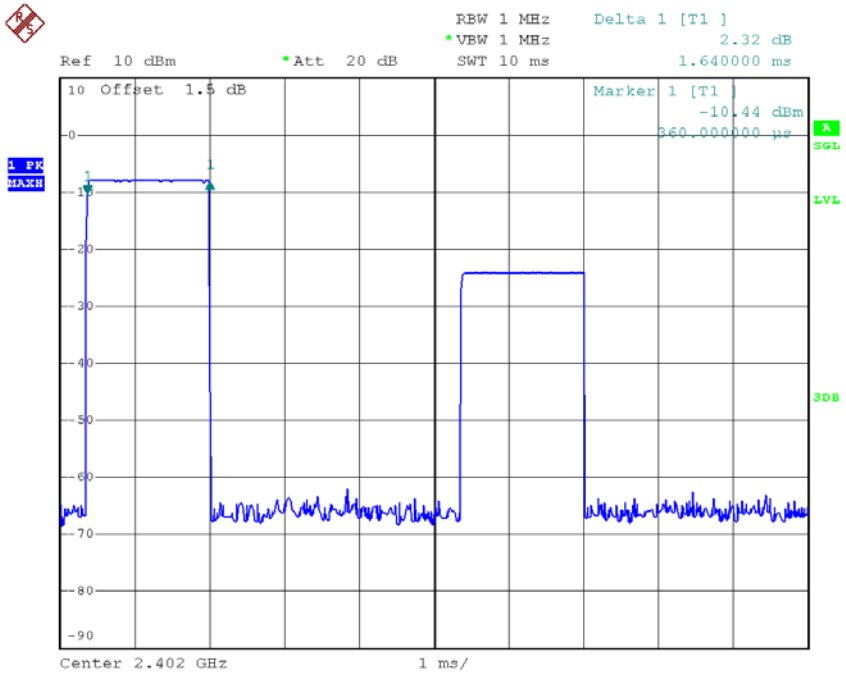
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.8800	0.3072	0.4000	Pass
DH3	2402	1.6400	0.2624	0.4000	Pass
DH1	2402	0.3900	0.1248	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH1	2441	0.3900	0.1248	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH1	2480	0.3900	0.1248	0.4000	Pass

CH00-DH1



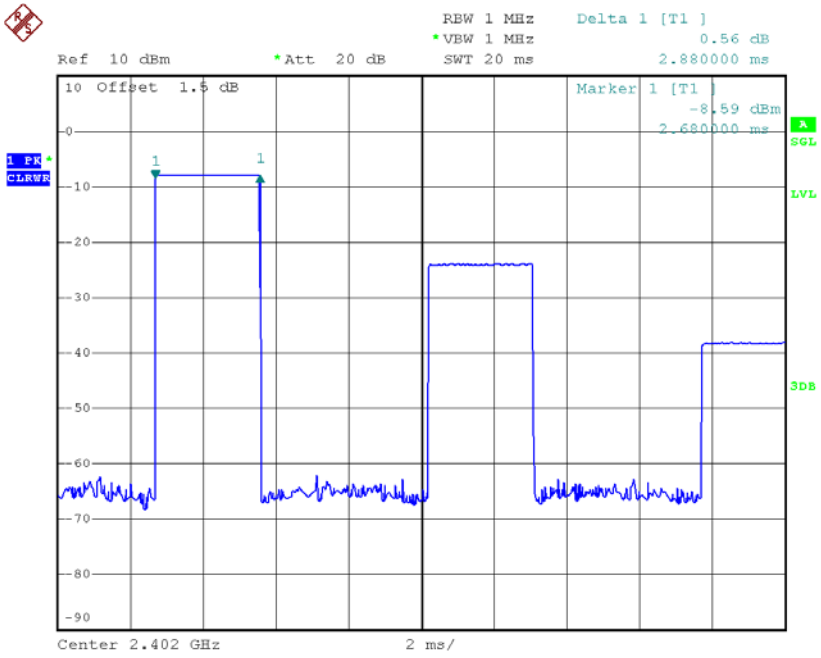
Date: 8.OCT.2018 10:12:29

CH00-DH3



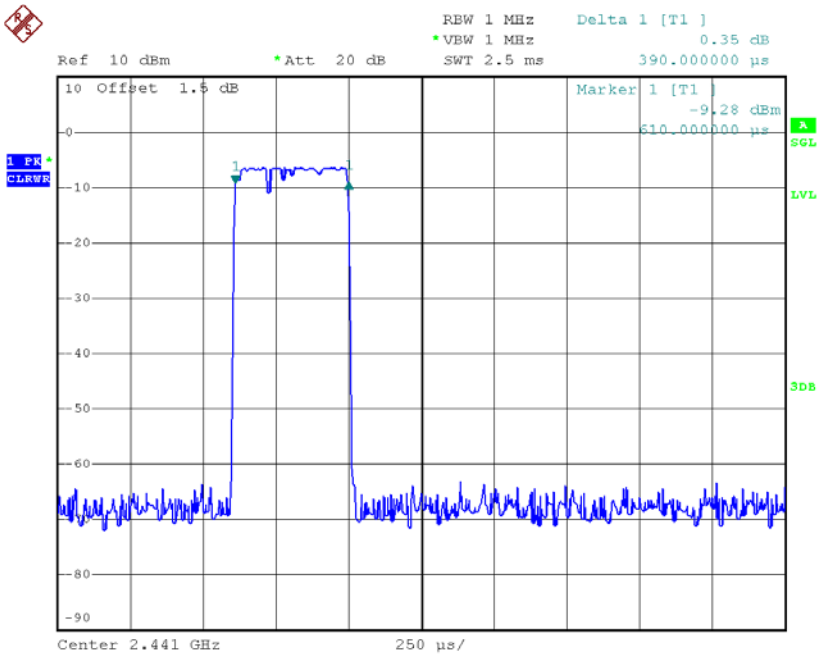
Date: 8.OCT.2018 10:22:15

CH00-DH5



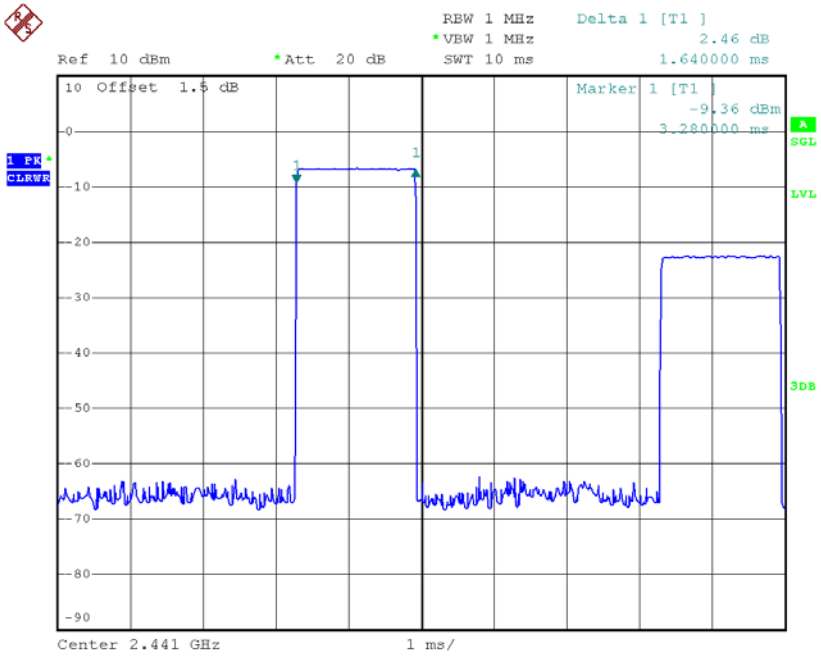
Date: 8.OCT.2018 10:24:48

CH39-DH1



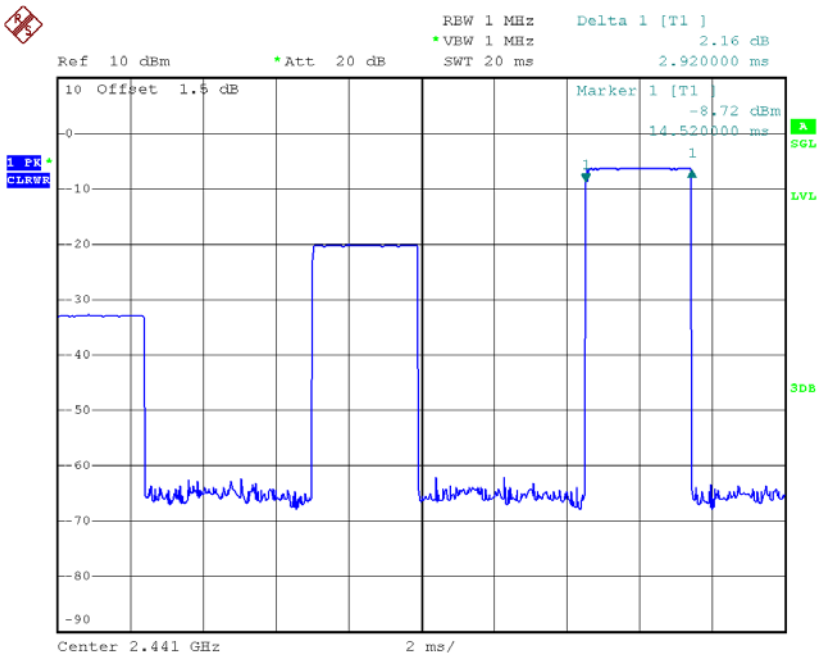
Date: 8.OCT.2018 10:12:33

CH39-DH3



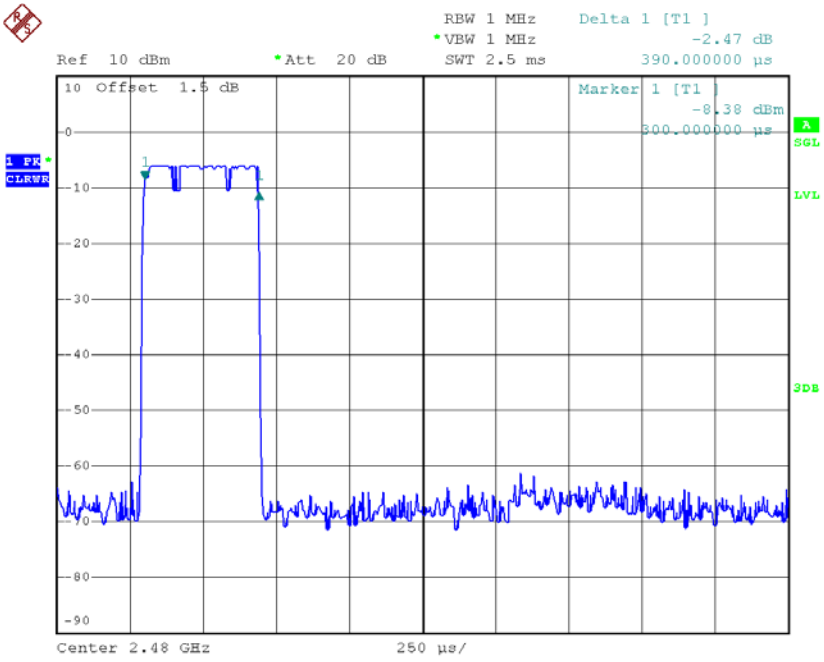
Date: 8.OCT.2018 10:22:20

CH39-DH5



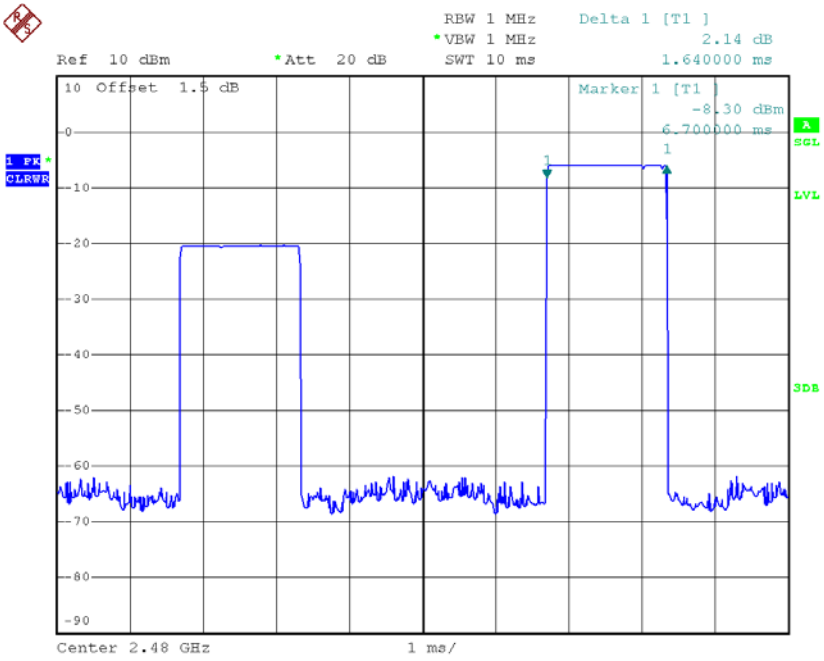
Date: 8.OCT.2018 10:24:52

CH78-DH1



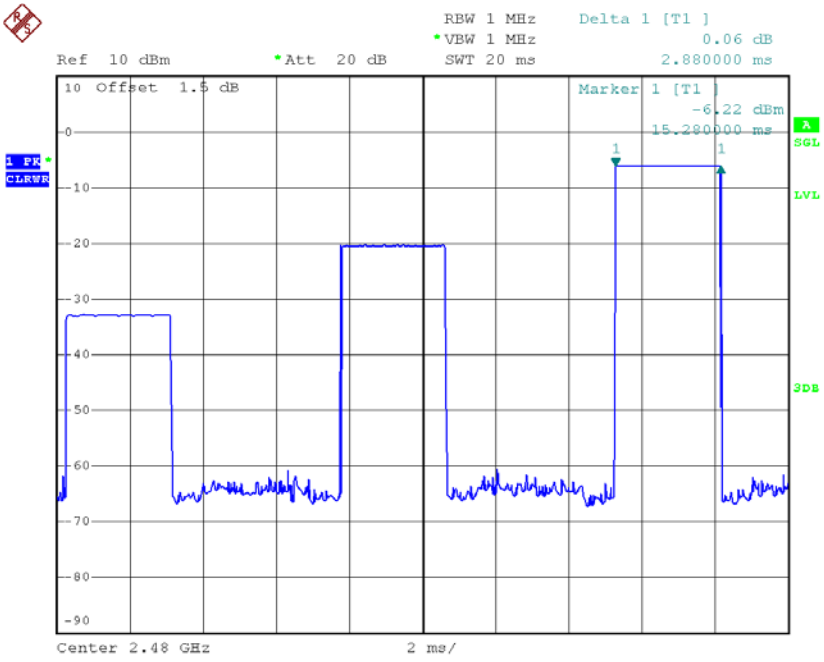
Date: 8.OCT.2018 10:12:38

CH78-DH3



Date: 8.OCT.2018 10:22:28

CH78-DH5

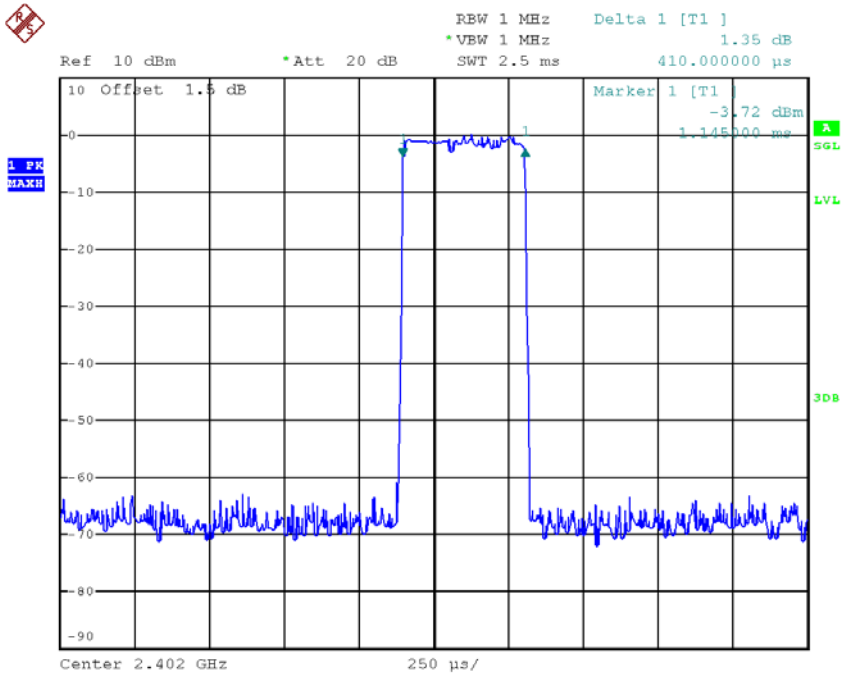


Date: 8.OCT.2018 10:27:25

Test Mode:	TX Mode_3Mbps

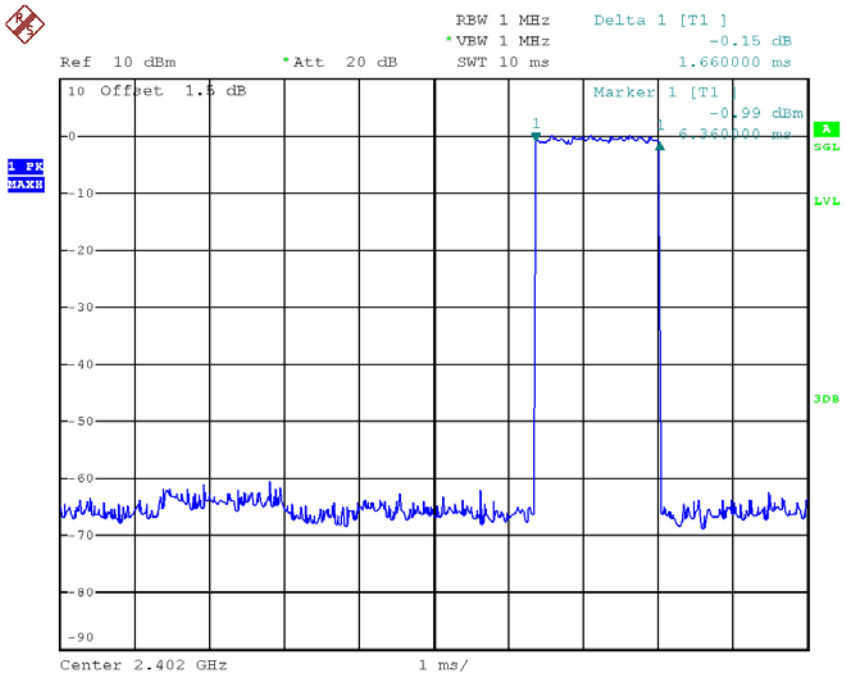
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.8800	0.3072	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH1	2402	0.4100	0.1312	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6600	0.2656	0.4000	Pass
DH1	2441	0.4050	0.1296	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass
DH3	2480	1.6600	0.2656	0.4000	Pass
DH1	2480	0.4100	0.1312	0.4000	Pass

CH00-DH1



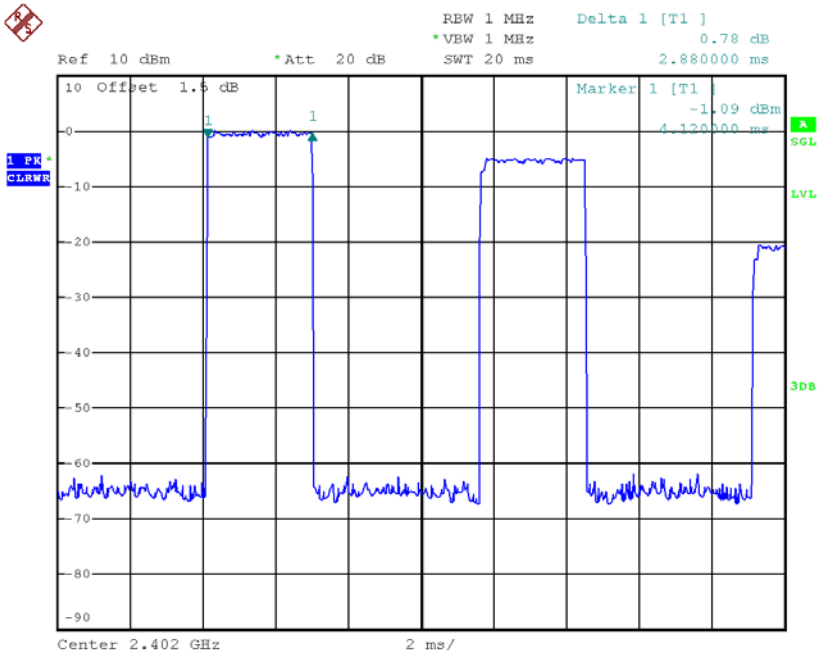
Date: 25.OCT.2018 12:39:49

CH00-DH3



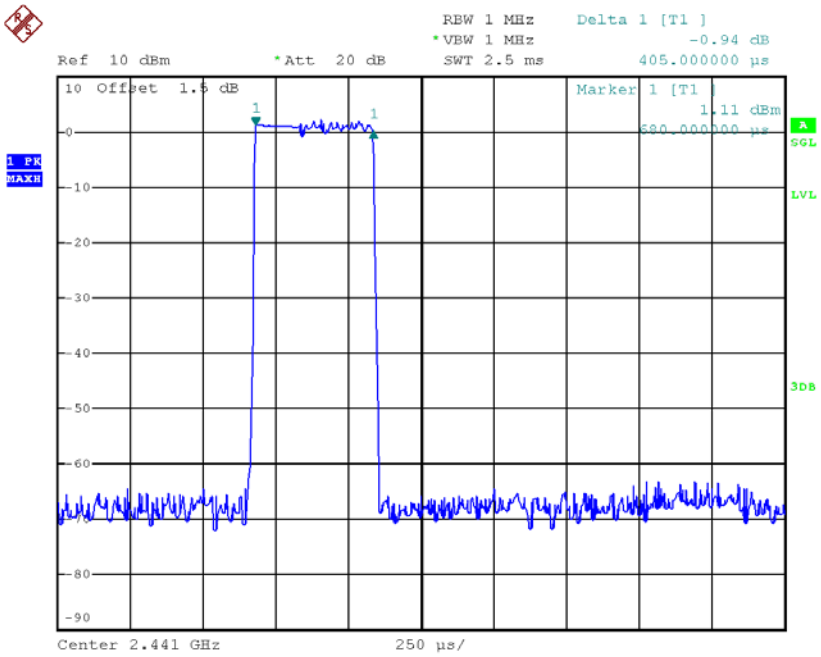
Date: 25.OCT.2018 13:02:56

CH00-DH5



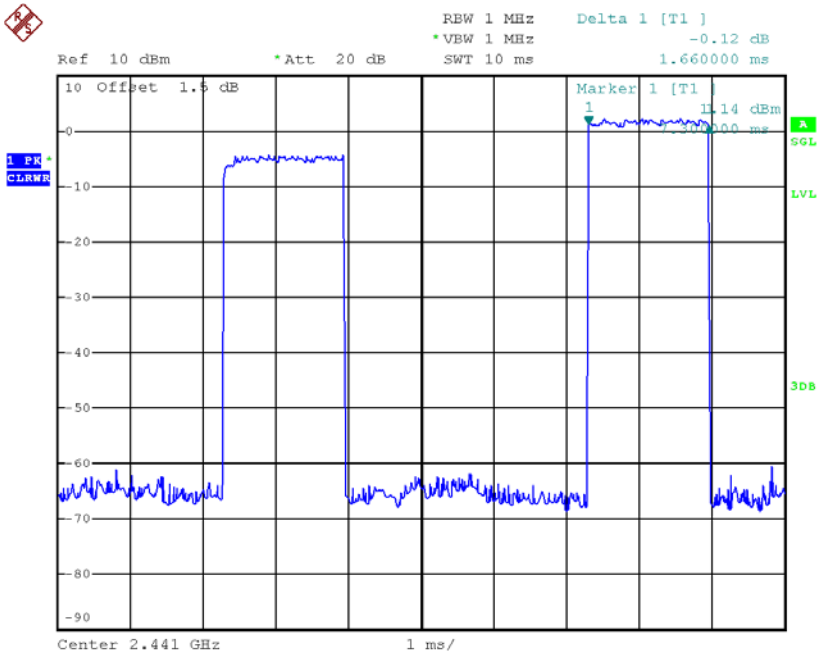
Date: 25.OCT.2018 14:36:22

CH39-DH1



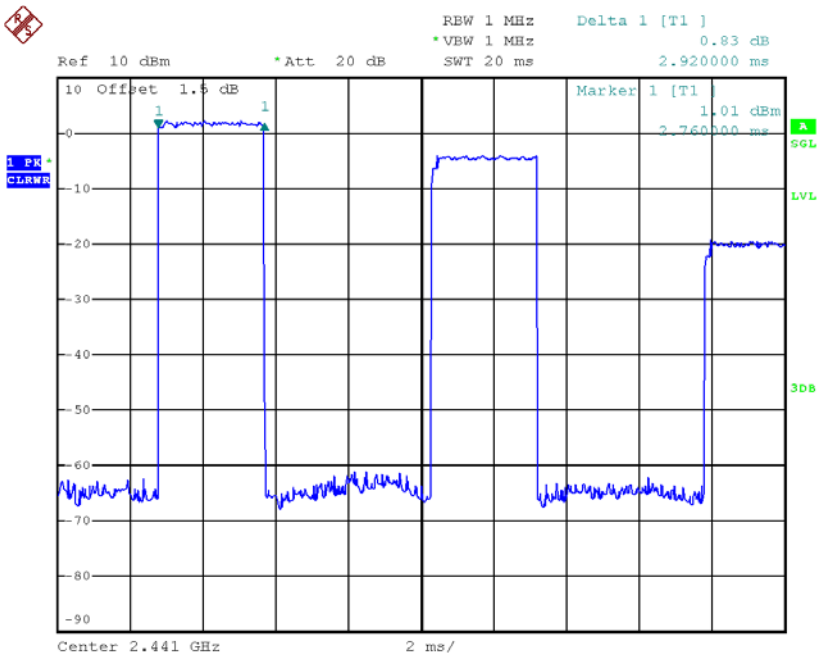
Date: 25.OCT.2018 12:41:30

CH39-DH3



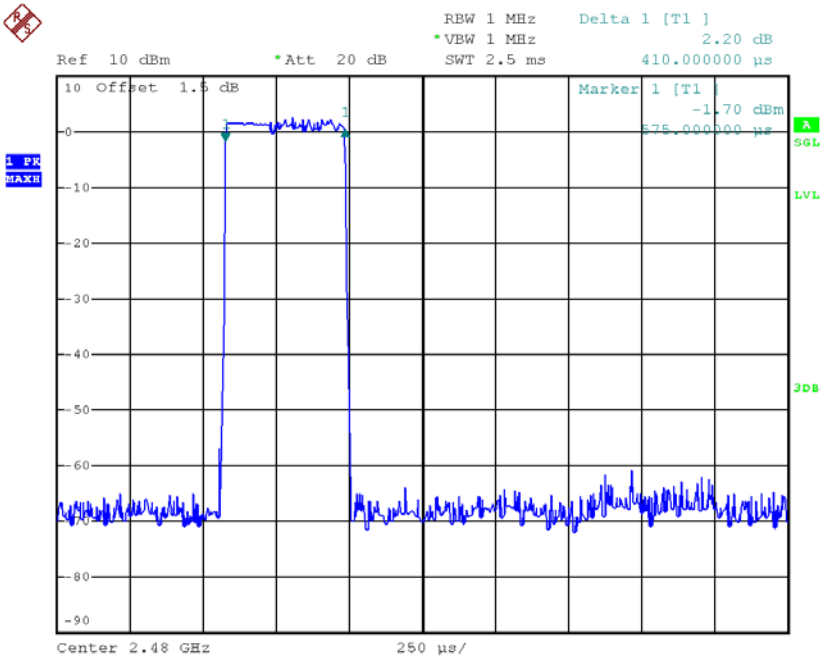
Date: 25.OCT.2018 13:03:43

CH39-DH5



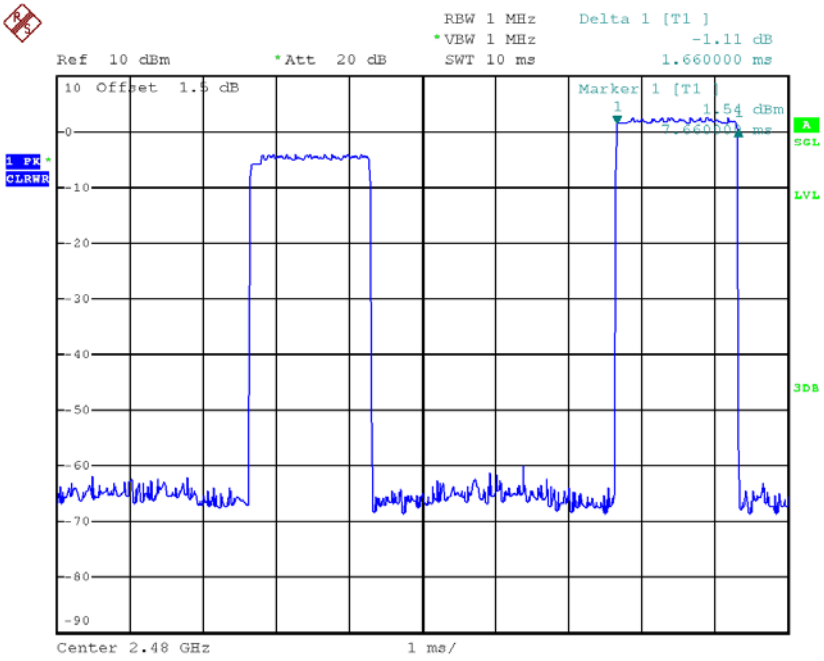
Date: 25.OCT.2018 14:36:26

CH78-DH1



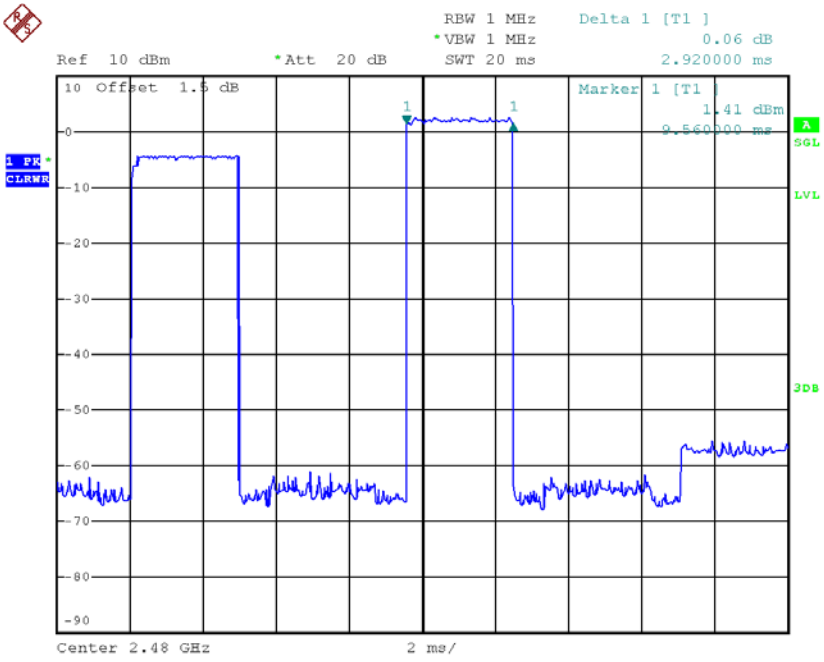
Date: 25.OCT.2018 12:42:09

CH78-DH3



Date: 25.OCT.2018 13:03:47

CH78-DH5



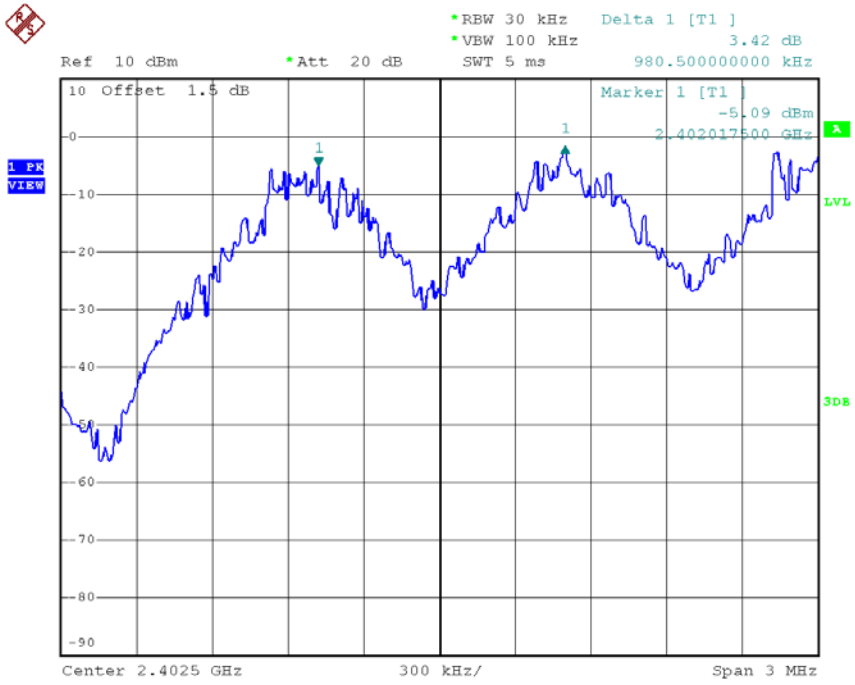
Date: 25.OCT.2018 14:36:30

APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT

Test Mode:	Hopping on _1Mbps

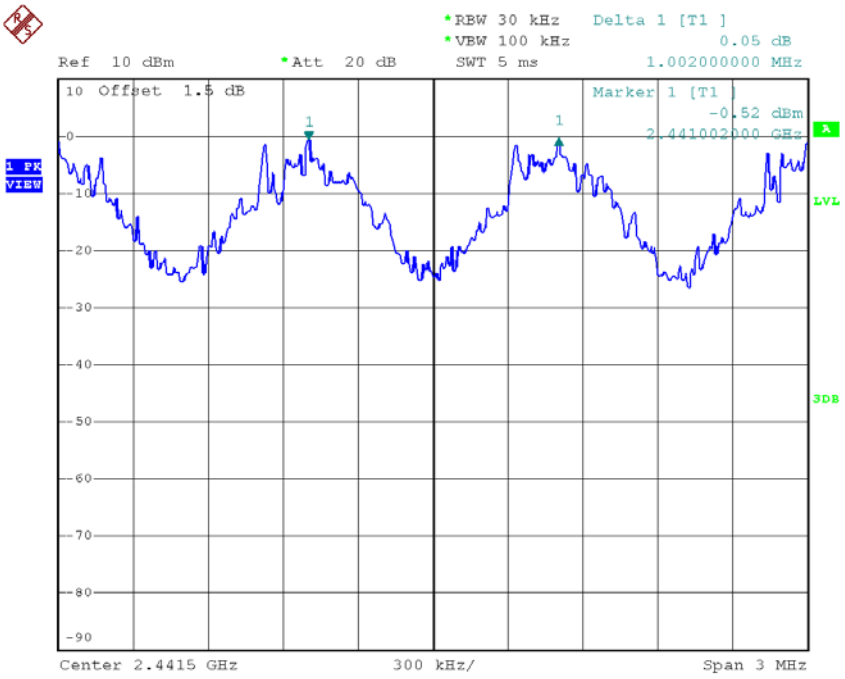
Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
2402	0.981	0.641	Pass
2441	1.002	0.636	Pass
2480	1.014	0.680	Pass

CH00



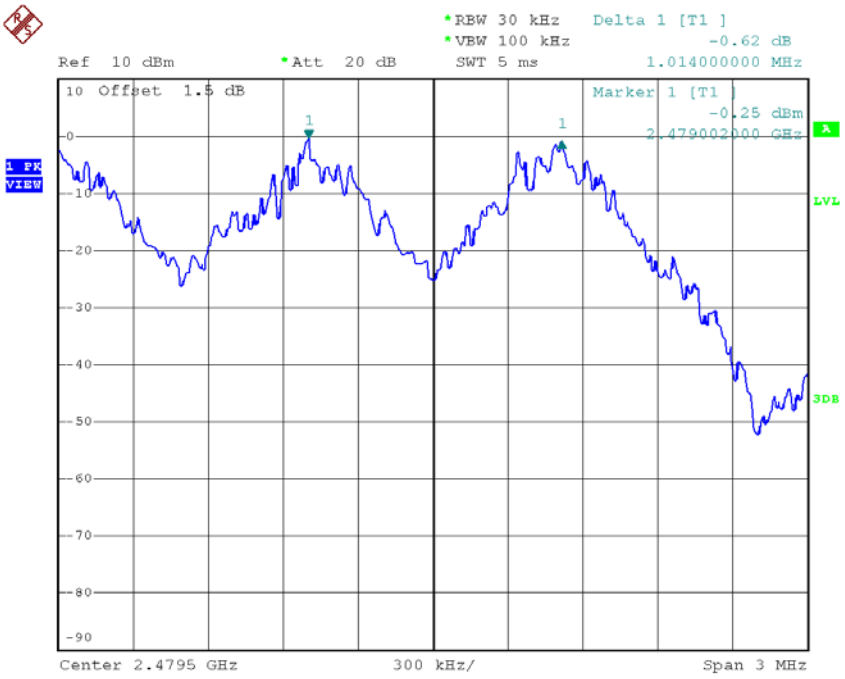
Date: 8.OCT.2018 10:13:46

CH39



Date: 8.OCT.2018 10:14:50

CH78

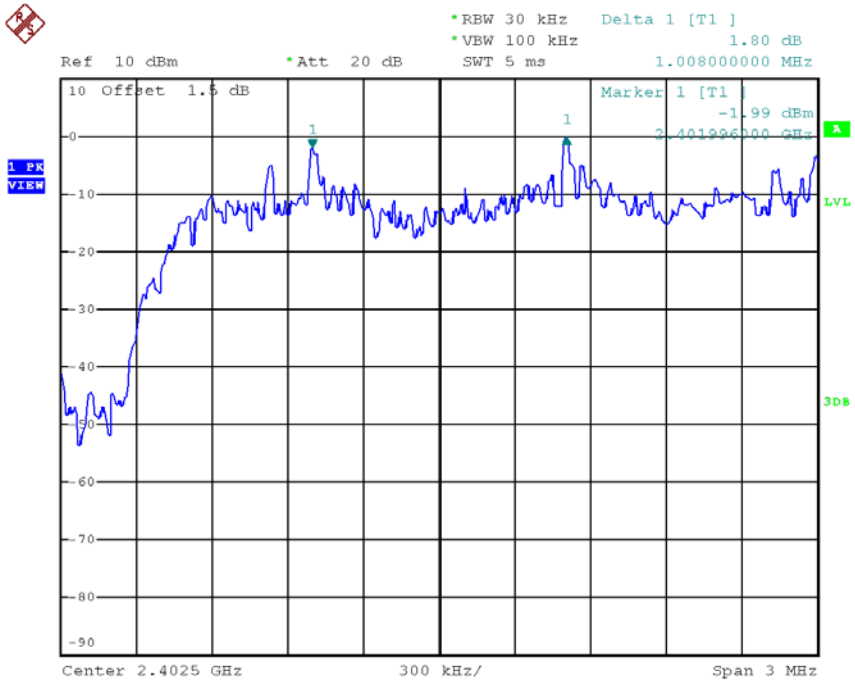


Date: 8.OCT.2018 10:15:54

Test Mode:	Hopping on _3Mbps

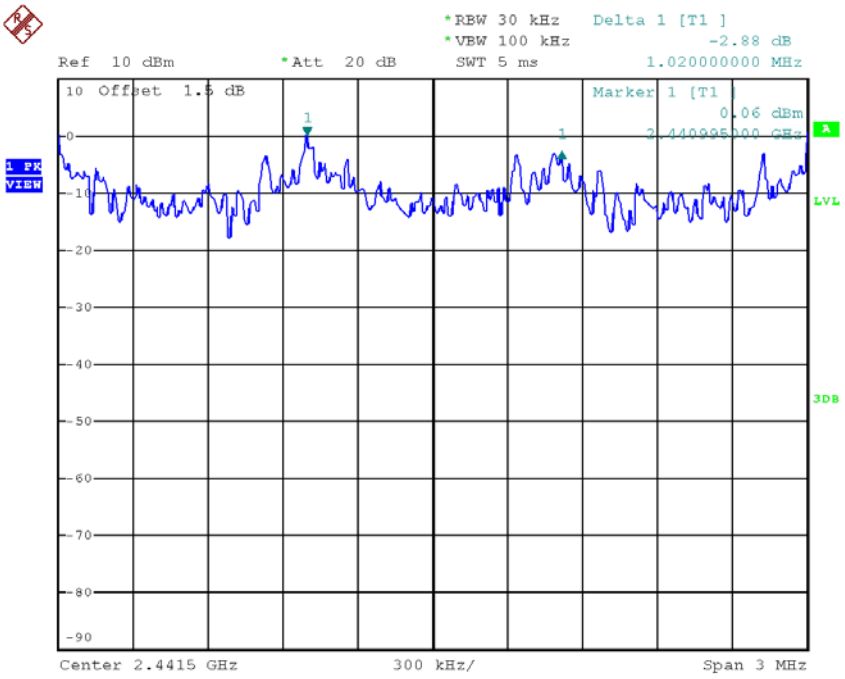
Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
2402	1.008	0.868	Pass
2441	1.020	0.835	Pass
2480	0.996	0.839	Pass

CH00



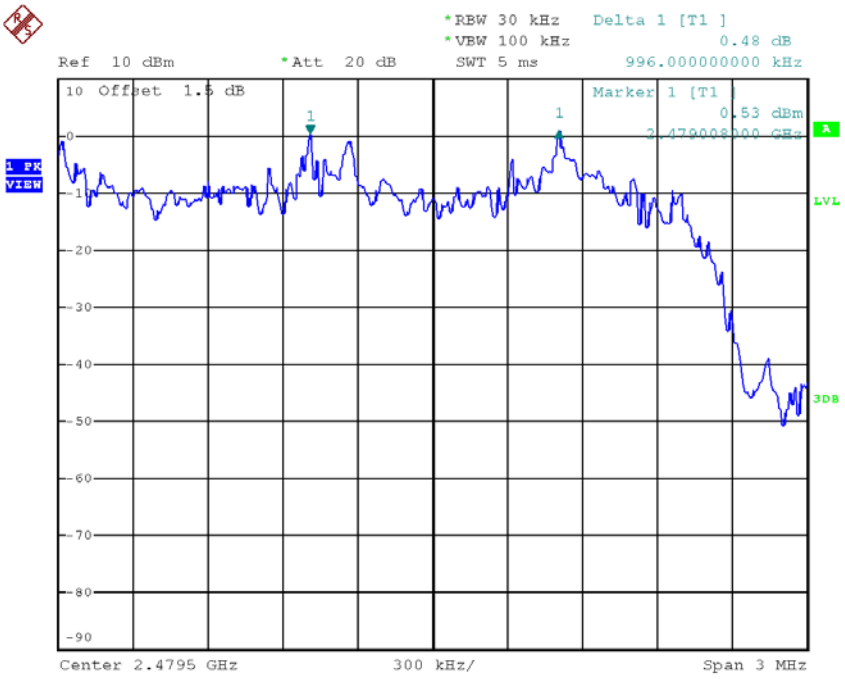
Date: 25.OCT.2018 12:43:36

CH39



Date: 25.OCT.2018 12:44:51

CH78



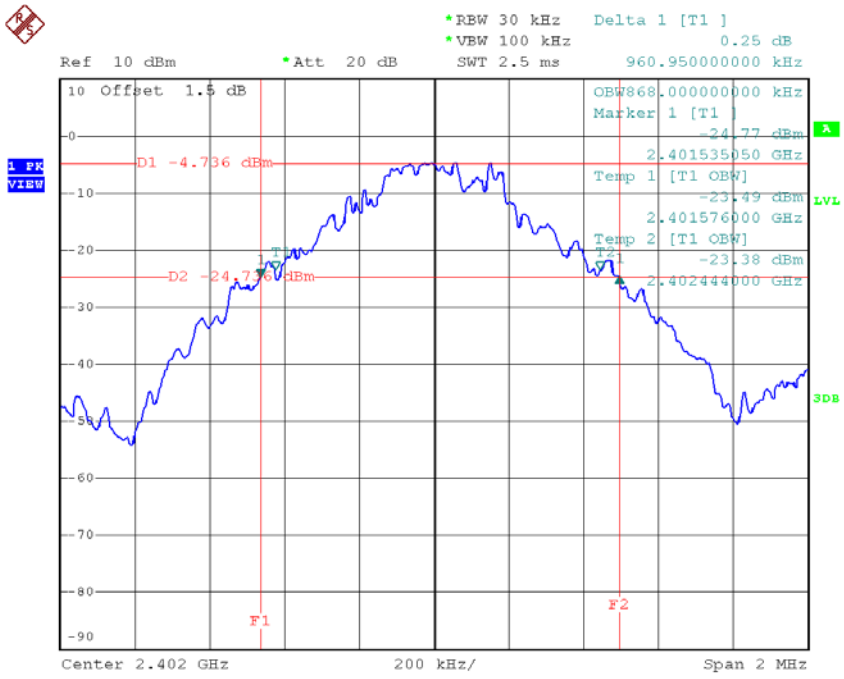
Date: 25.OCT.2018 12:45:55

APPENDIX H - BANDWIDTH

Test Mode:	TX Mode _1Mbps

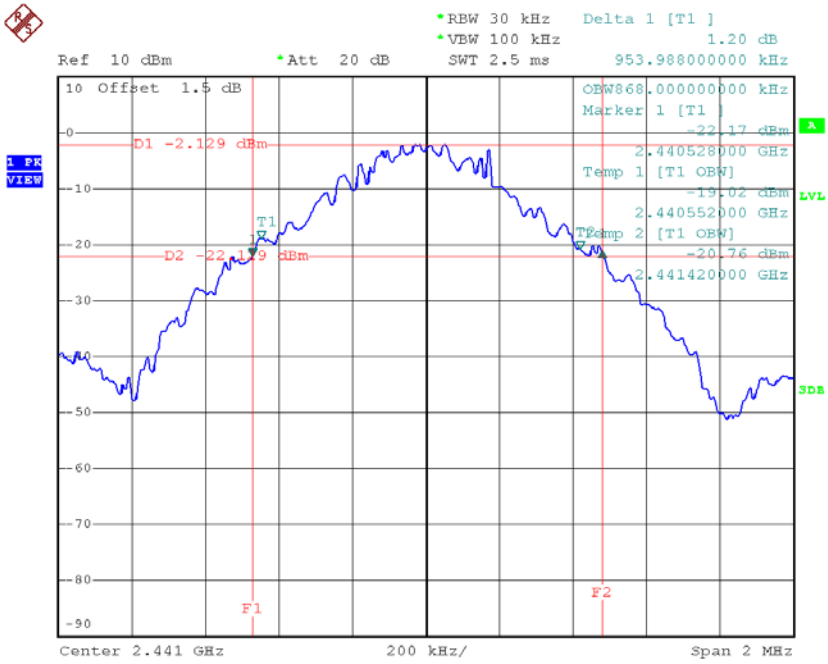
Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	0.961	0.868	Pass
2441	0.954	0.868	Pass
2480	1.020	0.864	Pass

CH00



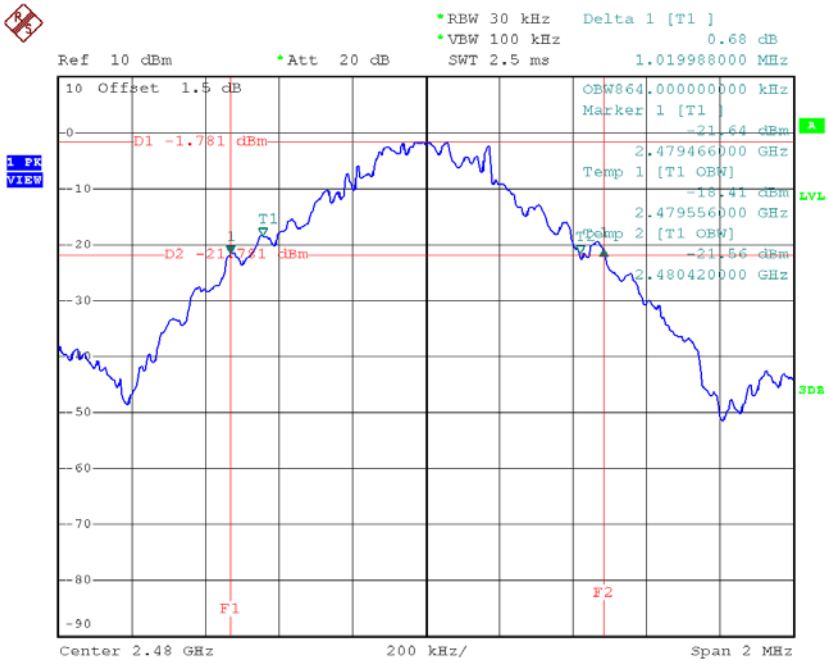
Date: 8.OCT.2018 10:06:12

CH39



Date: 8.OCT.2018 10:08:28

CH78

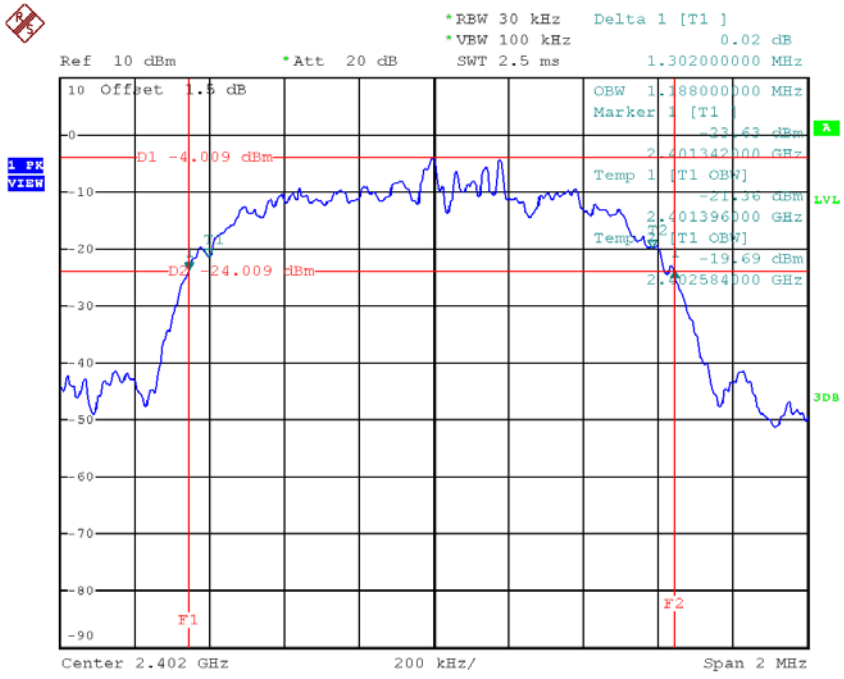


Date: 8.OCT.2018 10:09:30

Test Mode:	TX Mode _3Mbps

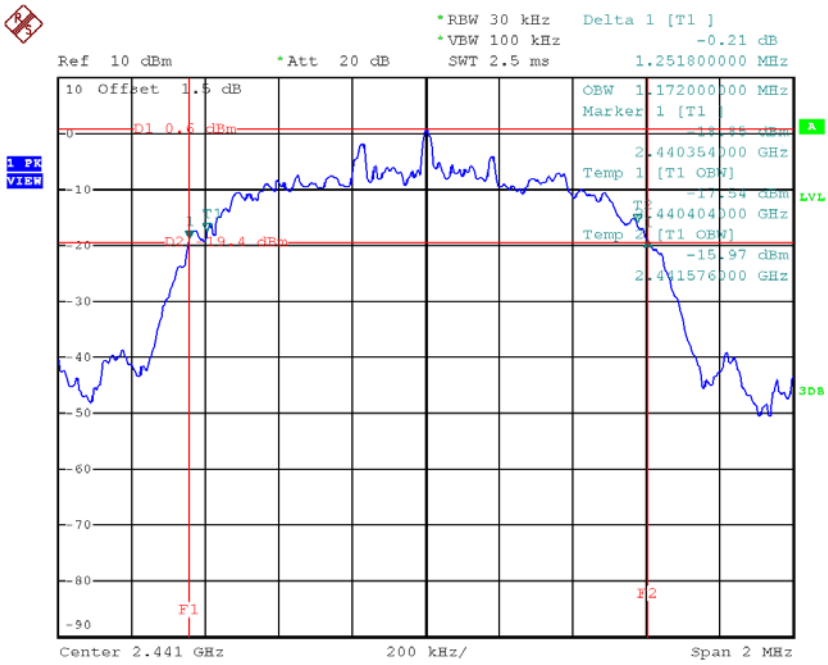
Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Test Result
2402	1.302	1.188	Pass
2441	1.252	1.172	Pass
2480	1.258	1.172	Pass

CH00



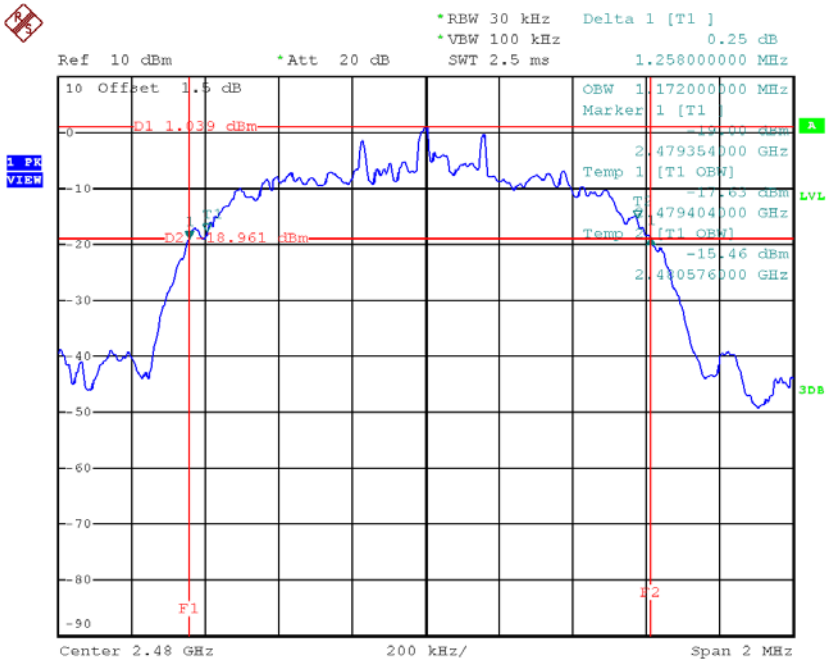
Date: 25.OCT.2018 12:16:07

CH39



Date: 25.OCT.2018 12:17:51

CH78



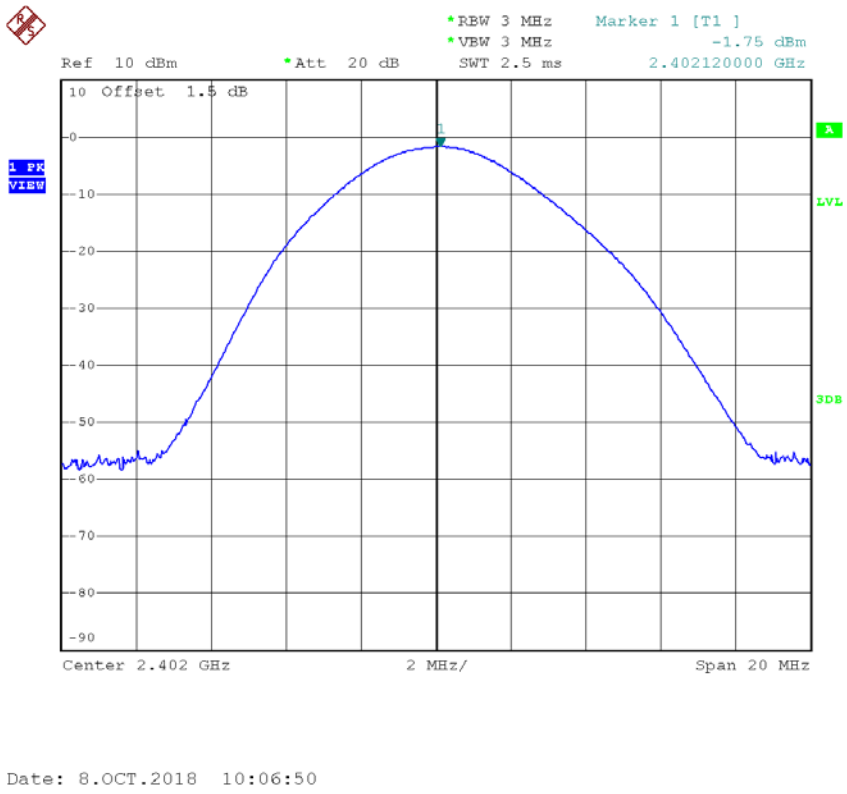
Date: 25.OCT.2018 12:18:35

APPENDIX I - MAXIMUM OUTPUT POWER

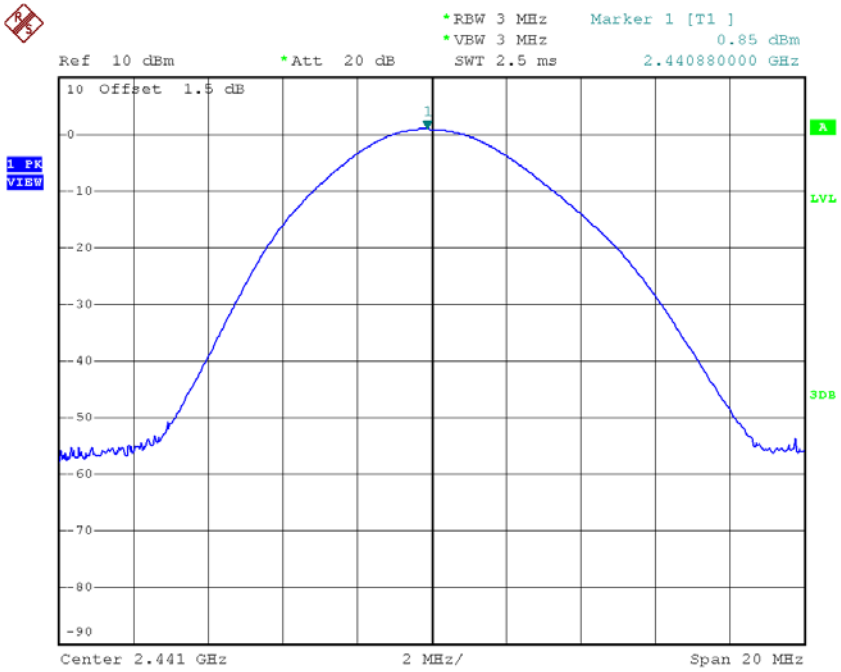
Test Mode:	TX Mode _1Mbps

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	-1.75	0.0007	21.00	0.125	Pass
2441	0.85	0.0012	21.00	0.125	Pass
2480	1.22	0.0013	21.00	0.125	Pass

CH00

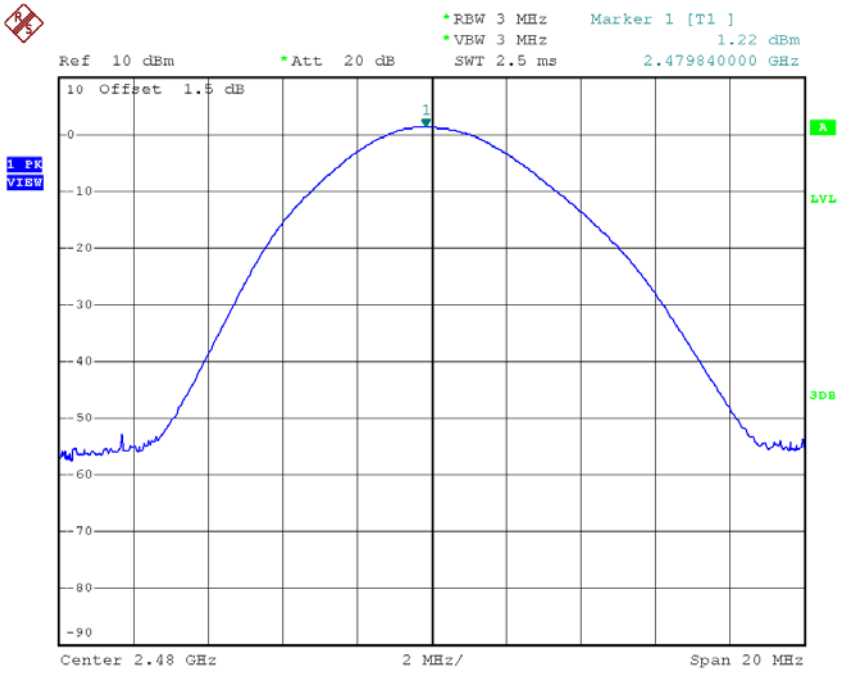


CH39



Date: 8.OCT.2018 10:08:34

CH78

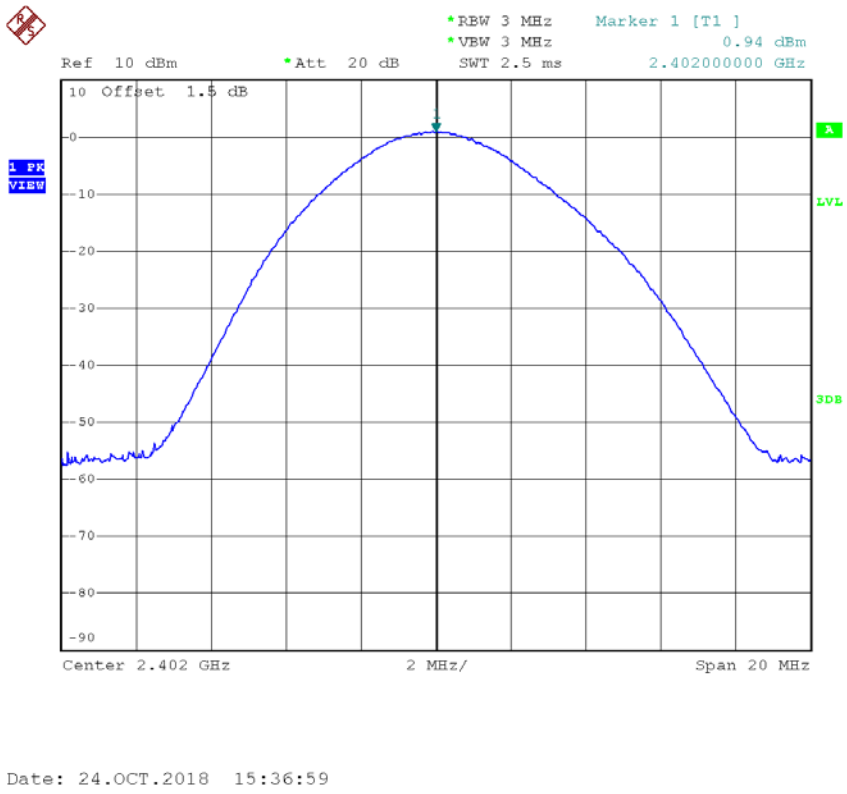


Date: 8.OCT.2018 10:10:07

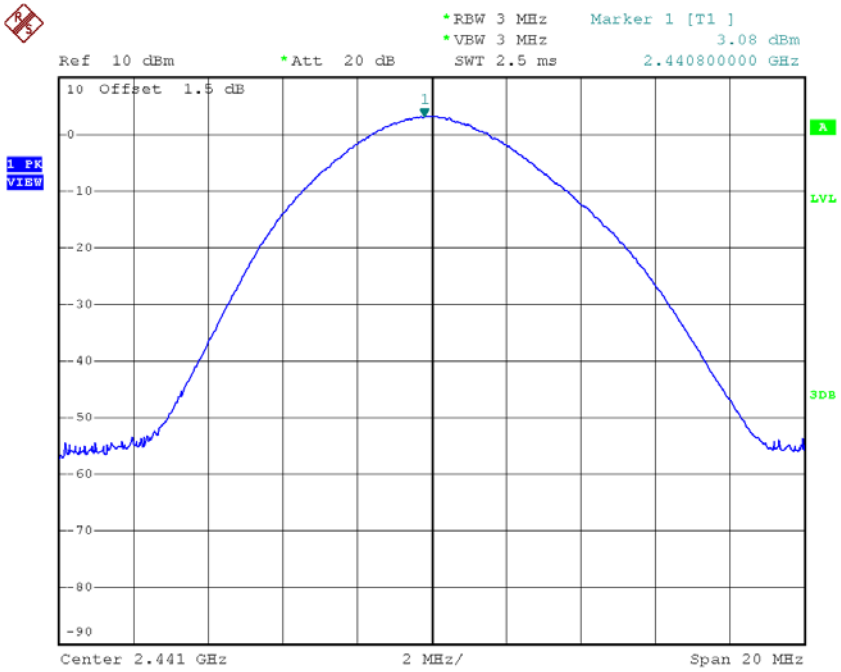
Test Mode:	TX Mode _3Mbps

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	0.94	0.0012	21.00	0.125	Pass
2441	3.08	0.0020	21.00	0.125	Pass
2480	3.75	0.0024	21.00	0.125	Pass

CH00

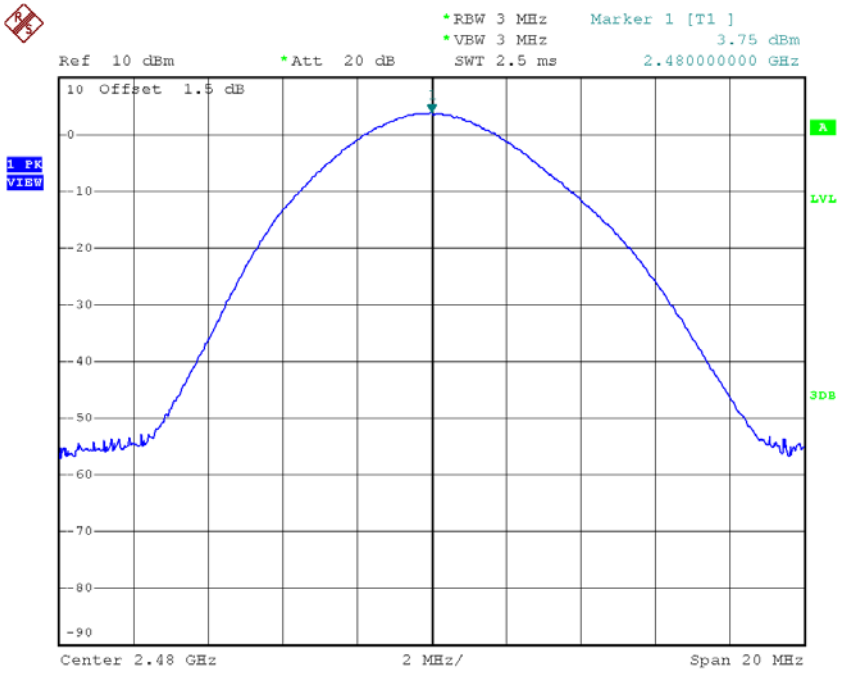


CH39



Date: 24.OCT.2018 15:36:36

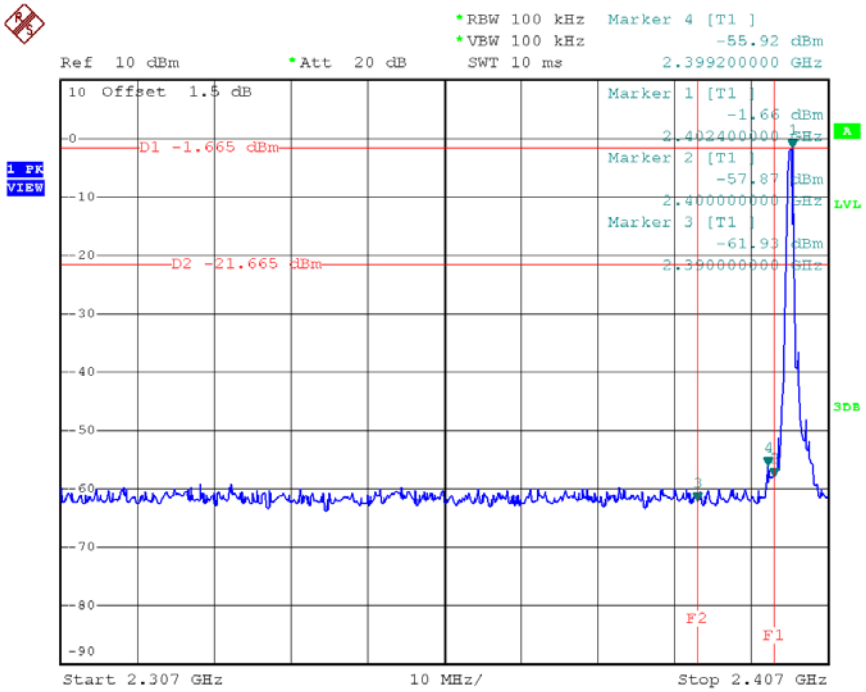
CH78



Date: 24.OCT.2018 15:37:16

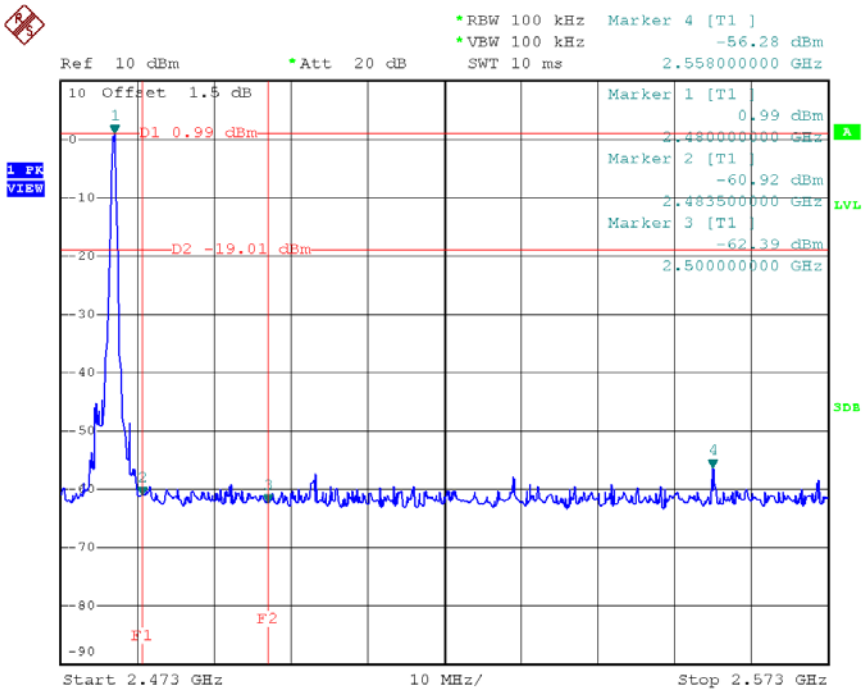
APPENDIX J - ANTENNA CONDUCTED SPURIOUS EMISSION

CH00 (Lower)_1Mbps



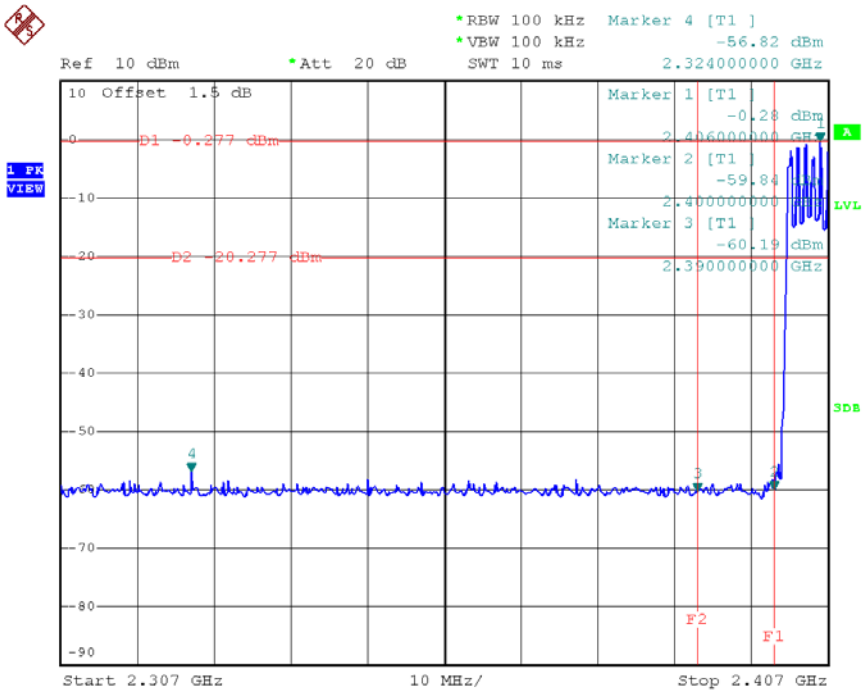
Date: 8.OCT.2018 10:05:45

CH78 (Upper) _1Mbps



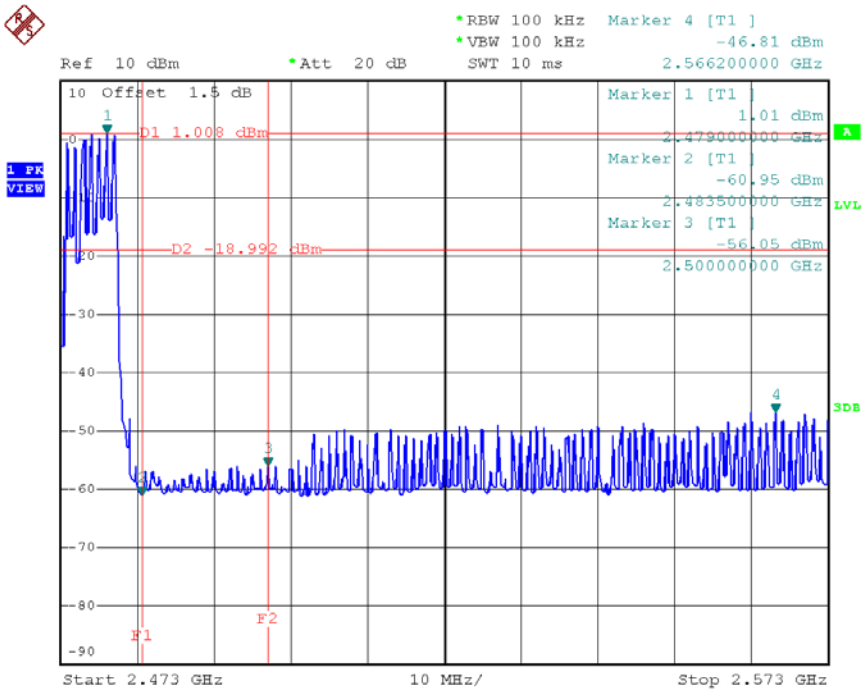
Date: 8.OCT.2018 10:09:05

CH00 Hopping on mode (Lower)_1Mbps



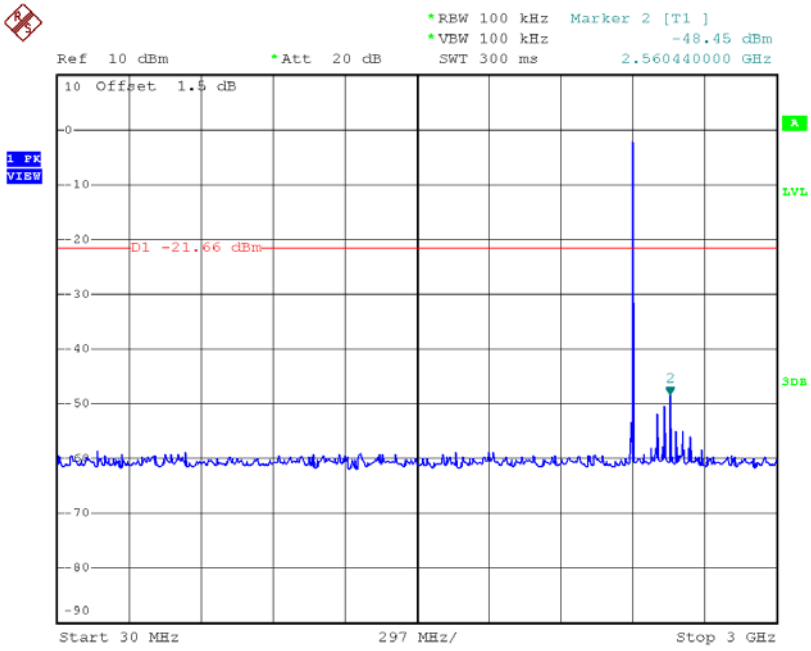
Date: 8.OCT.2018 10:20:56

CH78 Hopping on mode (Upper) _1Mbps

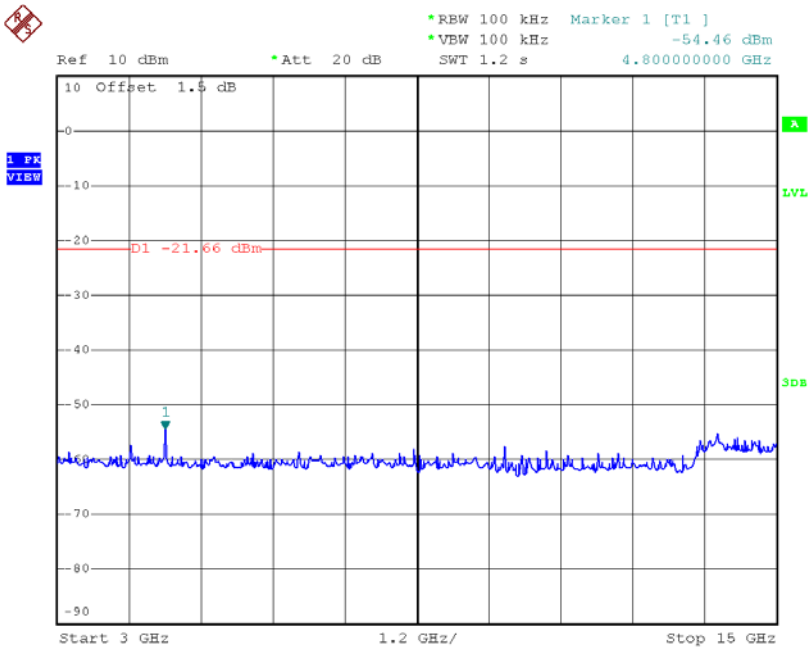


Date: 8.OCT.2018 10:21:36

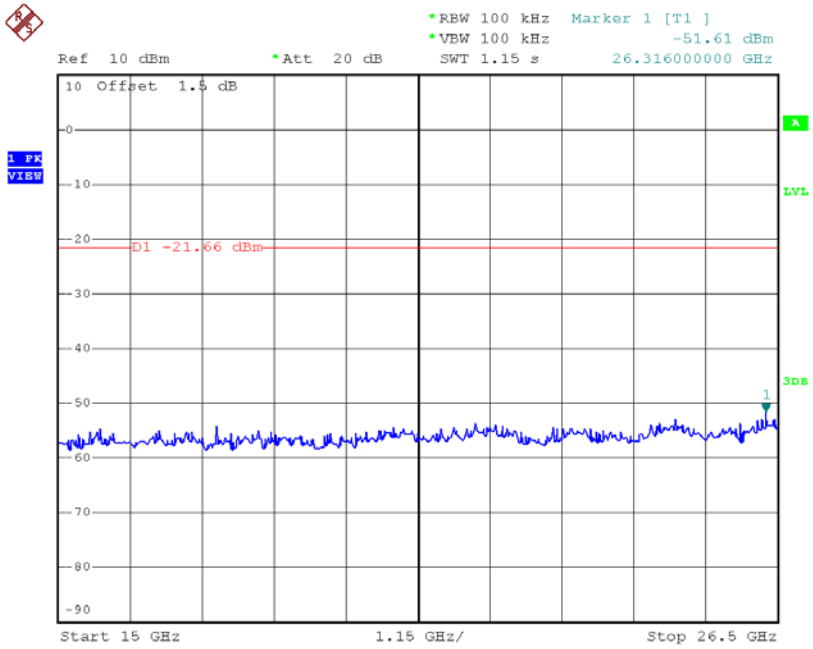
CH00 (10 Harmonic of the frequency) _1Mbps



Date: 8.OCT.2018 10:06:26

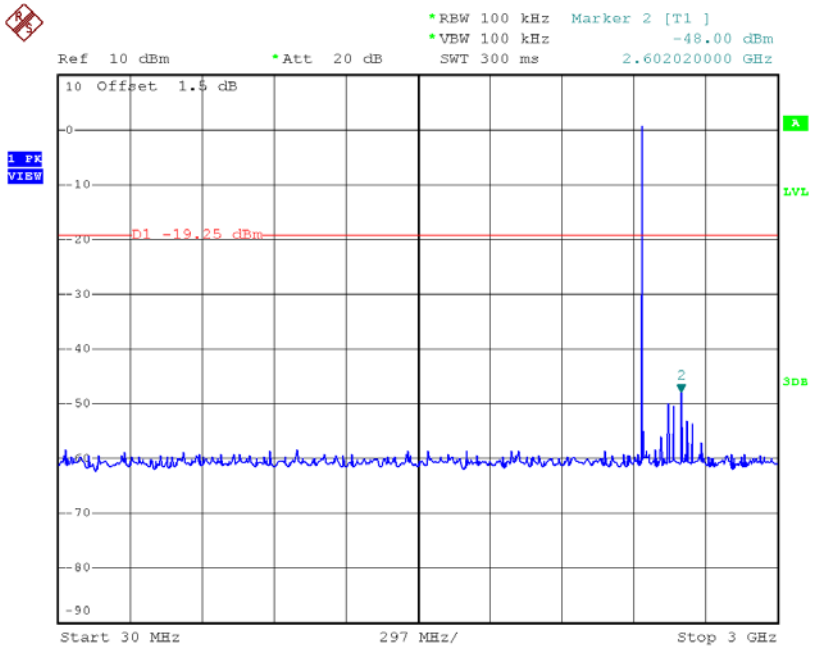


Date: 8.OCT.2018 10:06:35

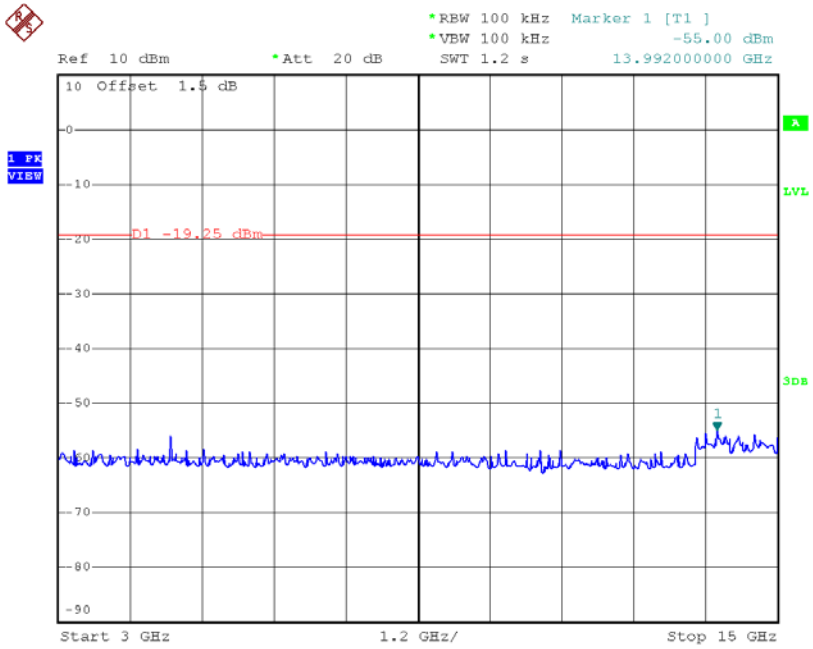


Date: 8.OCT.2018 10:06:43

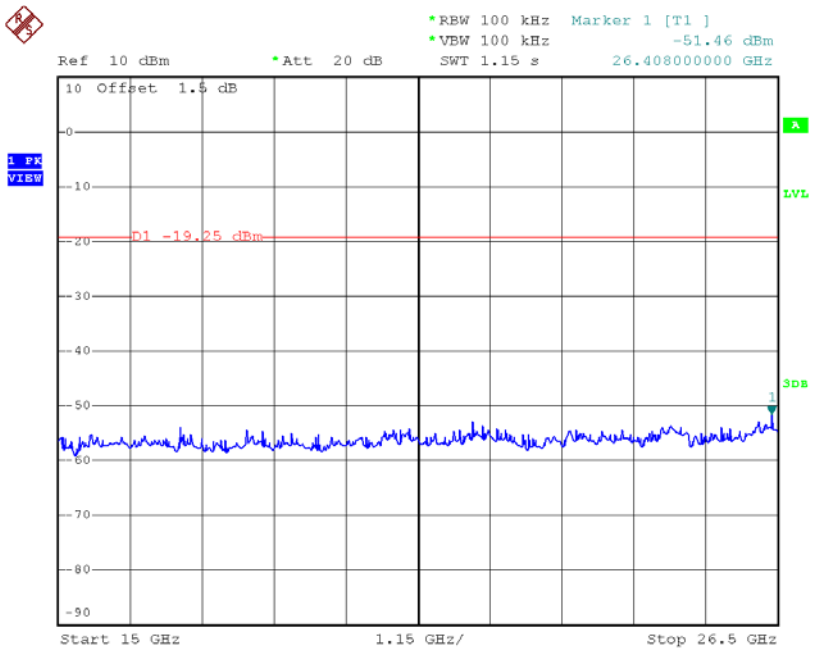
CH39 (10 Harmonic of the frequency) _1Mbps



Date: 8.OCT.2018 10:07:43

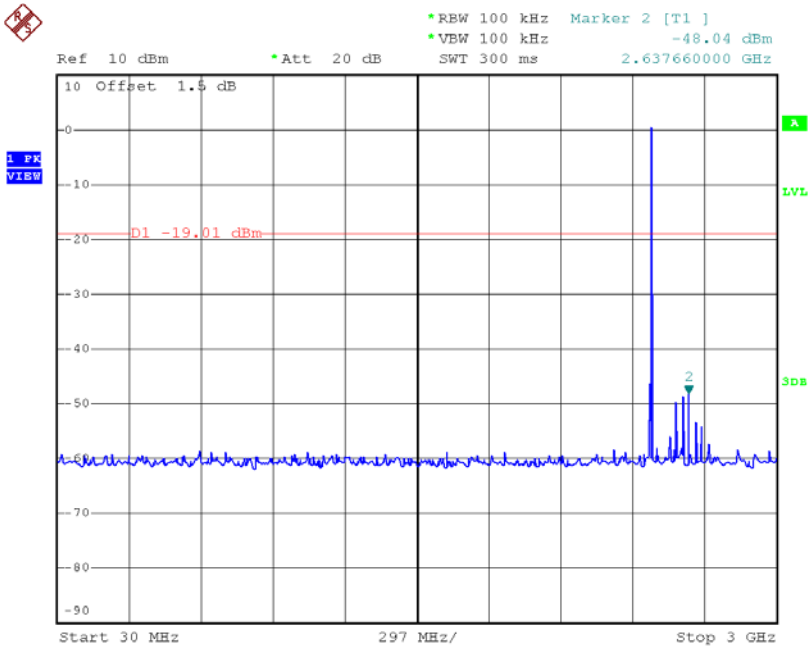


Date: 8.OCT.2018 10:07:51

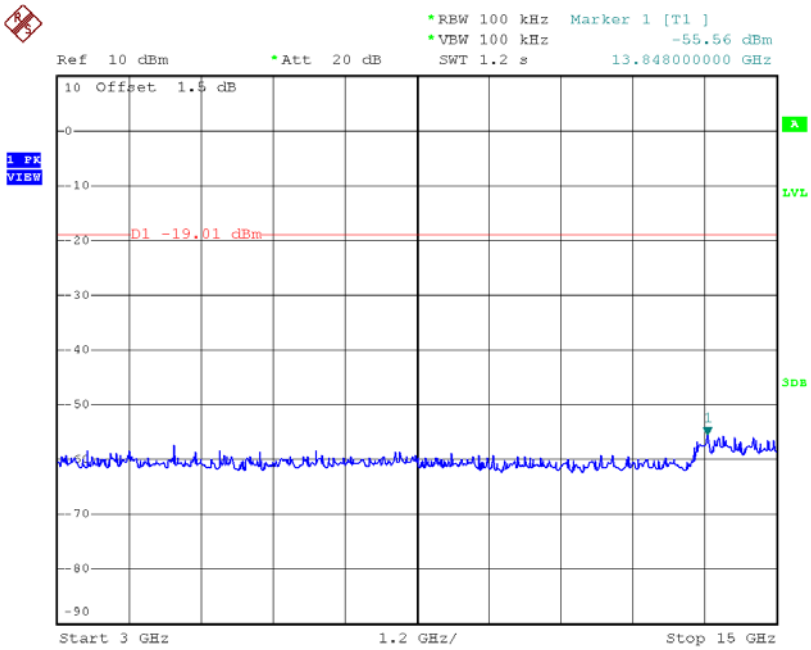


Date: 8.OCT.2018 10:08:00

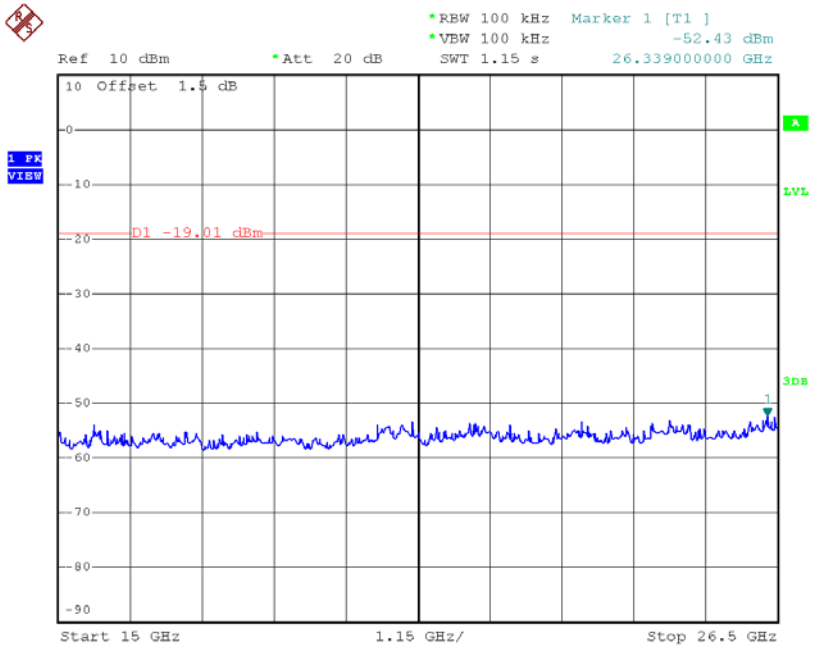
CH78 (10 Harmonic of the frequency) _1Mbps



Date: 8.OCT.2018 10:09:44

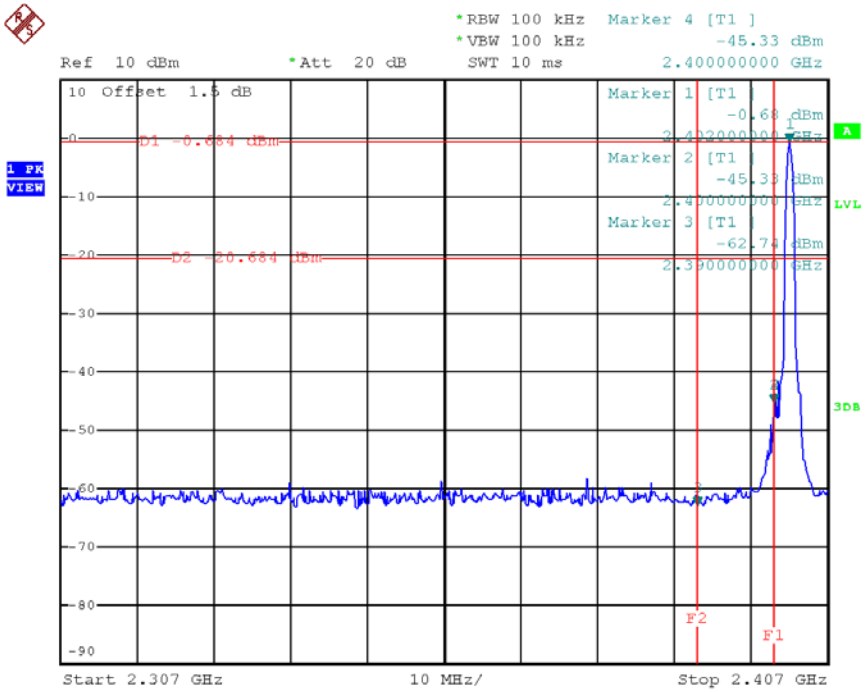


Date: 8.OCT.2018 10:09:53



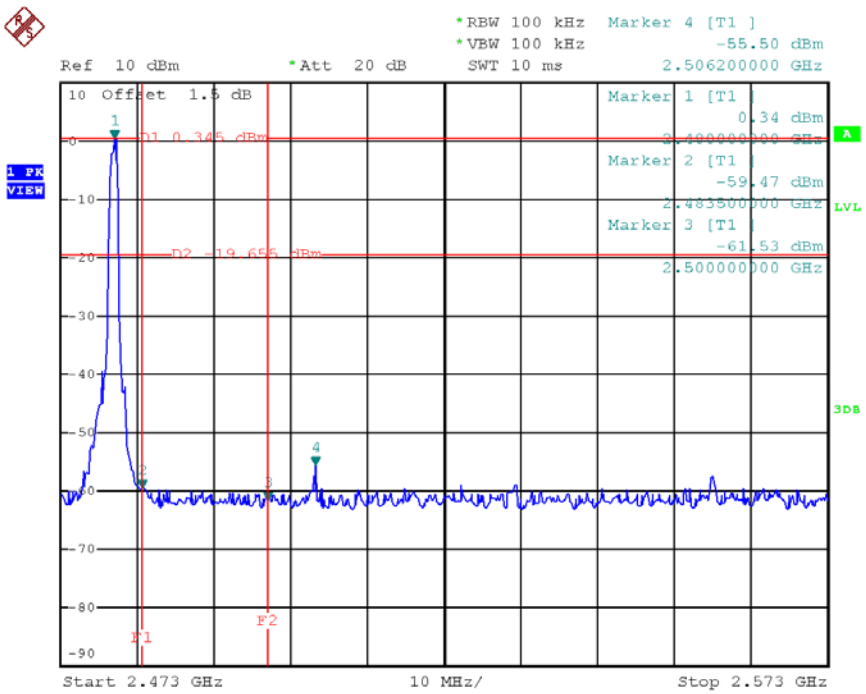
Date: 8.OCT.2018 10:10:01

CH00 (Lower) _3Mbps



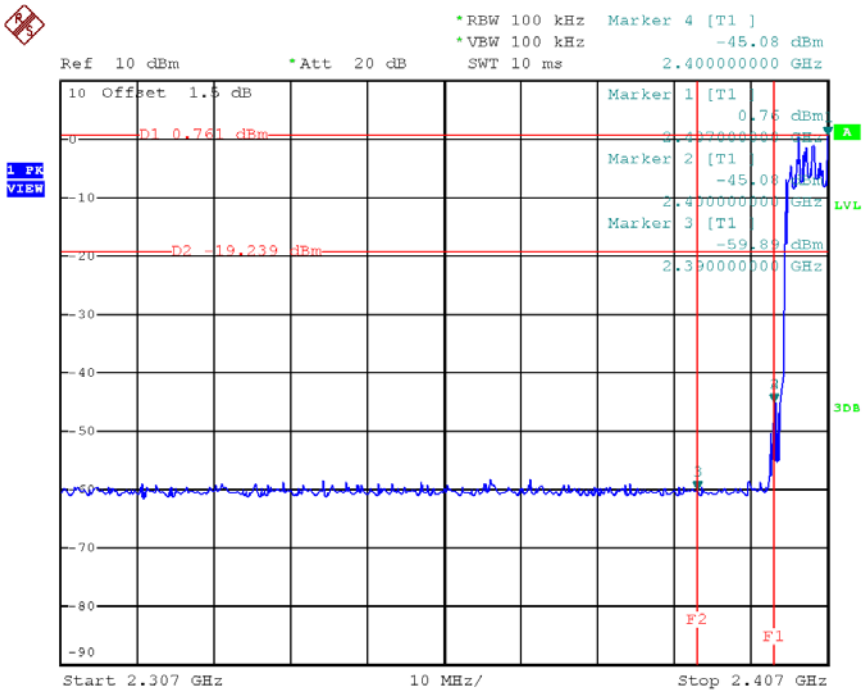
Date: 25.OCT.2018 12:15:39

CH78 (Upper) _3Mbps



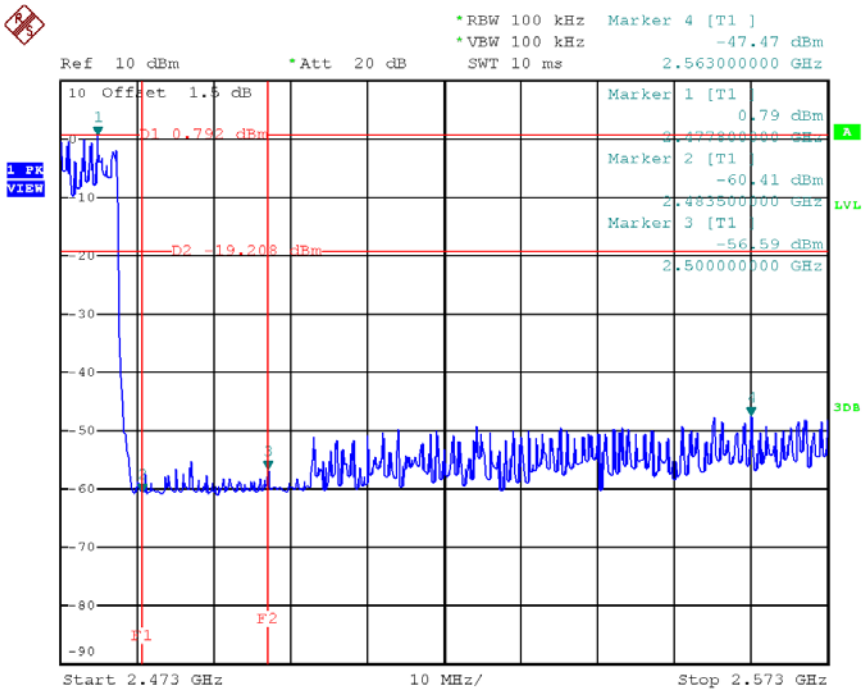
Date: 25.OCT.2018 12:18:06

CH00 Hopping on mode (Lower)_3Mbps



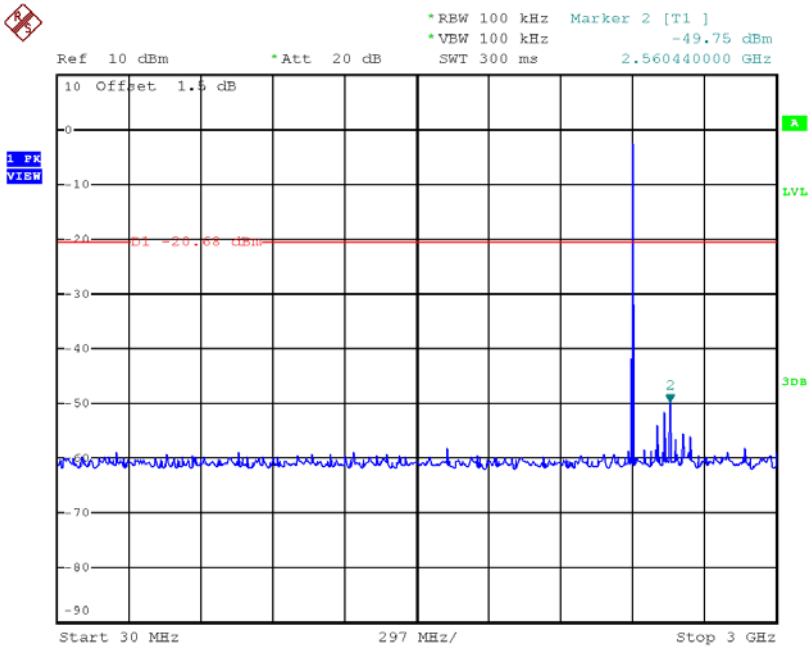
Date: 25.OCT.2018 12:48:19

CH78 Hopping on mode (Upper) _3Mbps

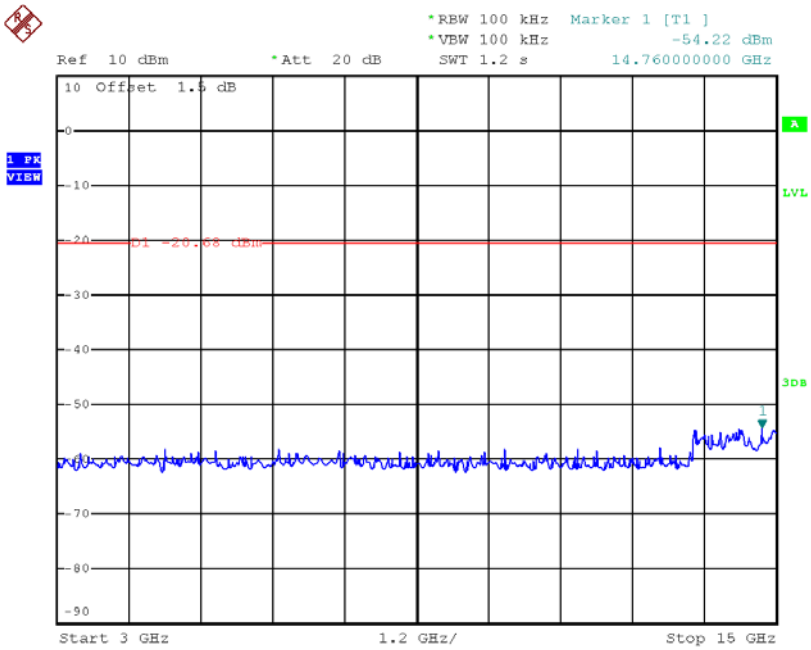


Date: 25.OCT.2018 12:48:55

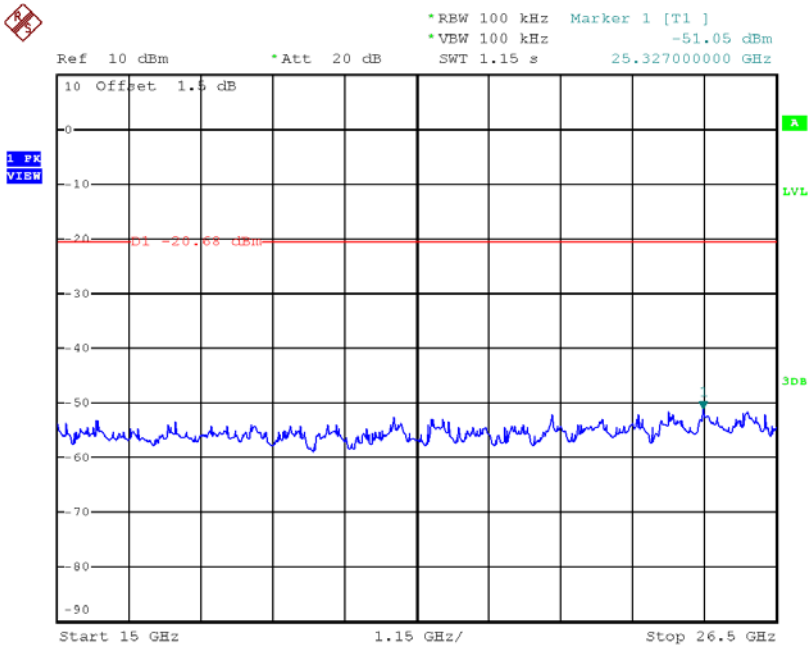
CH00 (10 Harmonic of the frequency) _3Mbps



Date: 25.OCT.2018 12:16:21

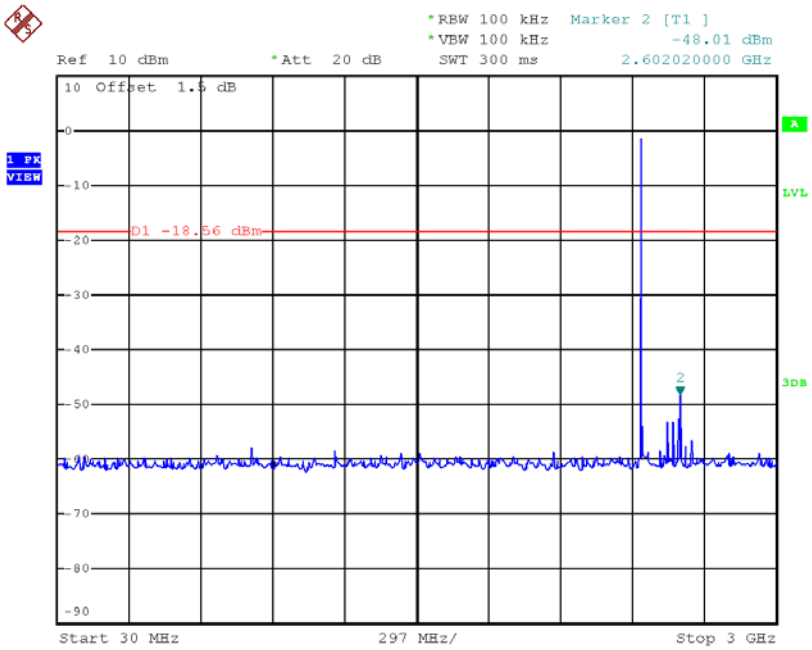


Date: 25.OCT.2018 12:16:28

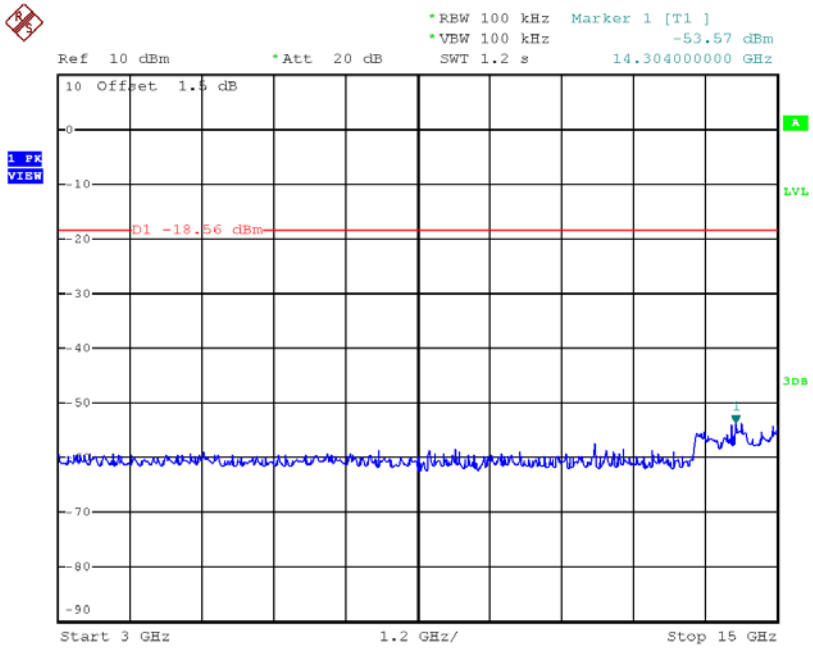


Date: 25.OCT.2018 12:16:35

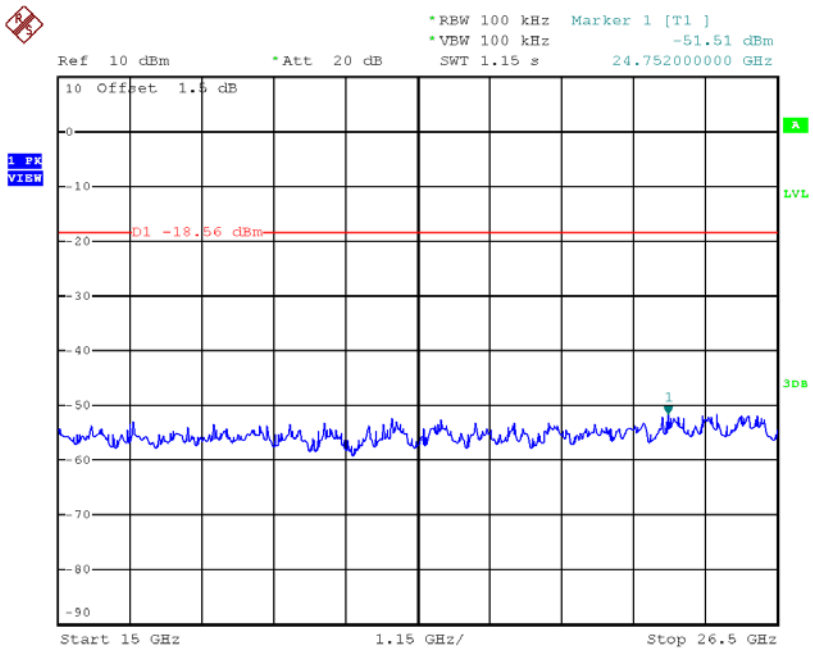
CH39 (10 Harmonic of the frequency) _3Mbps



Date: 25.OCT.2018 12:17:04

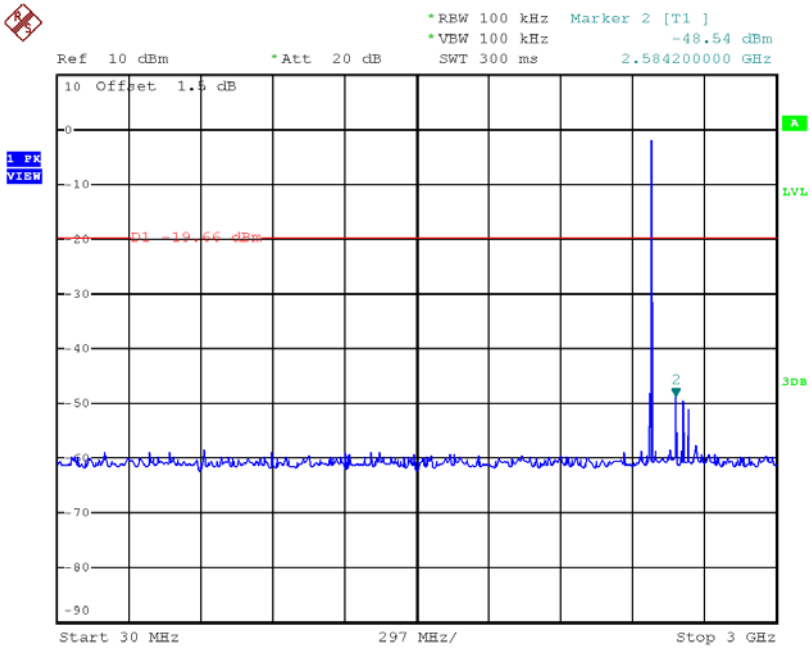


Date: 25.OCT.2018 12:17:11

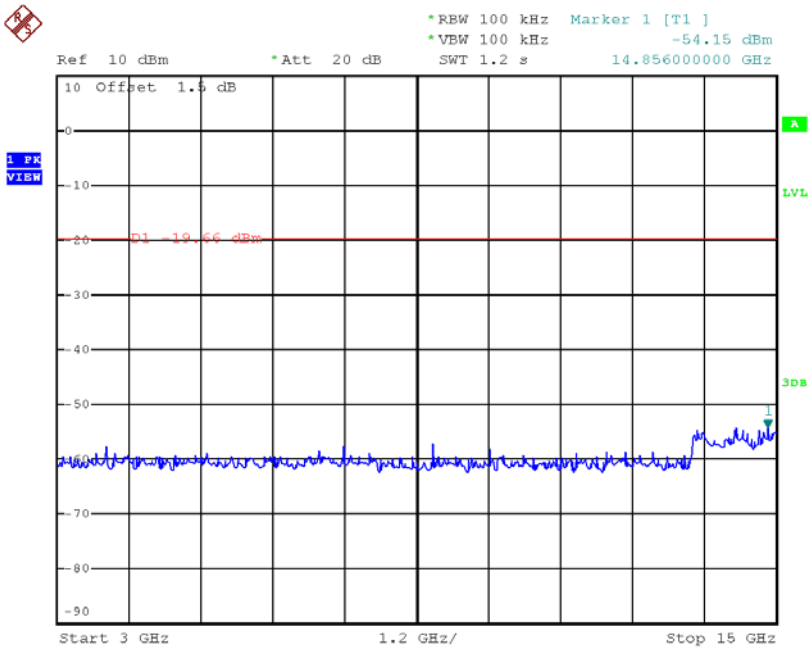


Date: 25.OCT.2018 12:17:18

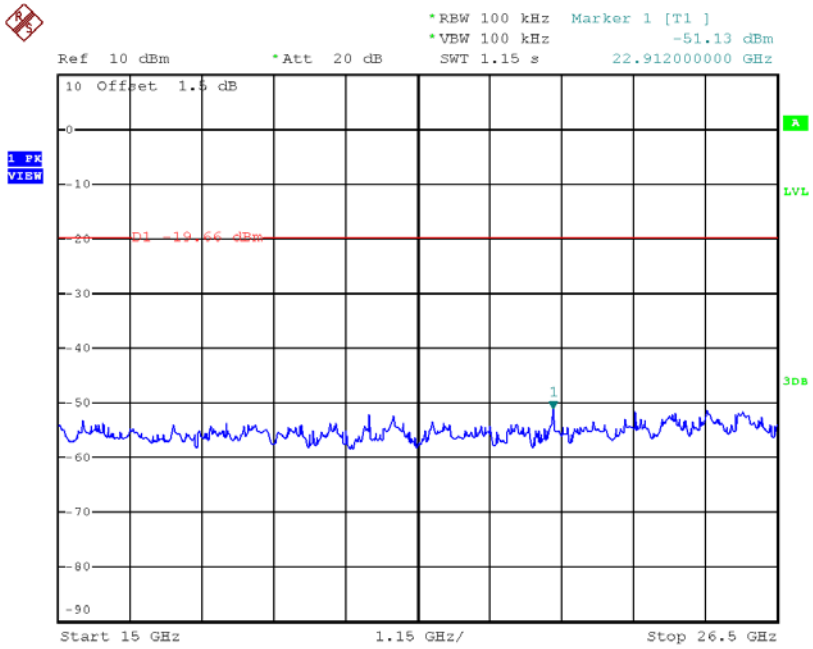
CH78 (10 Harmonic of the frequency) _3Mbps



Date: 25.OCT.2018 12:18:49



Date: 25.OCT.2018 12:18:56



Date: 25.OCT.2018 12:19:03

End of Test Report