FCC Radio Test Report

FCC ID: ZLE-RG650U

This report concerns: Original Grant

Project No.	:	1810C073
Equipment	:	LTE SMARTPHONE
Test Model	:	RG650U
Series Model	:	N/A
Applicant	:	Power Idea Technology (Shenzhen) Co., Ltd.
Address	:	4th Floor, A Section ,Languang Science&technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, ShenZhen, China

Date of Receipt	:	Oct. 18, 2018
Date of Test	:	Dec. 10, 2018 ~ Dec. 29, 2018
Issued Date	:	Jan. 28, 2019
Tested by	:	BTL Inc.

Testing Engineer : Paul Li
(Paul Li)

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/IEC 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 which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and 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.	Jan. 07, 2019
R01	Modified the comments of TCB.	Jan. 21, 2019
R02	Changed the FCC ID and applicant information.	Jan. 28, 2019

1. GENERAL SUMMARY

Equipment	:	LTE SMARTPHONE
Brand Name	:	RugGear
Test Model	:	RG650U
Series Model	:	N/A
Applicant	:	Power Idea Technology (Shenzhen) Co., Ltd.
Manufacturer	:	RUGGEAR LIMITED
Address	:	RM1301,13/F WING TUCK COMM CTR 177-183 WING LOK ST SHEUNG WAN HONG KONG
Date of Test	:	Dec. 10, 2018 ~ Dec. 29, 2018
Test Sample	:	Engineering Sample No.: D181211335 for conducted, D181211444 for radiated.
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-1-1810C073) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

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

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15 (15.247) , Subpart C				
Standard(s) Section	**Test Item**	**Test Result**	**Judgment**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS	------
15.247(d) 15.209 15.205	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.247(a)(1)(iii)	Number of Hopping Frequency	APPENDIX E	PASS	------
15.247(a)(1)(iii)	Average Time Of Occupancy	APPENDIX F	PASS	------
15.247(a)(1)	Hopping Channel Separation	APPENDIX G	PASS	------
15.247(a)(1)	Bandwidth	APPENDIX H	PASS	------
15.247(a)(1)	Maximum output power	APPENDIX I	PASS	------
15.247(d)	Antenna conducted Spurious Emission	APPENDIX J	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 Registration Number for FCC: 357015
BTL's Designation Number for FCC: CN1240

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:

A. AC power line conducted emissions Measurement:

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

B. Radiated emissions 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
Peak 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	LTE SMARTPHONE
Brand Name	RugGear
Test Model	RG650U
Series Model	N/A
Model Difference(s)	N/A
Hardware Version	V1.0
Software Version	RG650_US_1.0.0.0.0_1
Operation Frequency	2402 MHz to 2480 MHz
Modulation Technology	GFSK(1Mbps) π/4-DQPSK(2Mbps) 8-DPSK(3Mbps)
Bit Rate of Transmitter	
Maximum Peak Output Power	1Mbps: 1.77 dBm (0.0015W) 3Mbps: 1.77 dBm (0.0015W)
Power Source	1# DC voltage supplied from AC/DC adapter. Manufacturer / Model: Shenzhen Huntkey Electrio co.,Ltd / HKC0055010-2D 2# Supplied from Li-Polymer battery. Manufacturer / Model: SHENZHEN JIAYUANTONGDA TECHNOLOGY CO.,LTD. / BL420KP 3# Supplied from USB port.
Power Rating	1# I/P: 100-240V~ 50-60Hz 0.2A O/P: 5V⎓1.0A 2# DC 3.80V/4200mAh (15.96Wh) 3# DC 5V

Note:

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

2. Channel List:

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

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	0.2

3.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX Mode **Note (1)**

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

For Conducted Emission	
Final Test Mode	Description
Mode 1	TX Mode

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

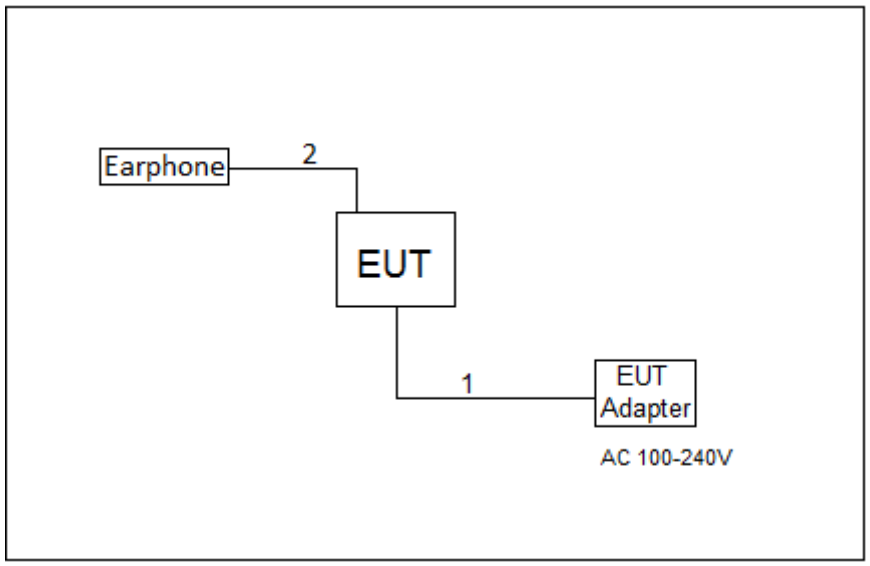
Note:

(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 PARAMETERS OF TEST SOFTWARE

Test Software Version	CMD		
Frequency (MHz)	2402	2441	2480
Parameters(1Mbps)	6	6	6
Parameters(3Mbps)	6	6	6

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 SUPPORT UNITS

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

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.2m	DC Cable
2	NO	NO	1.0m	Audio Cable

4. AC POWER LINE CONDUCTED EMISSIONS TEST

4.1 LIMIT

Frequency of Emission (MHz)	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 tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) 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
Sample calculations: (Refer to page 34, test result No.1.)

Reading Level		Correct Factor		Measurement Value
28.61	+	9.80	=	38.41

Measurement Value		Limit Value		Margin Level
38.41	-	57.10	=	-18.69

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

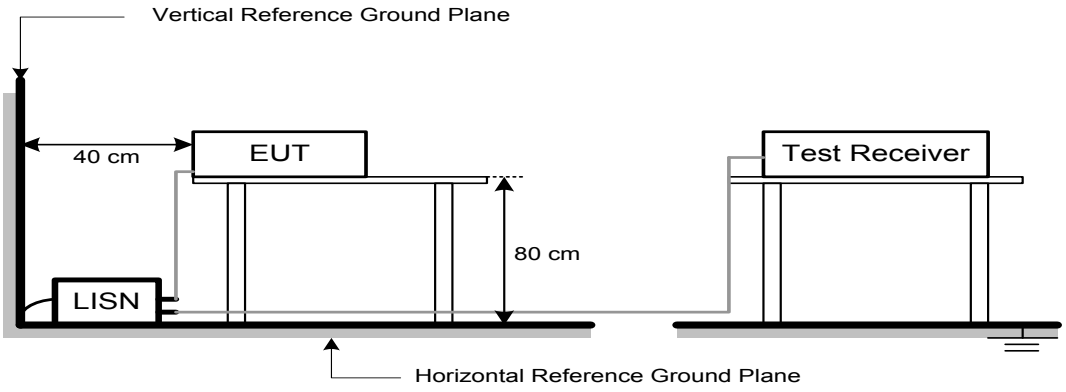
4.2 TEST PROCEDURE

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.

4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT was placed on the test table and programmed in normal function.

4.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 53% Test Voltage: AC 120V/60Hz

4.7 TEST RESULTS

Please refer to the APPENDIX A.

5. RADIATED EMISSION TEST

5.1 LIMIT

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

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

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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	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

Sample calculations: (Refer to page 39, test result No.1.)

Reading Level		Correct Factor		Measurement Value
36.20	+	20.55	=	56.75

Measurement Value		Limit Value		Margin Level
56.75	-	123.41	=	-66.66

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for Peak, 1 MHz / 1/T for Average

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

5.2 TEST PROCEDURE

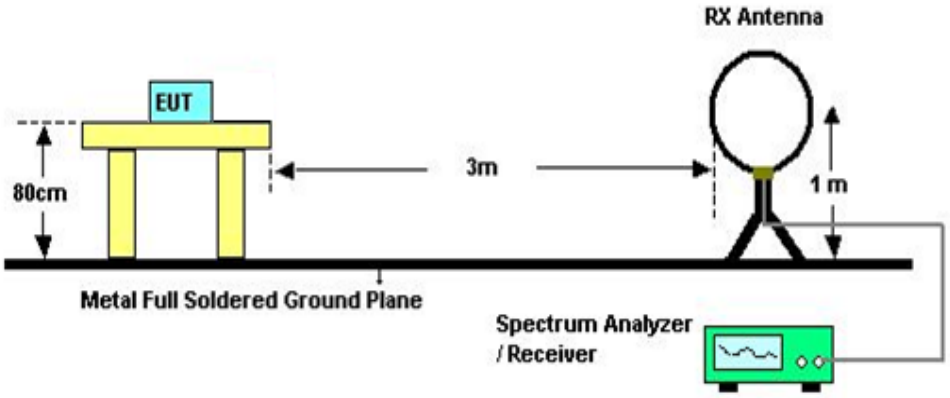
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance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

5.3 DEVIATION FROM TEST STANDARD

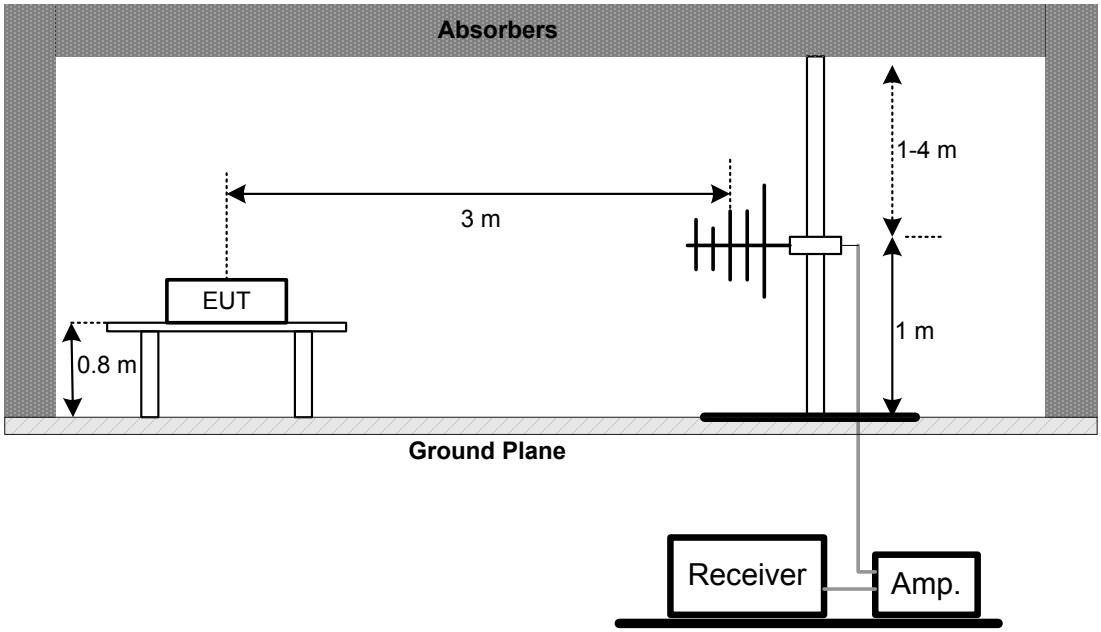
No deviation

5.4 TEST SETUP

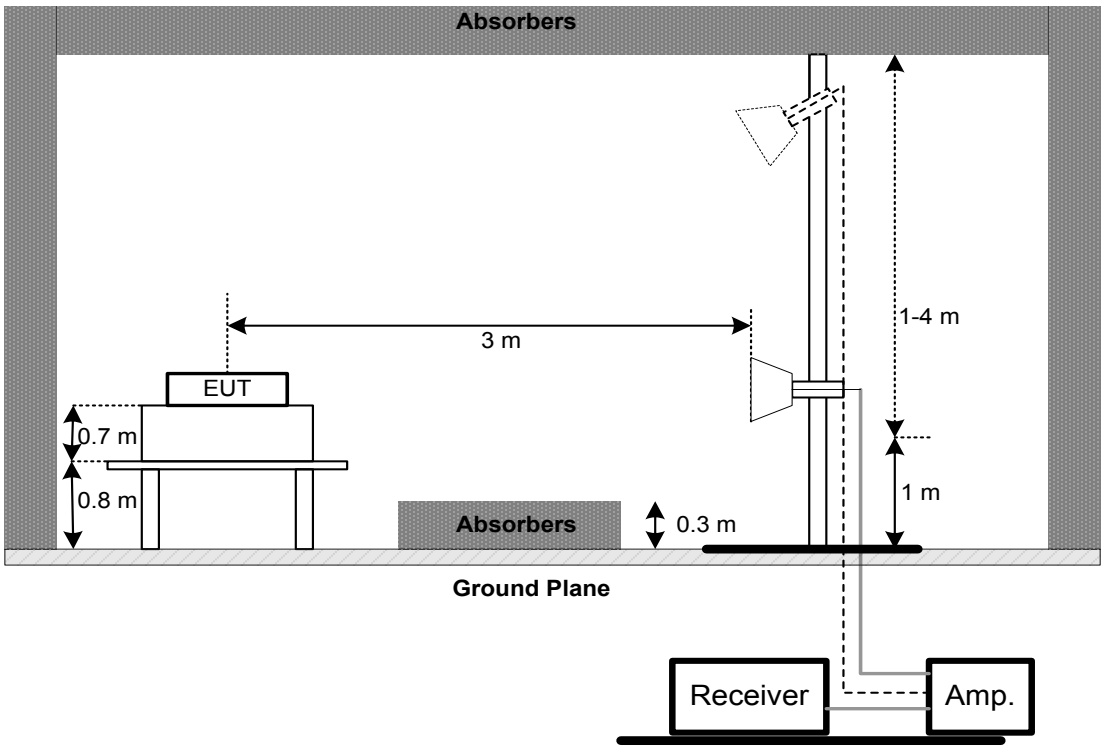
9 kHz-30 MHz



30 MHz to 1 GHz



Above 1 GHz



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 EUT TEST CONDITIONS

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

5.7 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.

5.8 TEST RESULTS - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

5.9 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.

6. NUMBER OF HOPPING CHANNEL

6.1 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

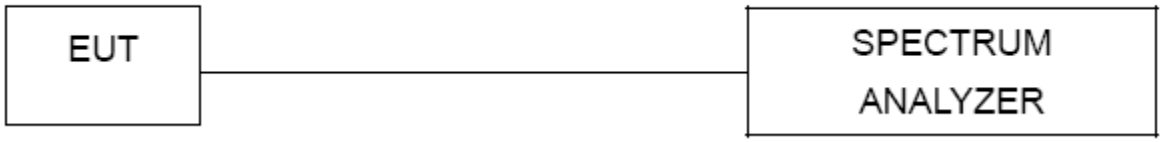
6.2 TEST PROCEDURE

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

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

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

6.6 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 47% Test Voltage: AC 120V/60Hz

6.7 TEST RESULTS

Please refer to the APPENDIX E

7. AVERAGE TIME OF OCCUPANCY

7.1 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

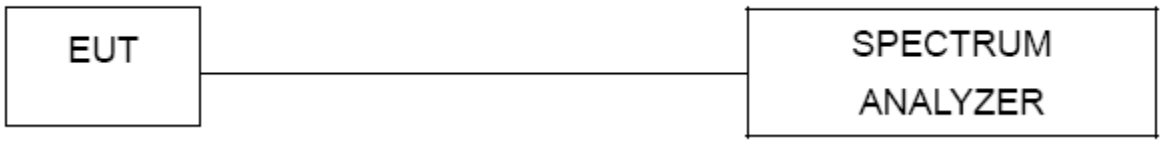
7.2 TEST PROCEDURE

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

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

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

7.6 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 47% Test Voltage: AC 120V/60Hz

7.7 TEST RESULTS

Please refer to the APPENDIX F

8. HOPPING CHANNEL SEPARATION MEASUREMENT

8.1 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

8.2 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

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

8.5 EUT OPERATION CONDITIONS

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

8.6 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 47% Test Voltage: AC 120V/60Hz

8.7 TEST RESULTS

Please refer to the APPENDIX G

9. BANDWIDTH TEST

9.1 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

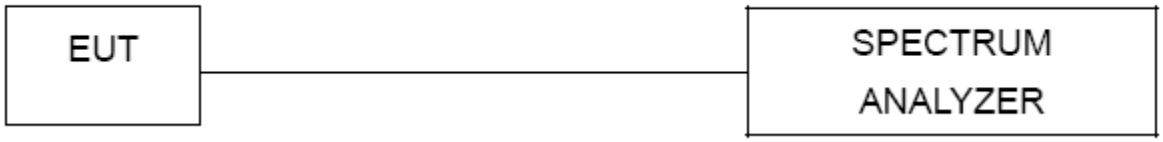
9.2 TEST PROCEDURE

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

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

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

9.6 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 47% Test Voltage: AC 120V/60Hz

9.7 TEST RESULTS

Please refer to the APPENDIX H

10. MAXIMUM OUTPUT POWER

10.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)	Maximum Peak 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.

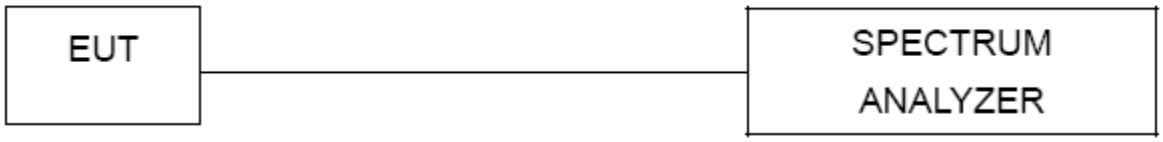
10.2 TEST PROCEDURE

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

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

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

10.6 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 47% Test Voltage: AC 120V/60Hz

10.7 TEST RESULTS

Please refer to the APPENDIX I

11. ANTENNA CONDUCTED SPURIOUS EMISSION

11.1 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)).

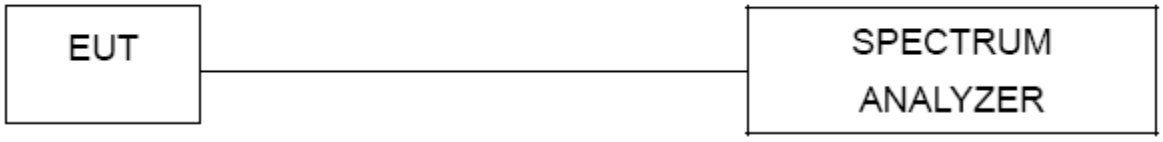
11.2 TEST PROCEDURE

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

11.3 DEVIATION FROM STANDARD

No deviation.

11.4 TEST SETUP



11.5 EUT OPERATION CONDITIONS

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

11.6 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 47% Test Voltage: AC 120V/60Hz

11.7 TEST RESULTS

Please refer to the APPENDIX J

12. MEASUREMENT INSTRUMENTS LIST

AC Power Line Conducted Emissions					
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 Emissions - 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 Emissions - 30 MHz to 1 GHz					
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-1GHz)(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 Emissions - Above 1 GHz					
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

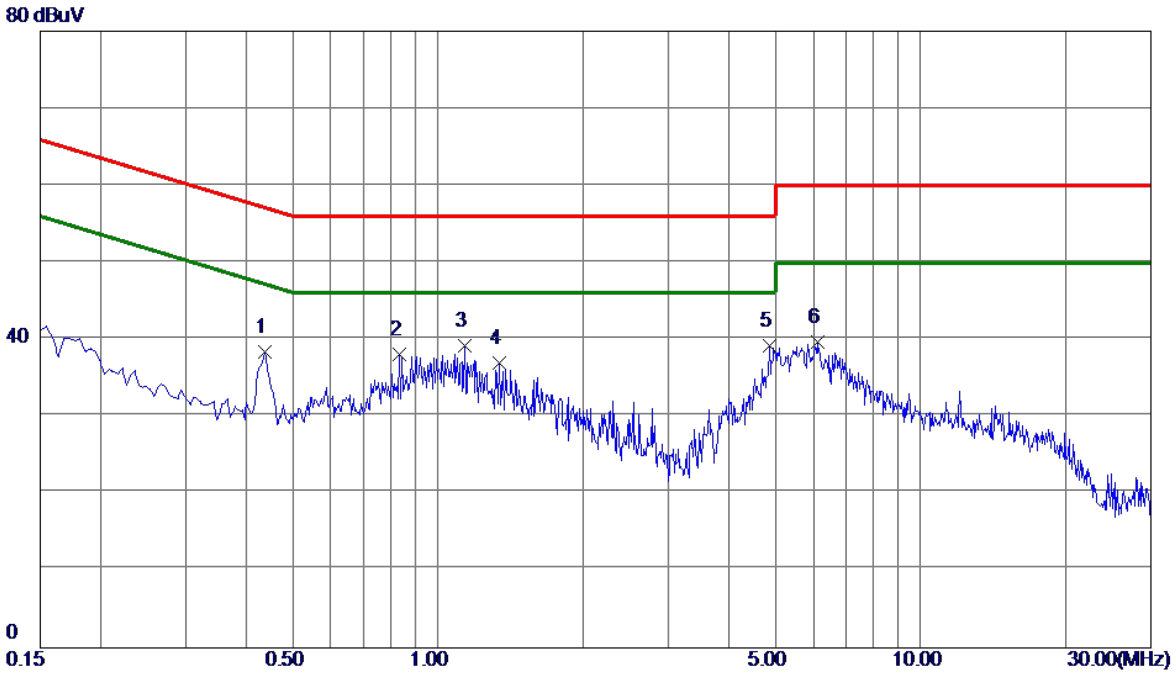
Antenna Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

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

APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode:	TX Model_1Mbps (Supplied from USB port.)

Line

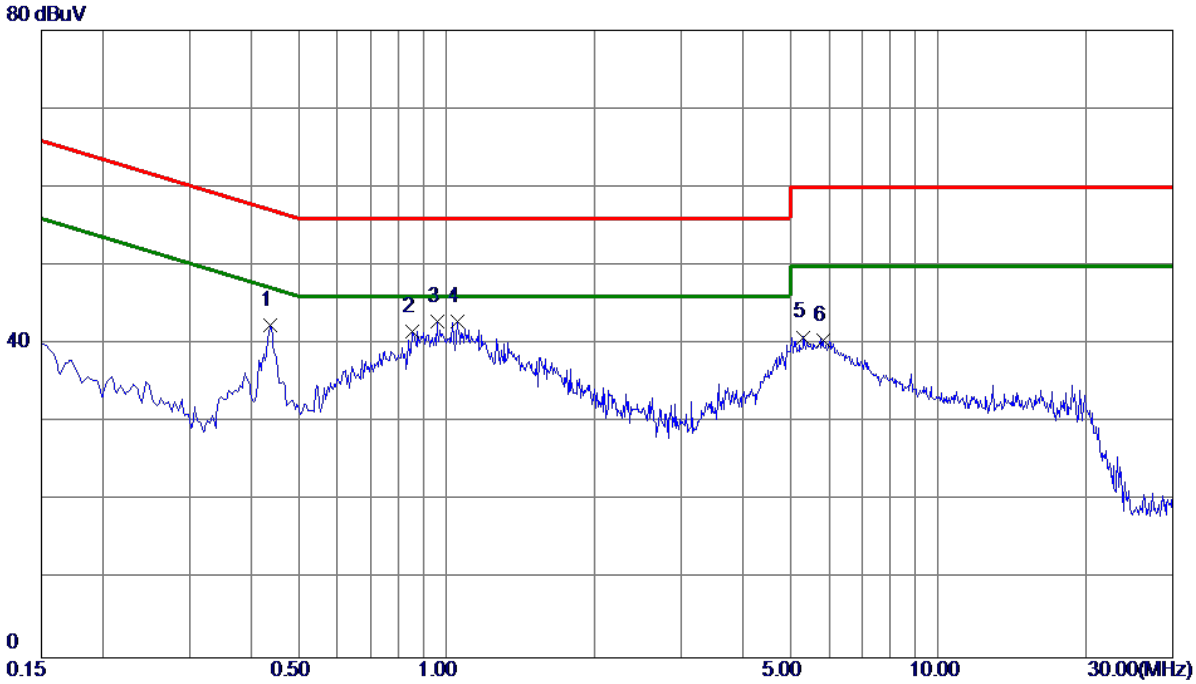


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.4380	28.61	9.80	38.41	57.10	-18.69	Peak	
2	0.8340	28.18	9.91	38.09	56.00	-17.91	Peak	
3 *	1.1355	29.32	9.93	39.25	56.00	-16.75	Peak	
4	1.3380	27.08	9.94	37.02	56.00	-18.98	Peak	
5	4.8705	29.04	10.18	39.22	56.00	-16.78	Peak	
6	6.1035	29.38	10.27	39.65	60.00	-20.35	Peak	

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

Test Mode:	TX Model_1Mbps (Supplied from USB port.)

Neutral

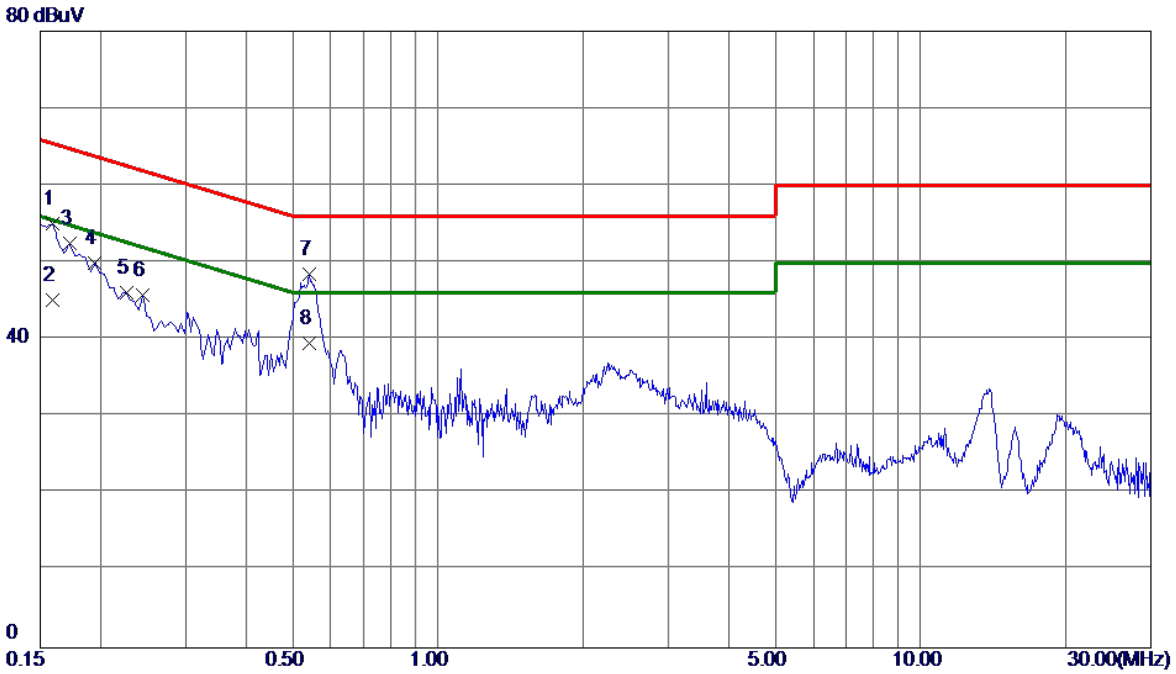


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.4380	32.52	9.95	42.47	57.10	-14.63	Peak	
2	0.8520	31.56	10.09	41.65	56.00	-14.35	Peak	
3	0.9555	32.72	10.11	42.83	56.00	-13.17	Peak	
4 *	1.0500	32.77	10.12	42.89	56.00	-13.11	Peak	
5	5.3205	30.45	10.43	40.88	60.00	-19.12	Peak	
6	5.8335	30.02	10.48	40.50	60.00	-19.50	Peak	

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

Test Mode:	TX Model_1Mbps (Supplied from adapter.)

Line

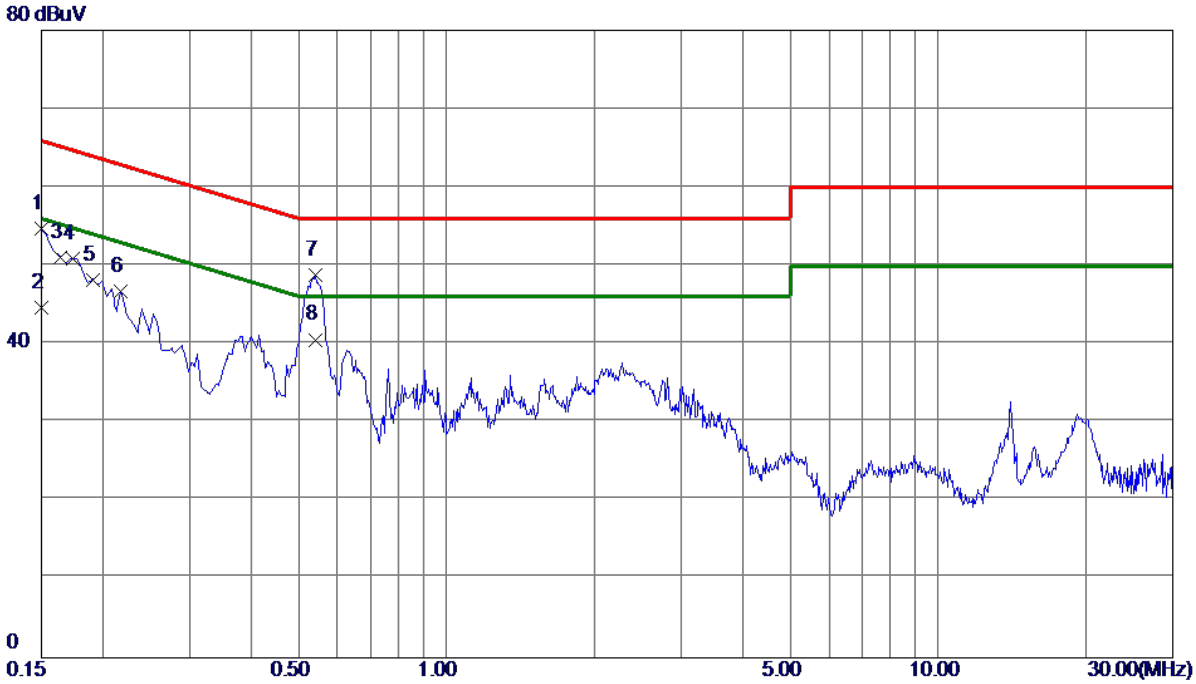


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1590	45.28	9.82	55.10	65.52	-10.42	Peak	
2	0.1590	35.30	9.82	45.12	55.52	-10.40	AVG	
3	0.1725	42.60	9.82	52.42	64.84	-12.42	Peak	
4	0.1949	40.02	9.82	49.84	63.83	-13.99	Peak	
5	0.2268	36.23	9.82	46.05	62.57	-16.52	Peak	
6	0.2445	35.92	9.82	45.74	61.94	-16.20	Peak	
7	0.5415	38.71	9.81	48.52	56.00	-7.48	Peak	
8 *	0.5415	29.70	9.81	39.51	46.00	-6.49	AVG	

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

Test Mode:	TX Model_1Mbps (Supplied from adapter.)

Neutral



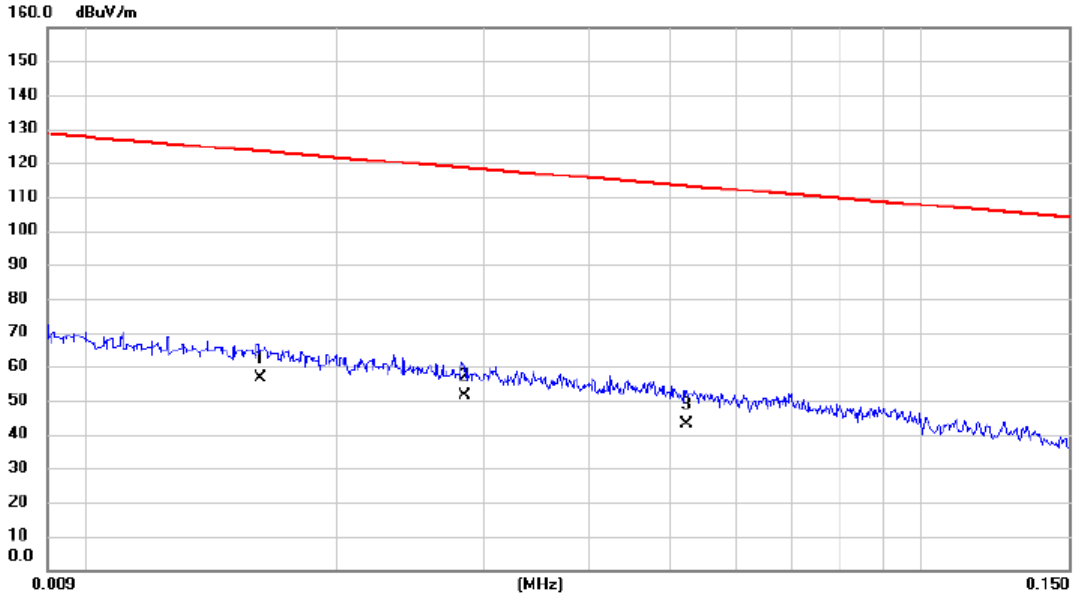
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	44.76	9.91	54.67	66.00	-11.33	Peak	
2	0.1500	34.80	9.91	44.71	56.00	-11.29	AVG	
3	0.1641	41.14	9.91	51.05	65.25	-14.20	Peak	
4	0.1740	41.02	9.91	50.93	64.77	-13.84	Peak	
5	0.1914	38.25	9.91	48.16	63.98	-15.82	Peak	
6	0.2175	36.86	9.91	46.77	62.91	-16.14	Peak	
7	0.5415	38.91	9.96	48.87	56.00	-7.13	Peak	
8 *	0.5415	30.60	9.96	40.56	46.00	-5.44	AVG	

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

APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

Test Mode:	TX Model_1Mbps

Ant 0°

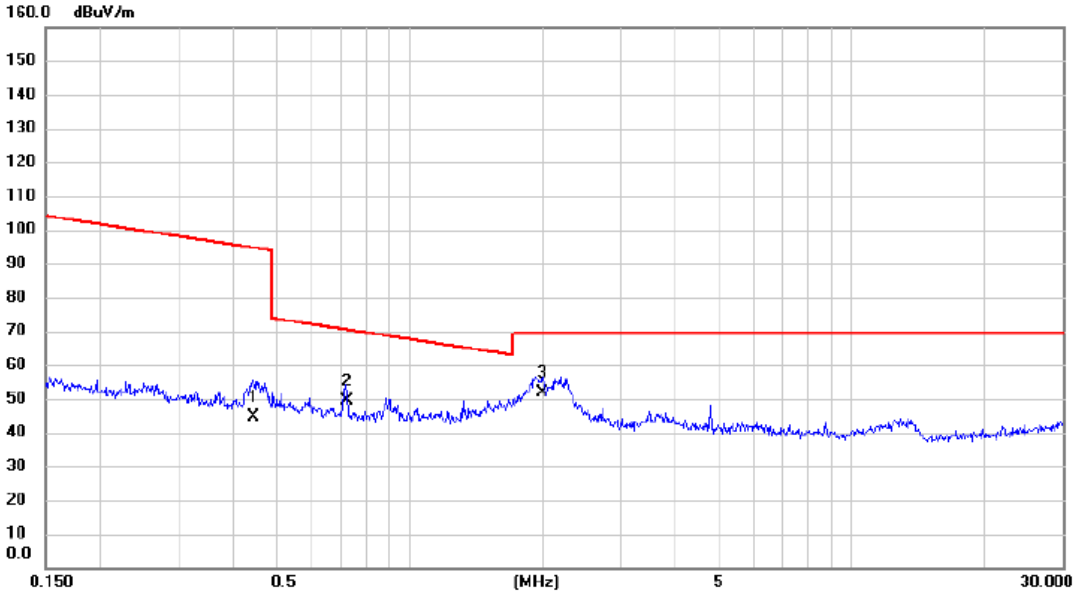


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0162	36.20	20.55	56.75	123.41	-66.66	AVG	
2		0.0284	31.60	19.88	51.48	118.54	-67.06	AVG	
3		0.0524	23.70	19.48	43.18	113.22	-70.04	AVG	

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

Test Mode:	TX Model_1Mbps

Ant 0°

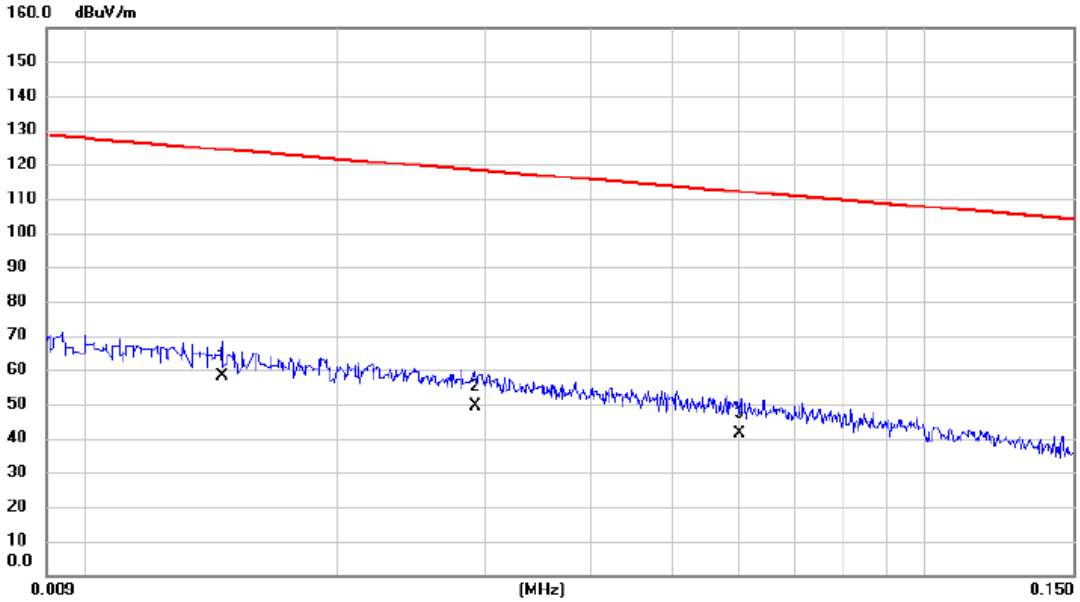


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.4421	27.50	16.98	44.48	94.69	-50.21	AVG	
2		0.7198	32.40	16.89	49.29	70.46	-21.17	QP	
3	*	2.0011	34.50	17.12	51.62	69.54	-17.92	QP	

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

Test Mode:	TX Model_1Mbps

Ant 90°

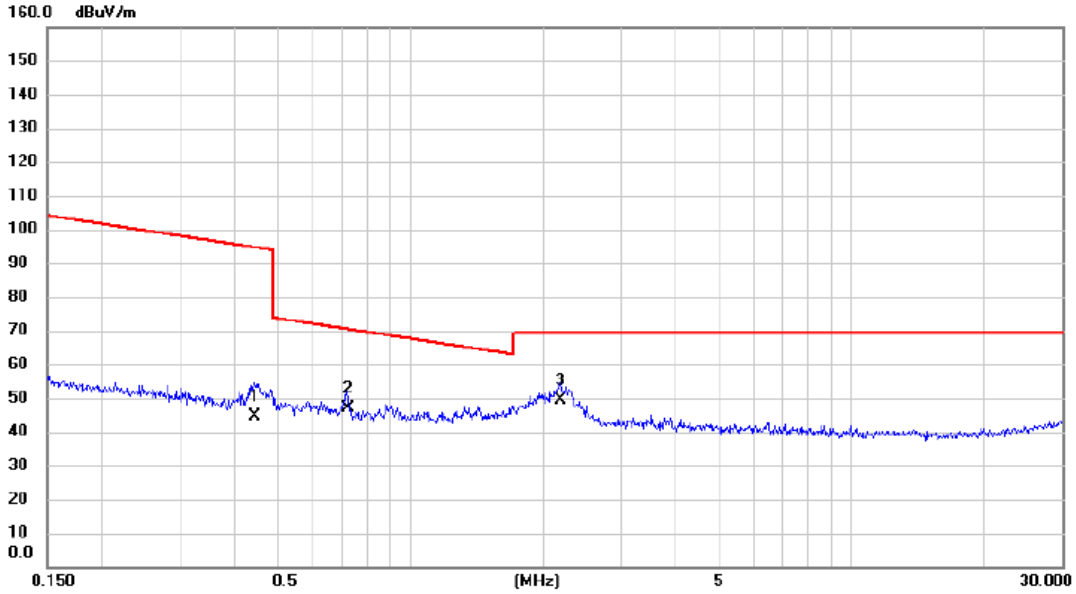


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0146	37.60	20.78	58.38	124.32	-65.94	AVG	
2		0.0292	29.40	19.87	49.27	118.30	-69.03	AVG	
3		0.0601	22.20	19.33	41.53	112.03	-70.50	AVG	

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

Test Mode:	TX Model_1Mbps

Ant 90°



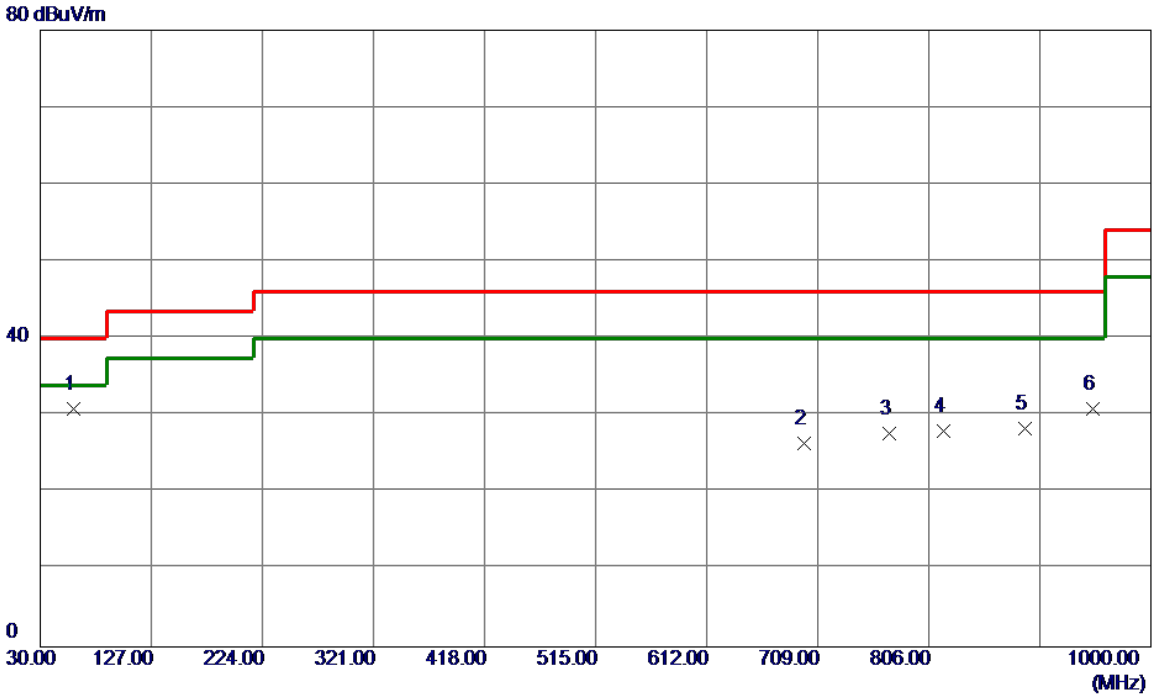
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.4421	27.60	16.98	44.58	94.69	-50.11	AVG	
2		0.7198	30.20	16.89	47.09	70.46	-23.37	QP	
3	*	2.1898	32.40	17.01	49.41	69.54	-20.13	QP	

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

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

Test Mode:	TX Model_1Mbps

Vertical

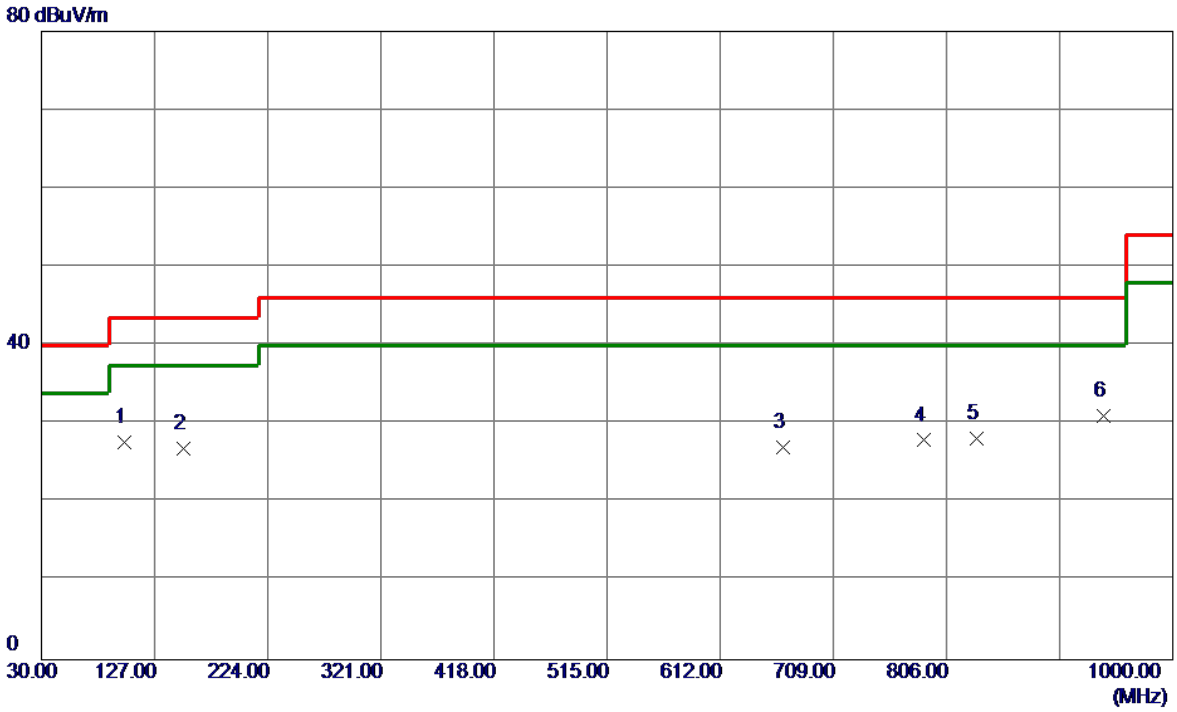


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	59.2756	46.48	-15.58	30.90	40.00	-9.10	Peak	
2	697.4850	29.33	-2.87	26.46	46.00	-19.54	Peak	
3	771.6498	30.45	-2.74	27.71	46.00	-18.29	Peak	
4	819.4668	29.32	-1.34	27.98	46.00	-18.02	Peak	
5	889.7283	29.24	-0.85	28.39	46.00	-17.61	Peak	
6	949.2555	29.45	1.38	30.83	46.00	-15.17	Peak	

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

Test Mode:	TX Model_1Mbps

Horizontal



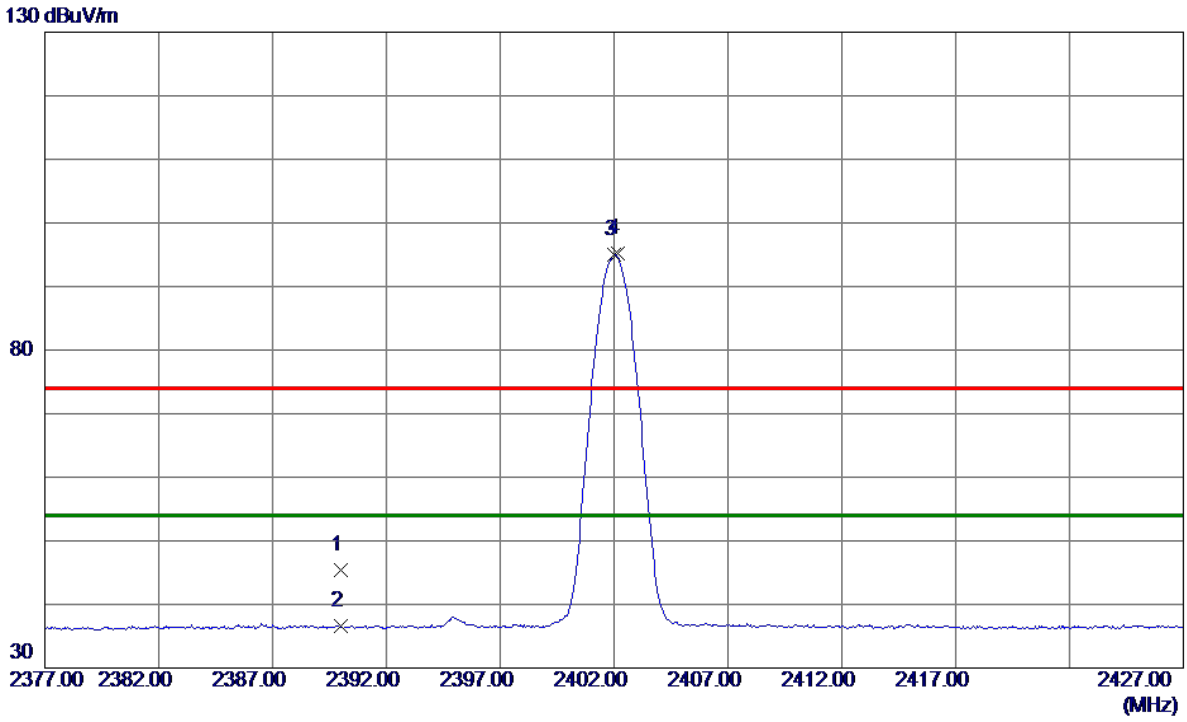
No.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	101.2950	45.71	-18.02	27.69	43.50	-15.81	Peak	
2	152.2200	38.14	-11.30	26.84	43.50	-16.66	Peak	
3	666.3200	31.39	-4.38	27.01	46.00	-18.99	Peak	
4	787.0850	29.74	-1.82	27.92	46.00	-18.08	Peak	
5	831.7050	29.65	-1.53	28.12	46.00	-17.88	Peak	
6 *	940.8300	30.03	1.04	31.07	46.00	-14.93	Peak	

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

APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ

Test Mode:	TX 2402 MHz _CH00_1Mbps

Vertical

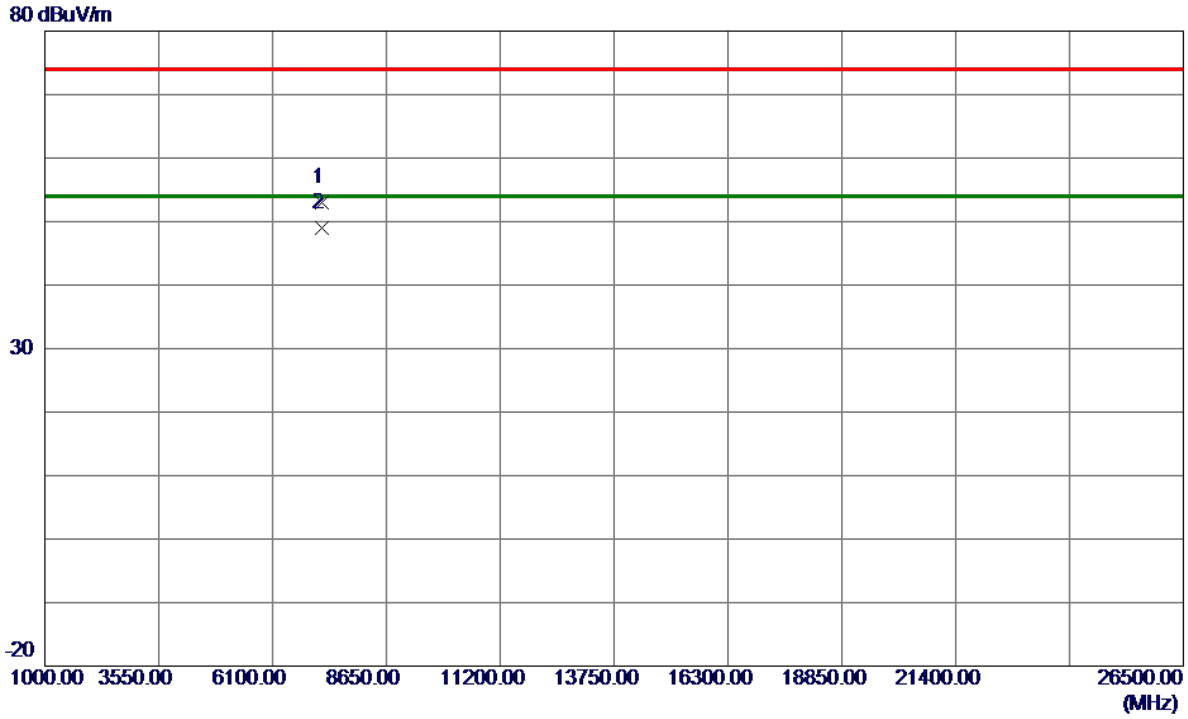


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	38.70	6.62	45.32	74.00	-28.68	Peak	
2	2390.0000	29.93	6.62	36.55	54.00	-17.45	AVG	
3 *	2402.0250	88.34	6.62	94.96	54.00	40.96	AVG	No Limit
4	2402.1750	88.61	6.62	95.23	74.00	21.23	Peak	No Limit

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

Test Mode:	TX 2402 MHz _CH00_1Mbps

Vertical

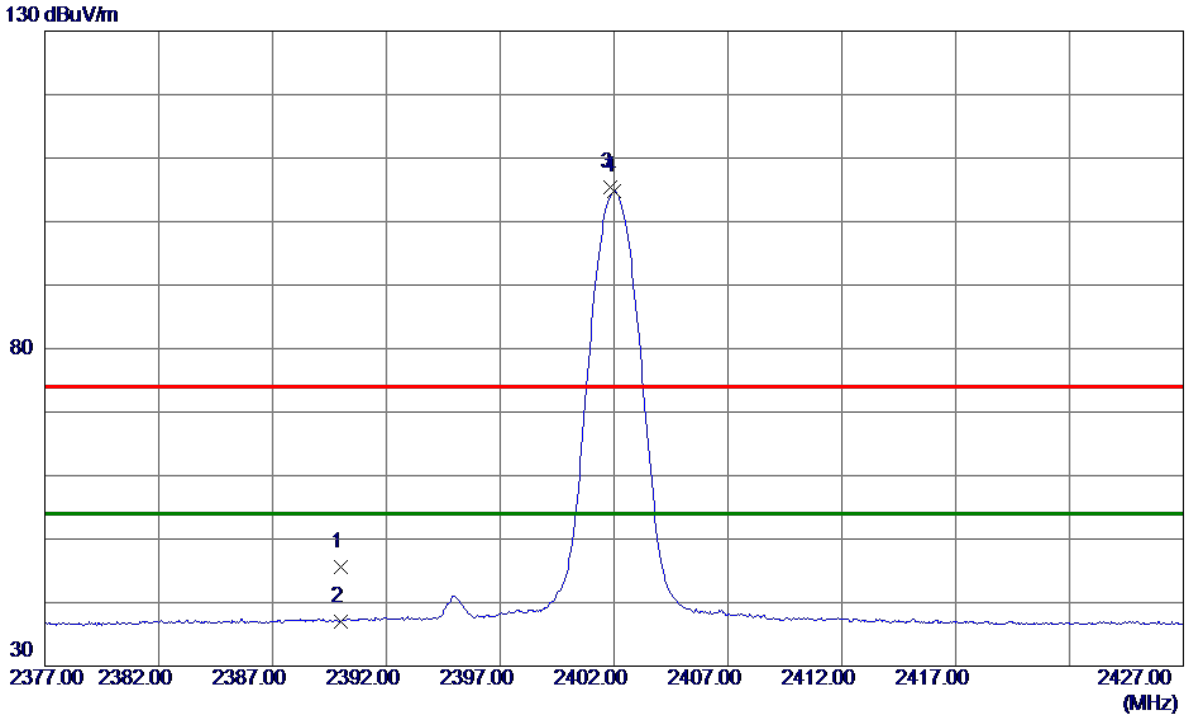


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7206.0300	43.56	9.38	52.94	74.00	-21.06	Peak	
2 *	7206.0470	39.57	9.38	48.95	54.00	-5.05	AVG	

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

Test Mode:	TX 2402 MHz _CH00_1Mbps

Horizontal

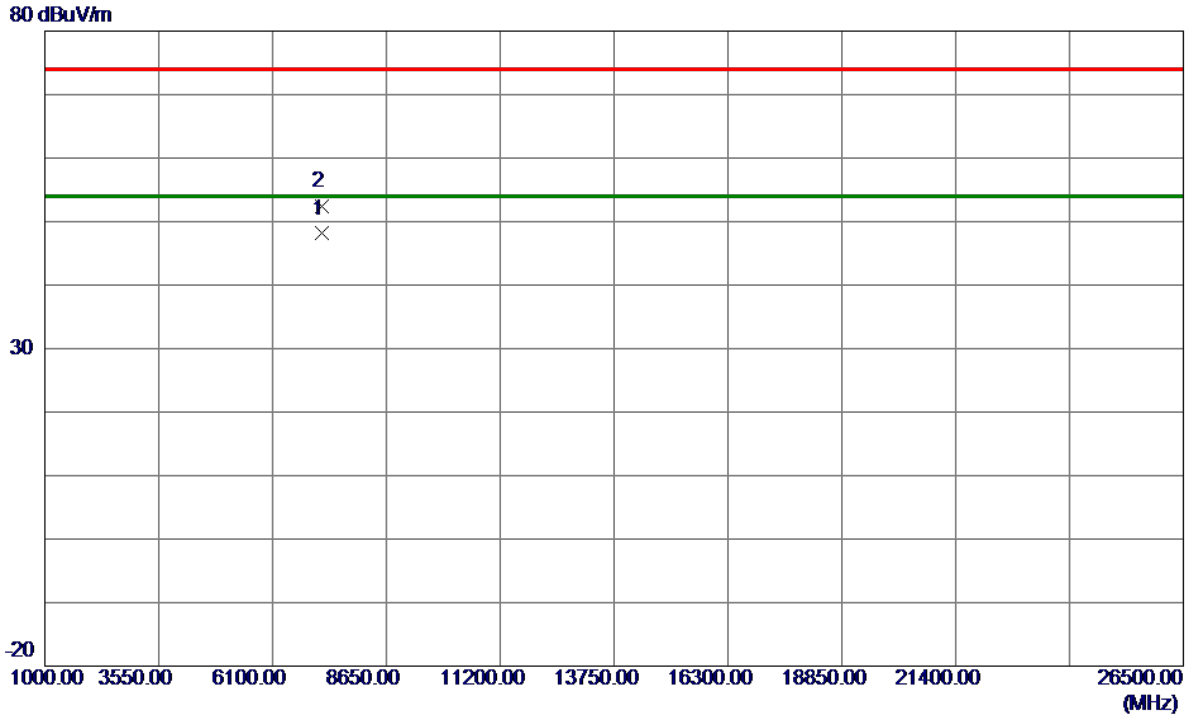


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	38.92	6.62	45.54	74.00	-28.46	Peak	
2	2390.0000	30.44	6.62	37.06	54.00	-16.94	AVG	
3	2401.8500	98.76	6.62	105.38	74.00	31.38	Peak	No Limit
4 *	2402.0250	98.18	6.62	104.80	54.00	50.80	AVG	No Limit

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

Test Mode:	TX 2402 MHz _CH00_1Mbps

Horizontal

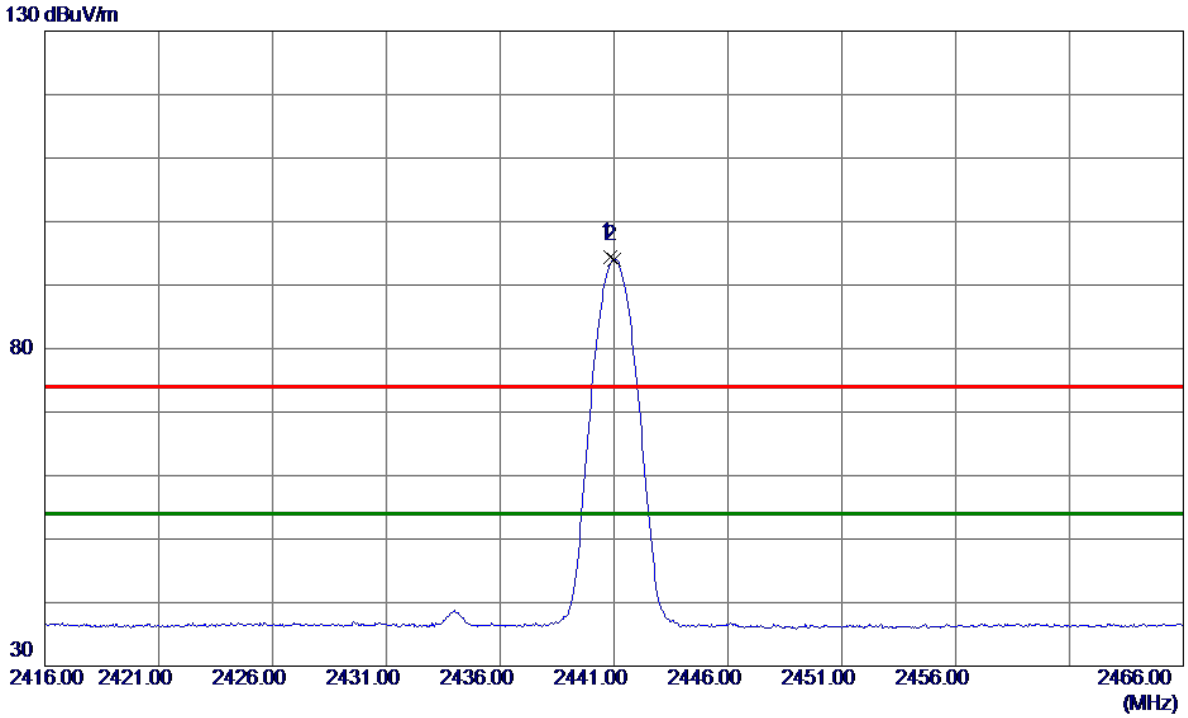


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7206.0280	38.72	9.38	48.10	54.00	-5.90	AVG	
2	7206.0610	43.07	9.38	52.45	74.00	-21.55	Peak	

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

Test Mode:	TX 2441 MHz _CH39_1Mbps

Vertical

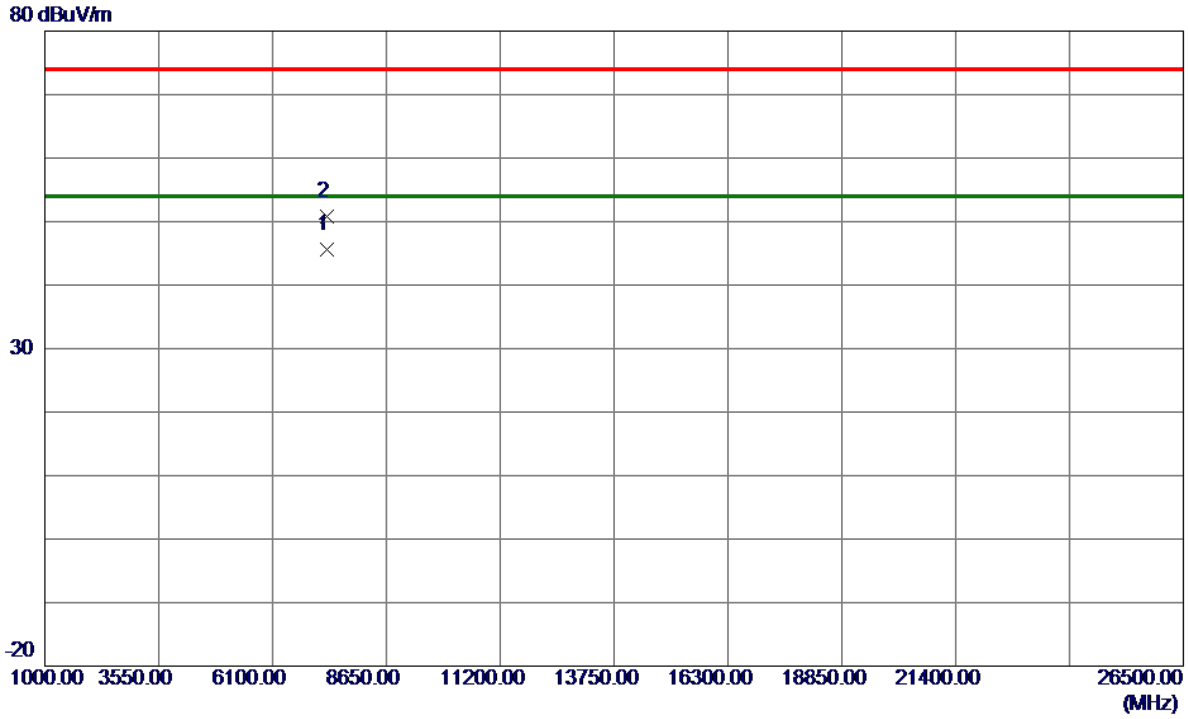


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8500	87.83	6.61	94.44	74.00	20.44	Peak	No Limit
2 *	2441.0000	87.44	6.61	94.05	54.00	40.05	AVG	No Limit

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

Test Mode:	TX 2441 MHz _CH39_1Mbps

Vertical

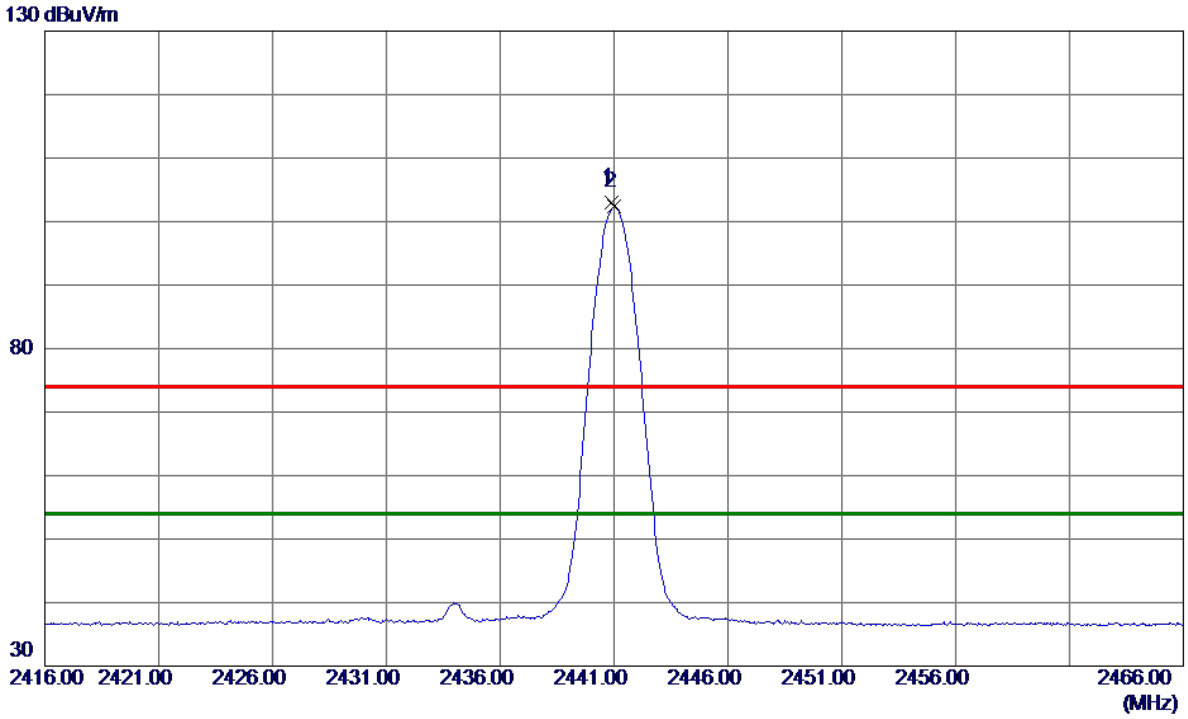


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7323.0280	35.84	9.67	45.51	54.00	-8.49	AVG	
2	7323.0510	41.04	9.67	50.71	74.00	-23.29	Peak	

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

Test Mode:	TX 2441 MHz _CH39_1Mbps

Horizontal

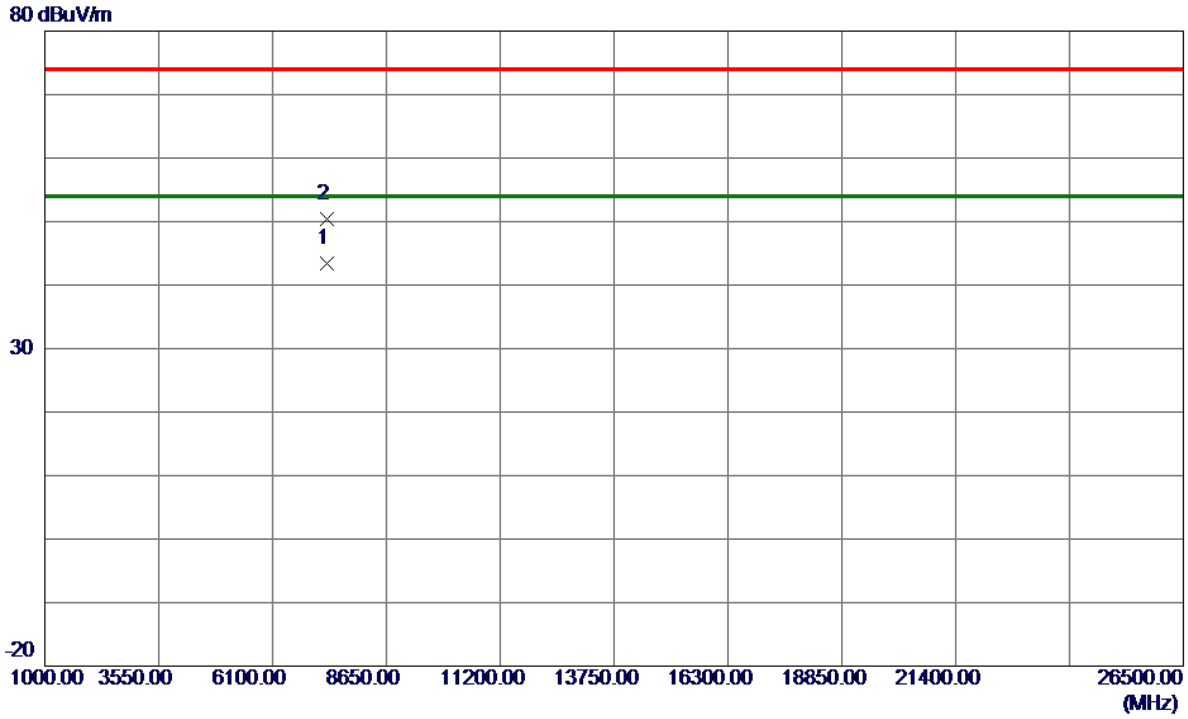


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8750	96.36	6.61	102.97	74.00	28.97	Peak	No Limit
2 *	2441.0000	95.75	6.61	102.36	54.00	48.36	AVG	No Limit

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

Test Mode:	TX 2441 MHz _CH39_1Mbps

Horizontal

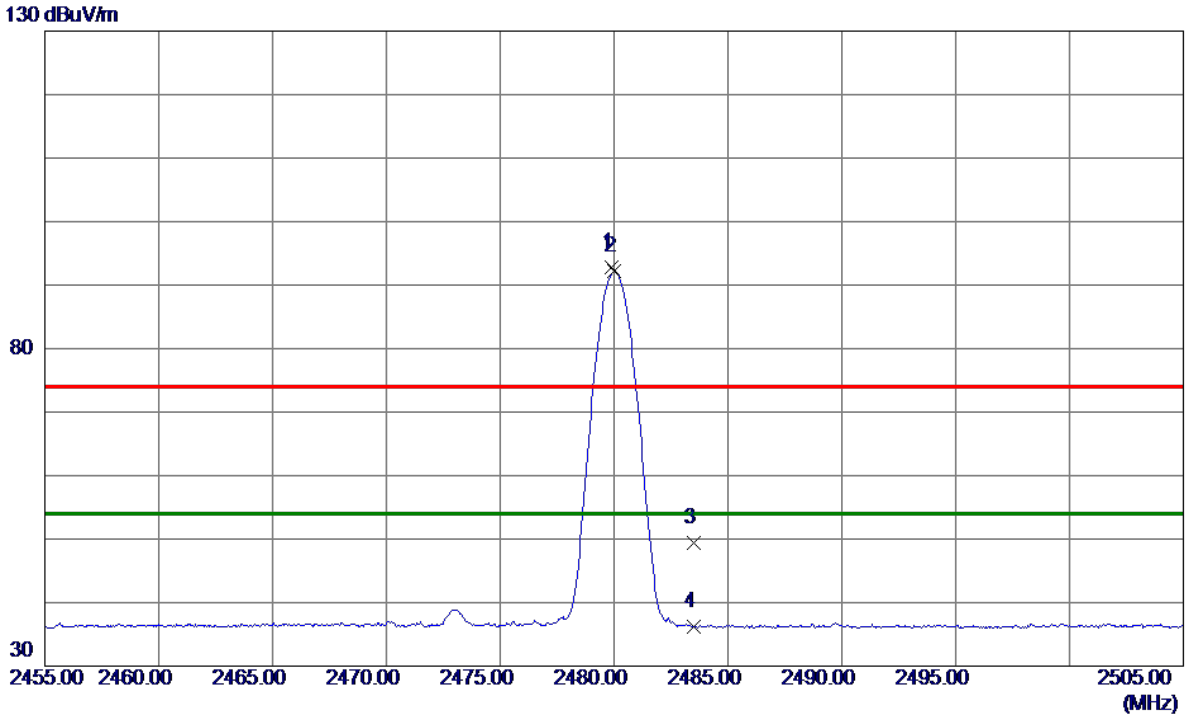


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7323.0120	33.75	9.67	43.42	54.00	-10.58	AVG	
2	7323.2230	40.80	9.67	50.47	74.00	-23.53	Peak	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps

Vertical

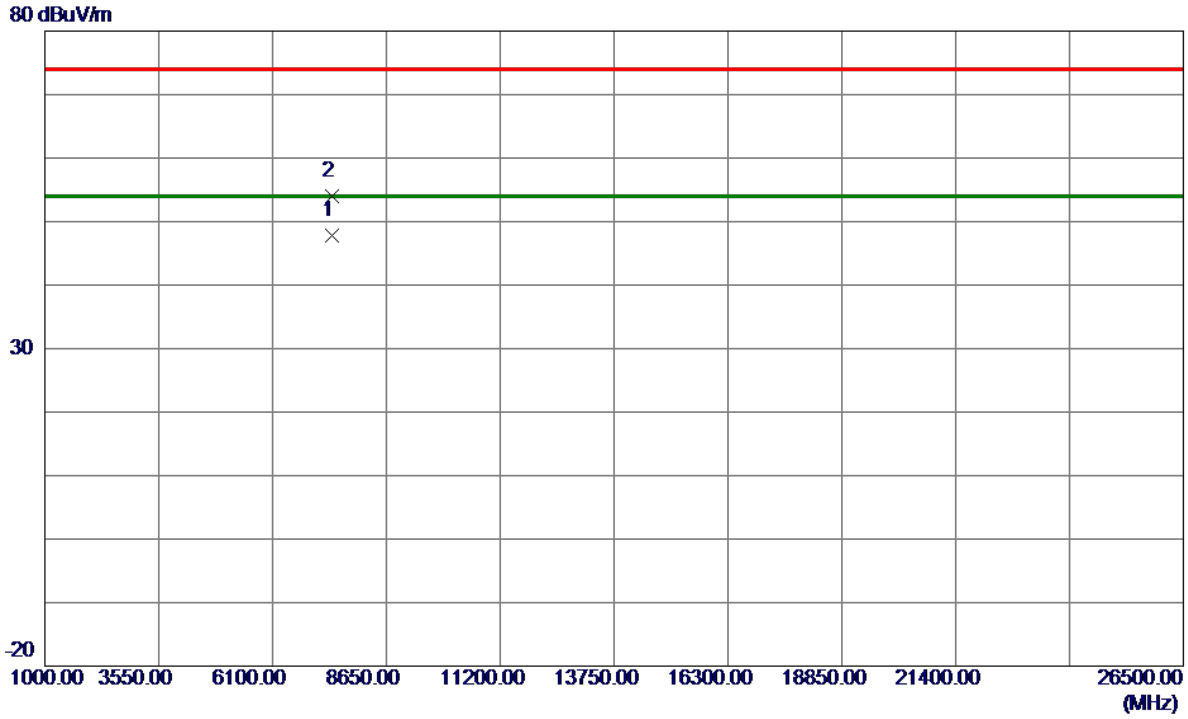


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.9000	86.16	6.61	92.77	74.00	18.77	Peak	No Limit
2 *	2480.0000	85.59	6.61	92.20	54.00	38.20	AVG	No Limit
3	2483.5000	42.77	6.61	49.38	74.00	-24.62	Peak	
4	2483.5000	29.54	6.61	36.15	54.00	-17.85	AVG	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps

Vertical

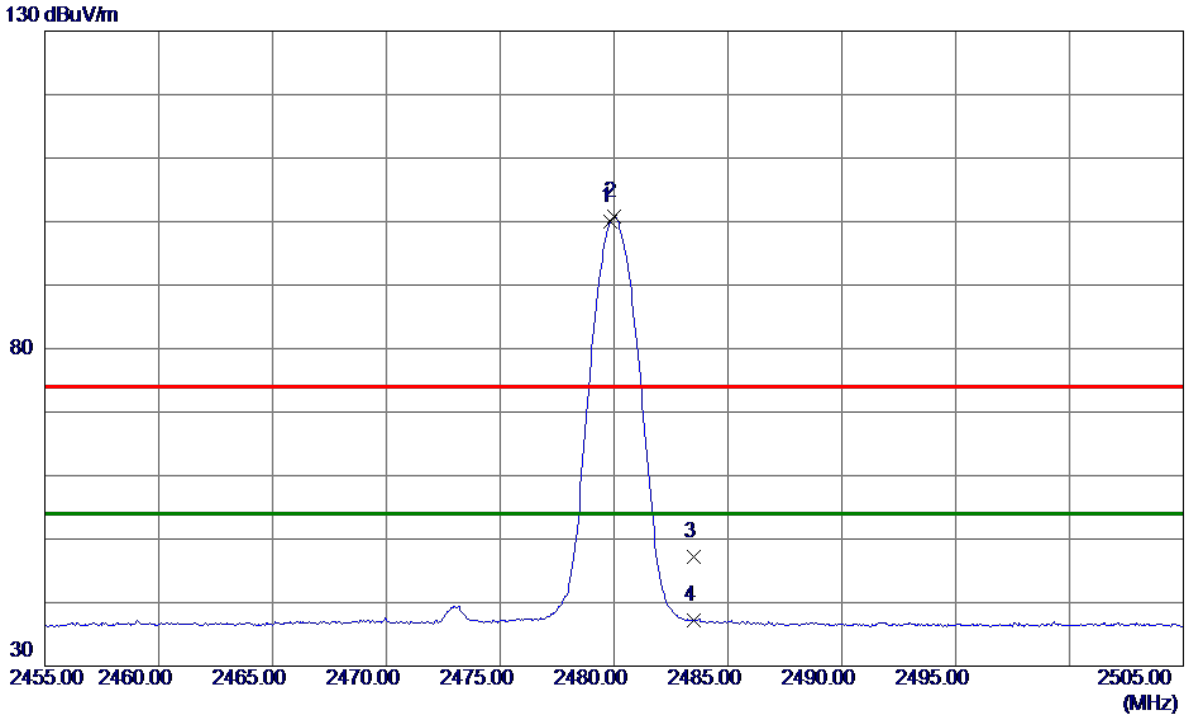


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7440.0460	37.90	9.96	47.86	54.00	-6.14	AVG	
2	7440.0530	44.13	9.96	54.09	74.00	-19.91	Peak	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps

Horizontal

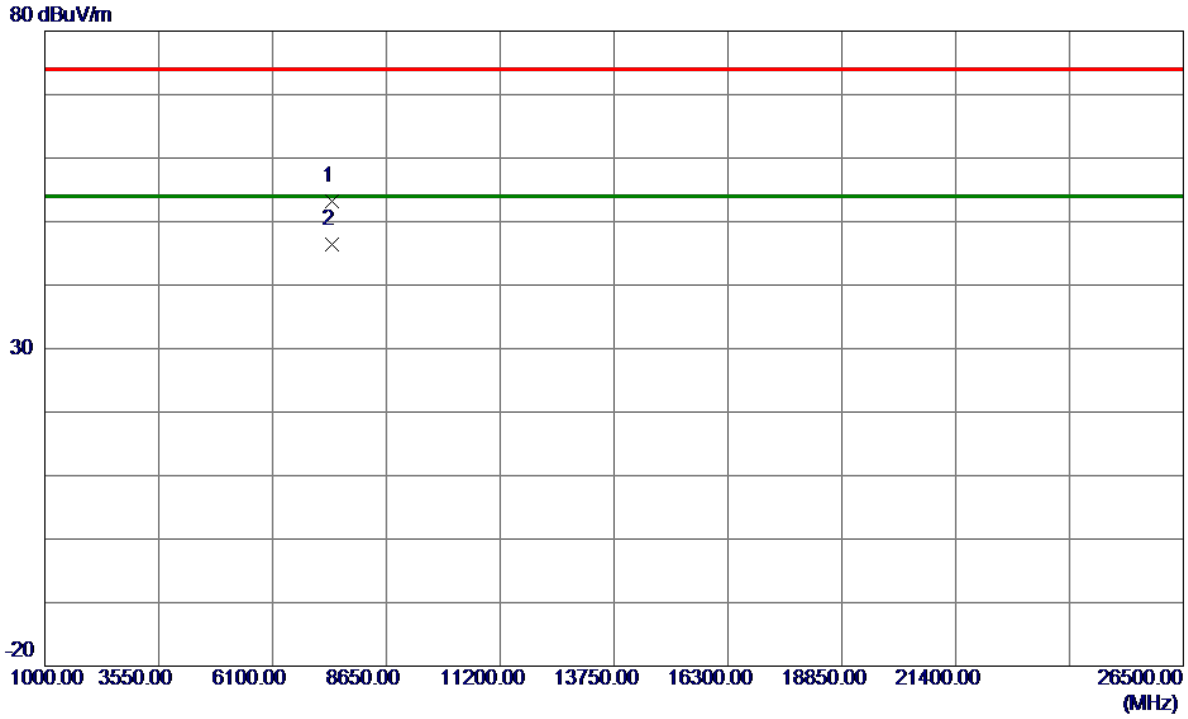


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2479.8500	93.43	6.61	100.04	54.00	46.04	AVG	No Limit
2	2480.0250	94.21	6.61	100.82	74.00	26.82	Peak	No Limit
3	2483.5000	40.61	6.61	47.22	74.00	-26.78	Peak	
4	2483.5000	30.66	6.61	37.27	54.00	-16.73	AVG	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps

Horizontal

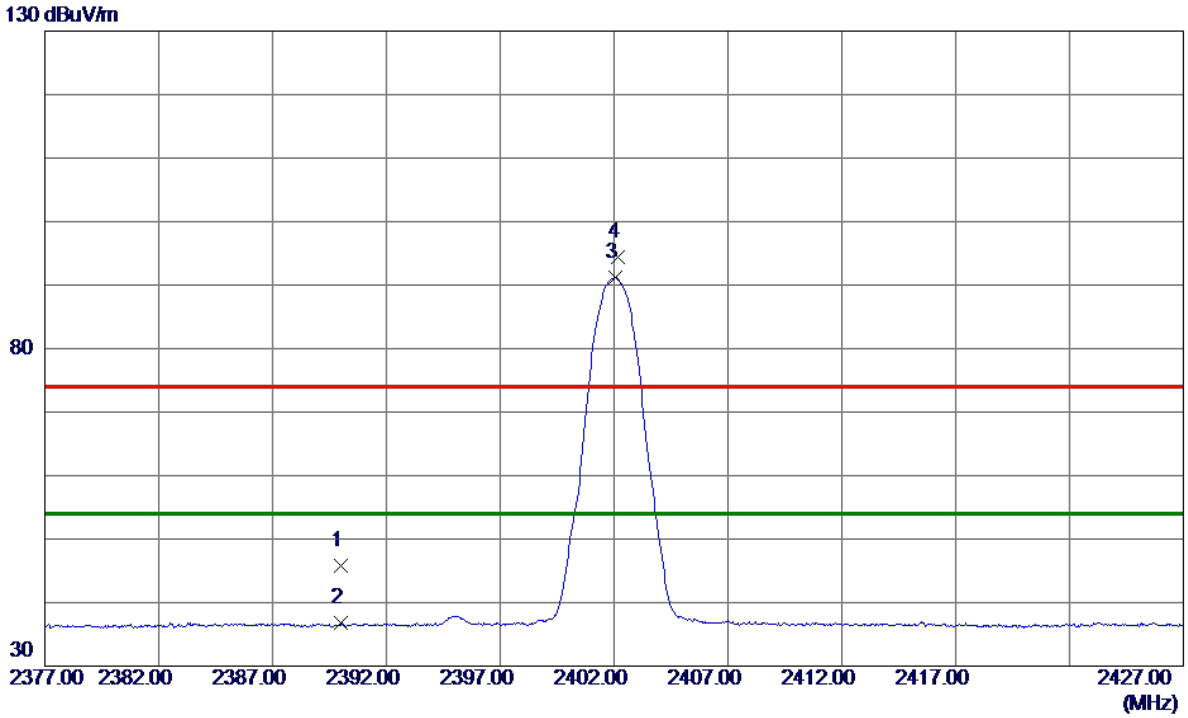


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7439.9330	43.17	9.96	53.13	74.00	-20.87	Peak	
2 *	7440.0370	36.49	9.96	46.45	54.00	-7.55	AVG	

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

Test Mode:	TX 2402 MHz _CH00_3Mbps

Vertical

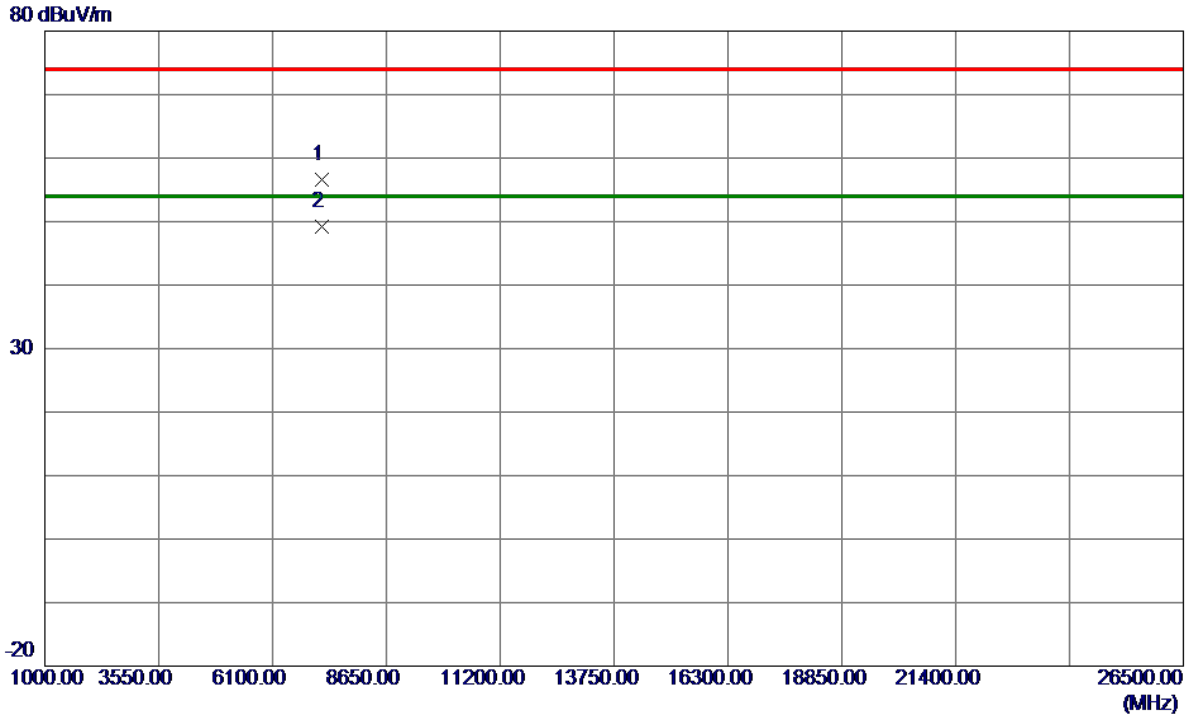


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	39.17	6.62	45.79	74.00	-28.21	Peak	
2	2390.0000	30.12	6.62	36.74	54.00	-17.26	AVG	
3 *	2402.0500	84.55	6.62	91.17	54.00	37.17	AVG	No Limit
4	2402.1750	87.75	6.62	94.37	74.00	20.37	Peak	No Limit

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

Test Mode:	TX 2402 MHz _CH00_3Mbps

Vertical

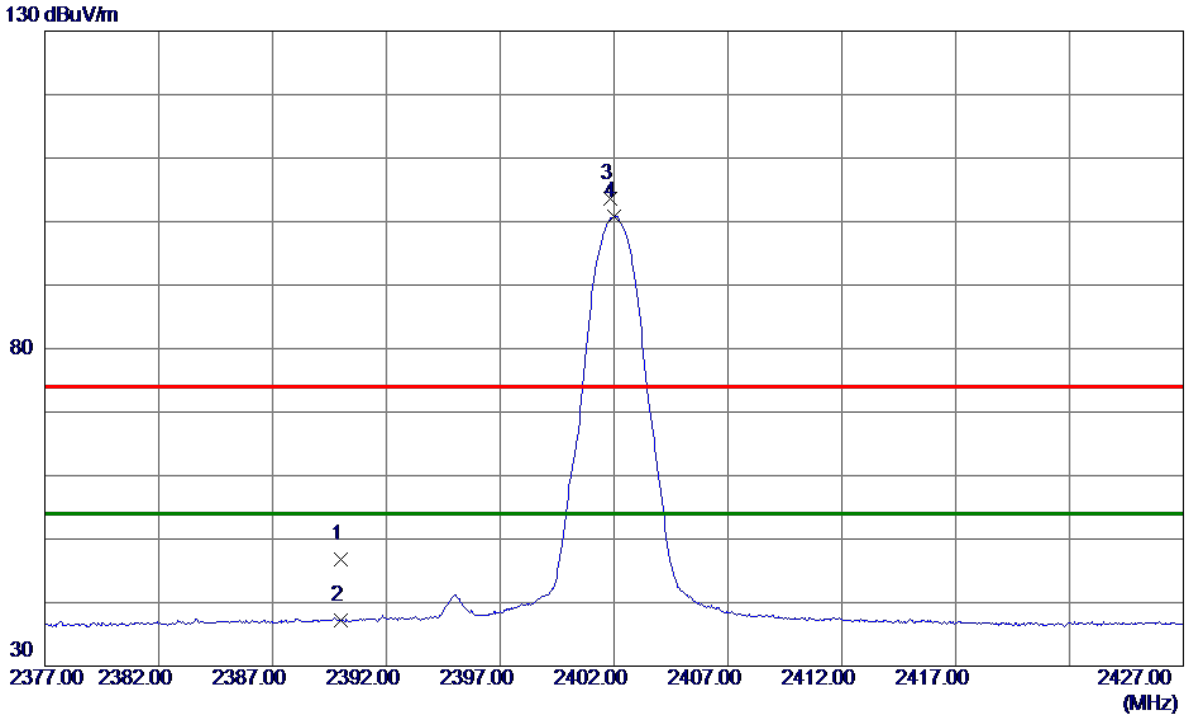


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7205.9560	47.17	9.38	56.55	74.00	-17.45	Peak	
2 *	7206.0210	39.75	9.38	49.13	54.00	-4.87	AVG	

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

Test Mode:	TX 2402 MHz _CH00_3Mbps

Horizontal

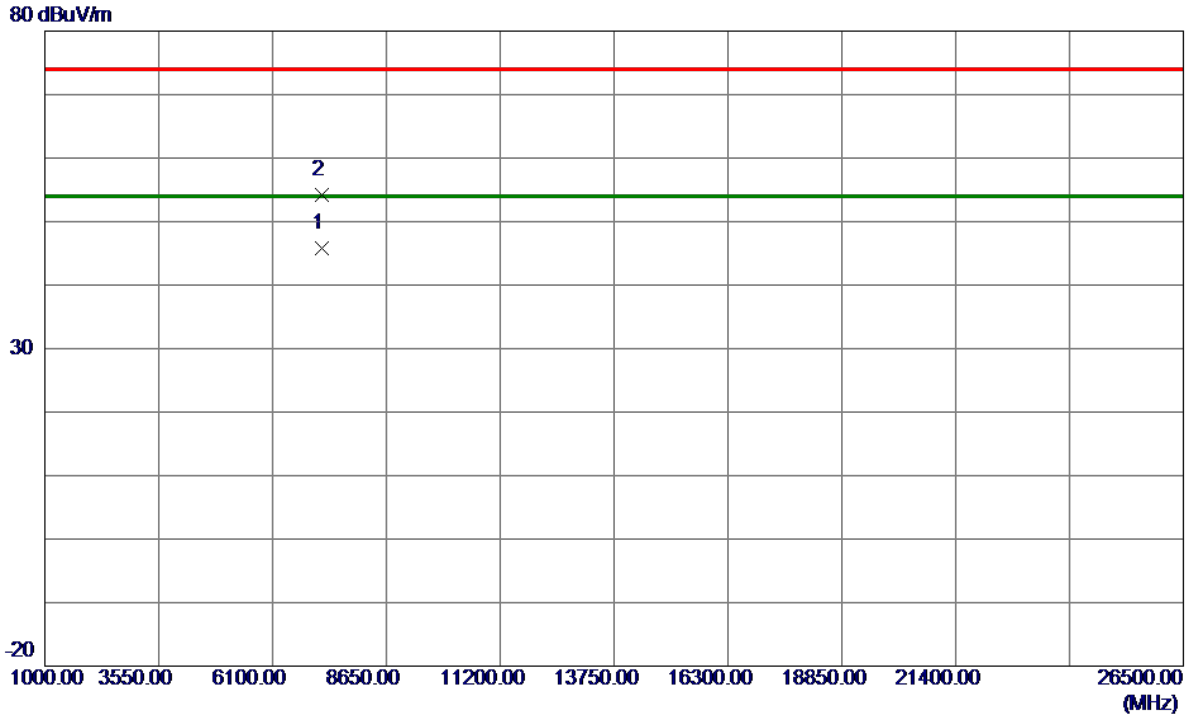


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	40.12	6.62	46.74	74.00	-27.26	Peak	
2	2390.0000	30.60	6.62	37.22	54.00	-16.78	AVG	
3	2401.8500	97.02	6.62	103.64	74.00	29.64	Peak	No Limit
4 *	2402.0250	94.20	6.62	100.82	54.00	46.82	AVG	No Limit

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

Test Mode:	TX 2402 MHz _CH00_3Mbps

Horizontal

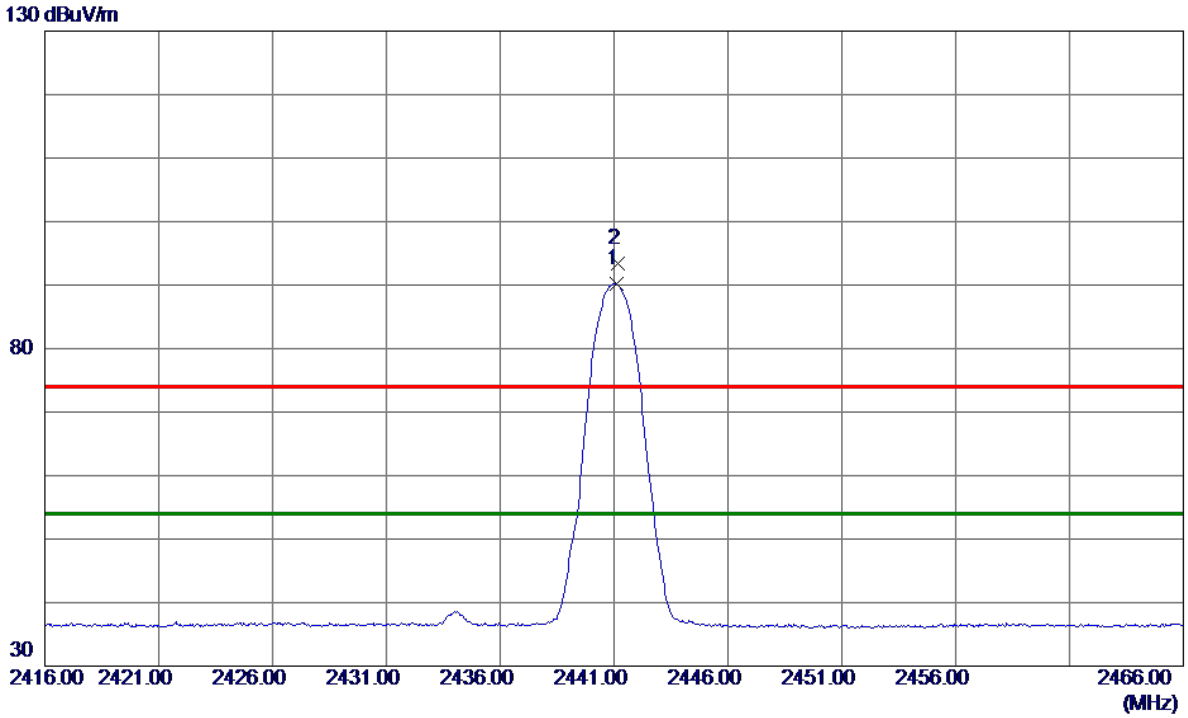


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7205.9320	36.40	9.38	45.78	54.00	-8.22	AVG	
2	7205.9410	44.91	9.38	54.29	74.00	-19.71	Peak	

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

Test Mode:	TX 2441 MHz _CH39_3Mbps

Vertical

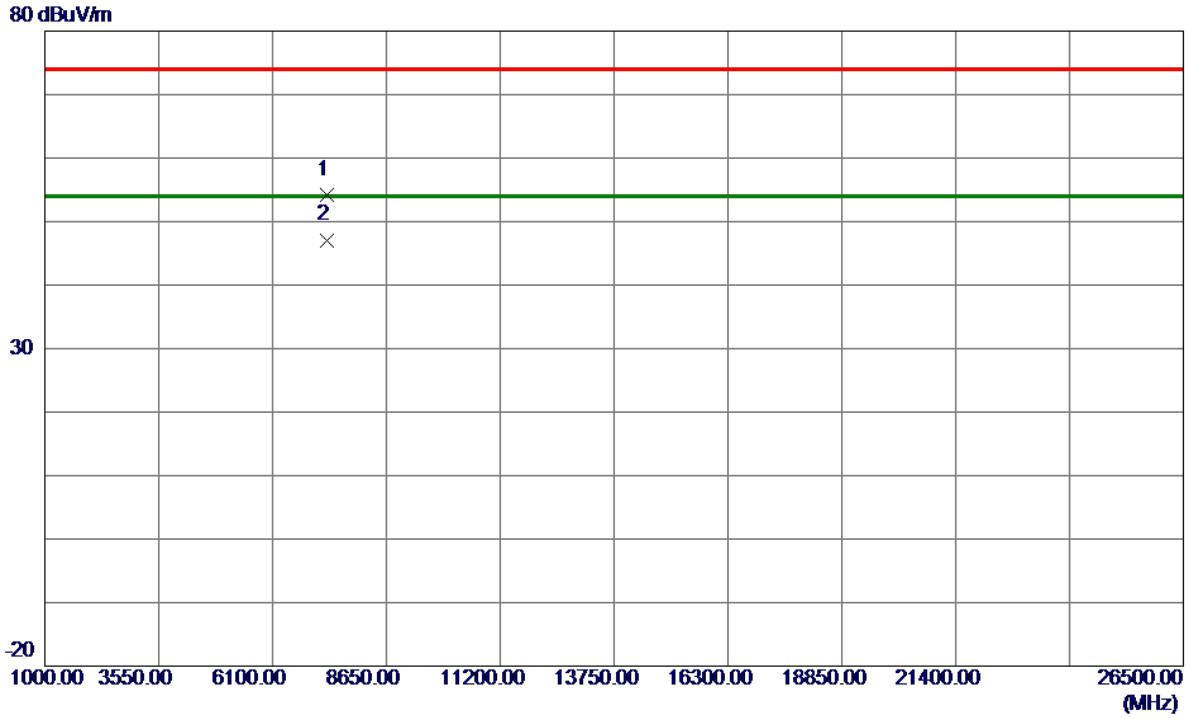


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2441.1000	83.60	6.61	90.21	54.00	36.21	AVG	No Limit
2	2441.1500	86.71	6.61	93.32	74.00	19.32	Peak	No Limit

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

Test Mode:	TX 2441 MHz _CH39_3Mbps

Vertical

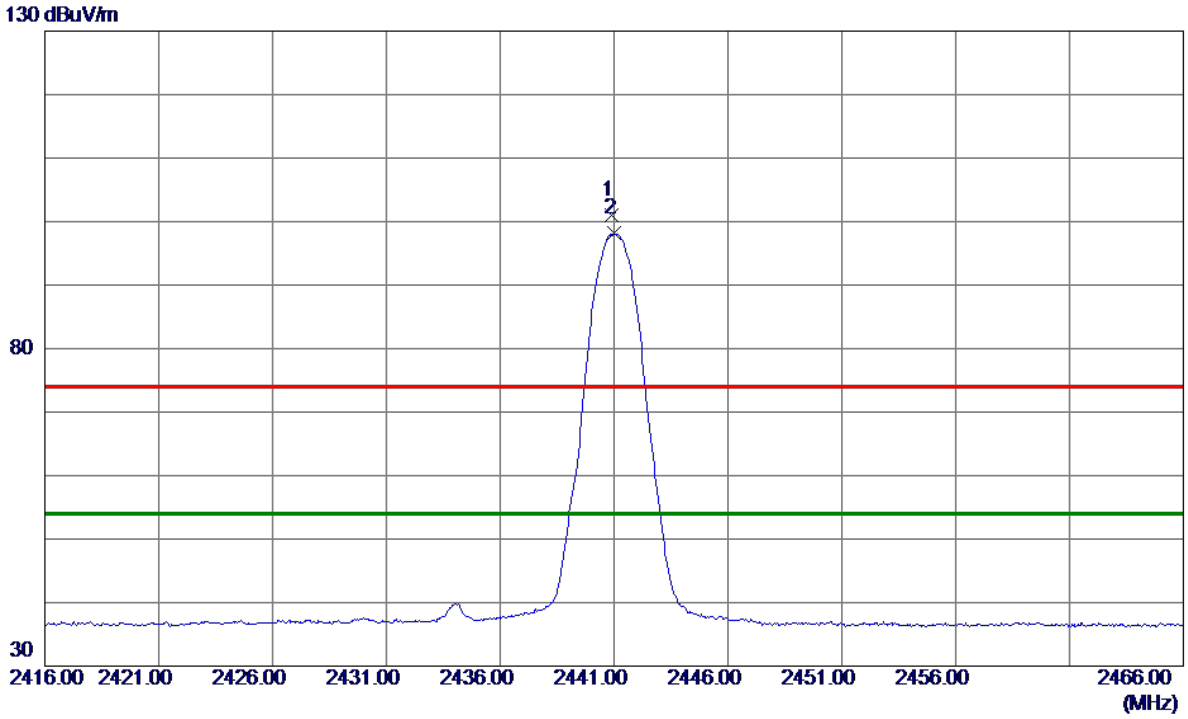


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7322.9770	44.61	9.67	54.28	74.00	-19.72	Peak	
2 *	7322.9990	37.43	9.67	47.10	54.00	-6.90	AVG	

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

Test Mode:	TX 2441 MHz _CH39_3Mbps

Horizontal

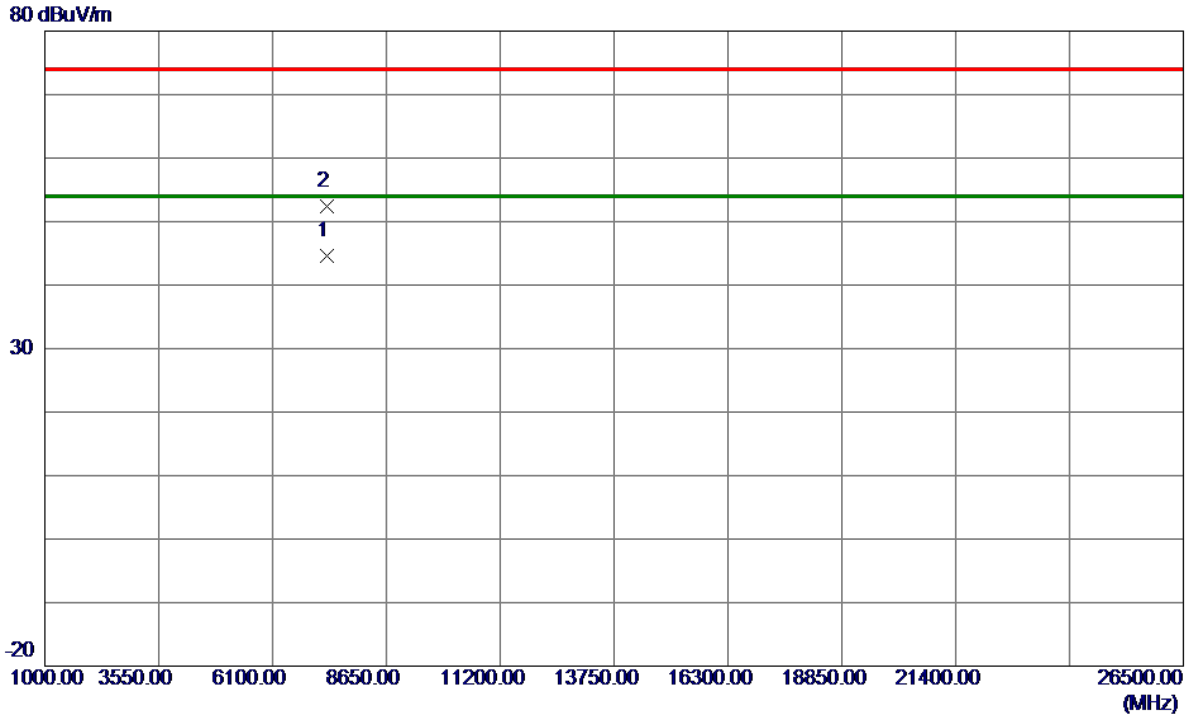


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8750	94.42	6.61	101.03	74.00	27.03	Peak	No Limit
2 *	2441.0000	91.60	6.61	98.21	54.00	44.21	AVG	No Limit

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

Test Mode:	TX 2441 MHz _CH39_3Mbps

Horizontal

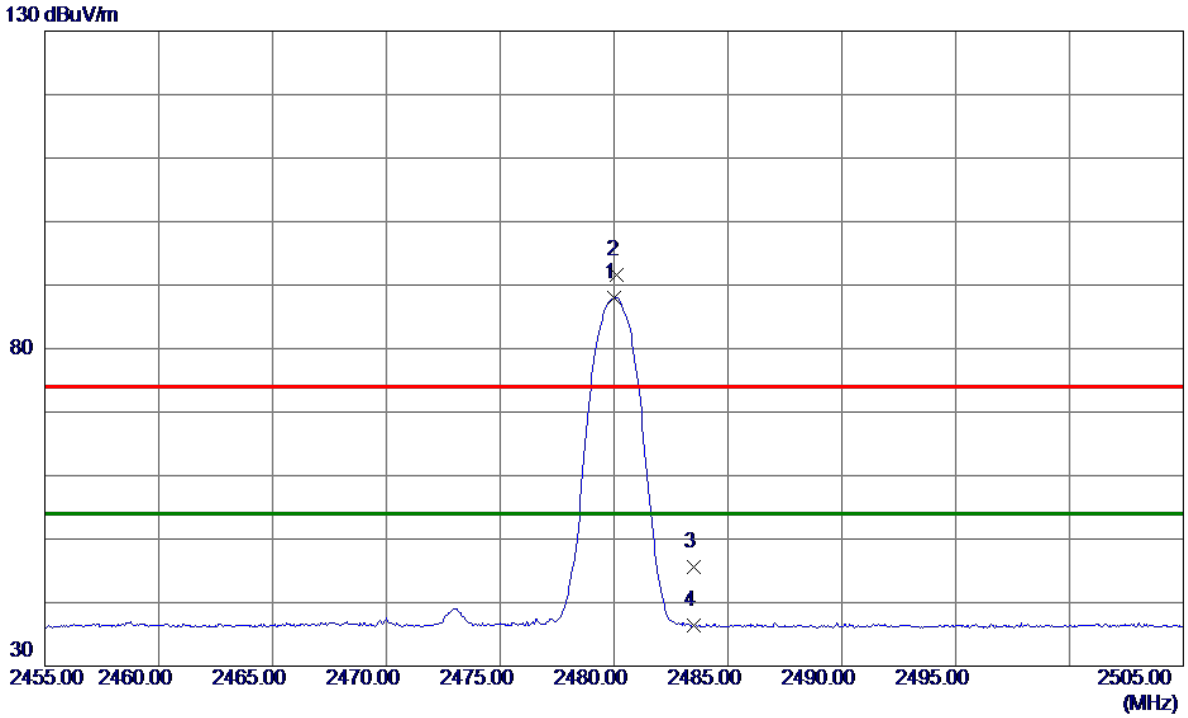


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7323.1040	34.91	9.67	44.58	54.00	-9.42	AVG	
2	7323.1690	42.77	9.67	52.44	74.00	-21.56	Peak	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps

Vertical

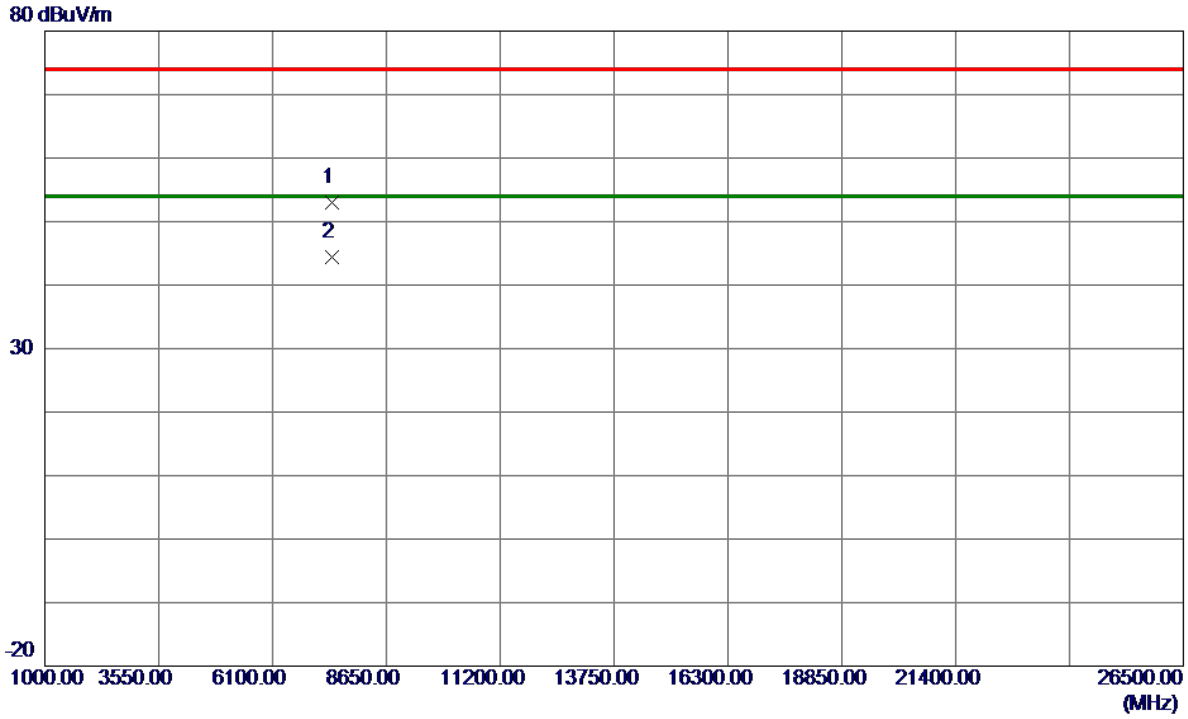


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2480.0000	81.41	6.61	88.02	54.00	34.02	AVG	No Limit
2	2480.1000	84.97	6.61	91.58	74.00	17.58	Peak	No Limit
3	2483.5000	39.02	6.61	45.63	74.00	-28.37	Peak	
4	2483.5000	29.84	6.61	36.45	54.00	-17.55	AVG	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps

Vertical

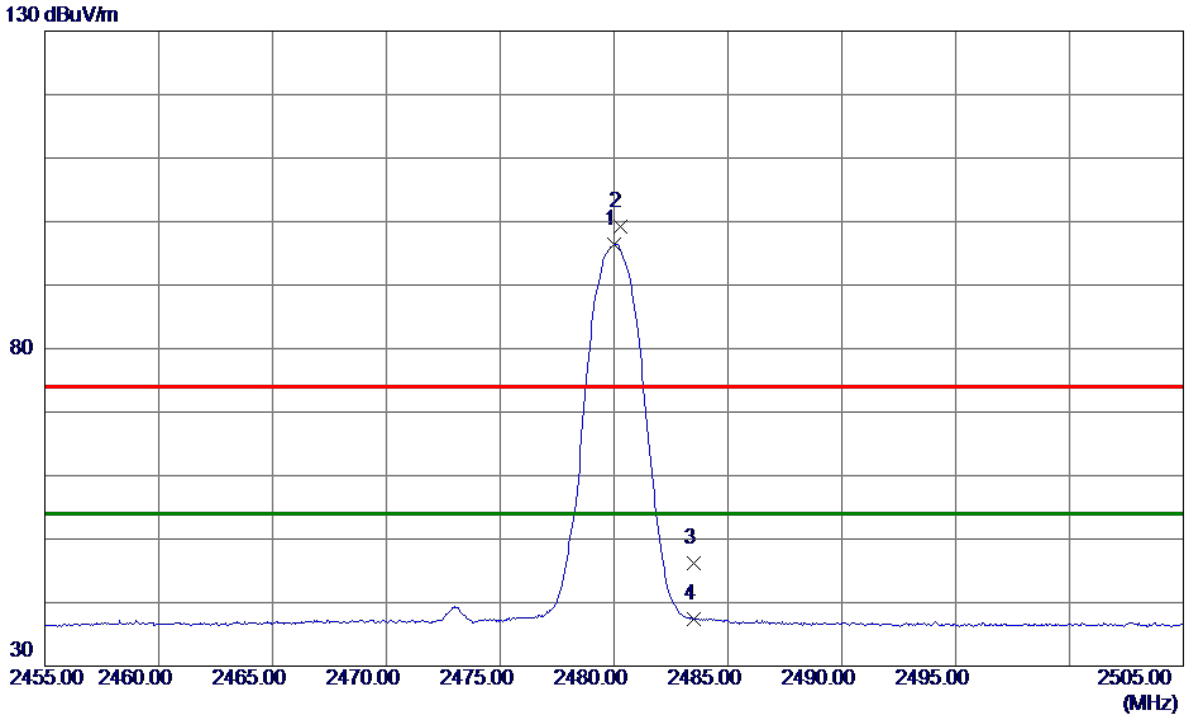


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7439.8810	43.00	9.96	52.96	74.00	-21.04	Peak	
2 *	7440.0760	34.40	9.96	44.36	54.00	-9.64	AVG	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps

Horizontal

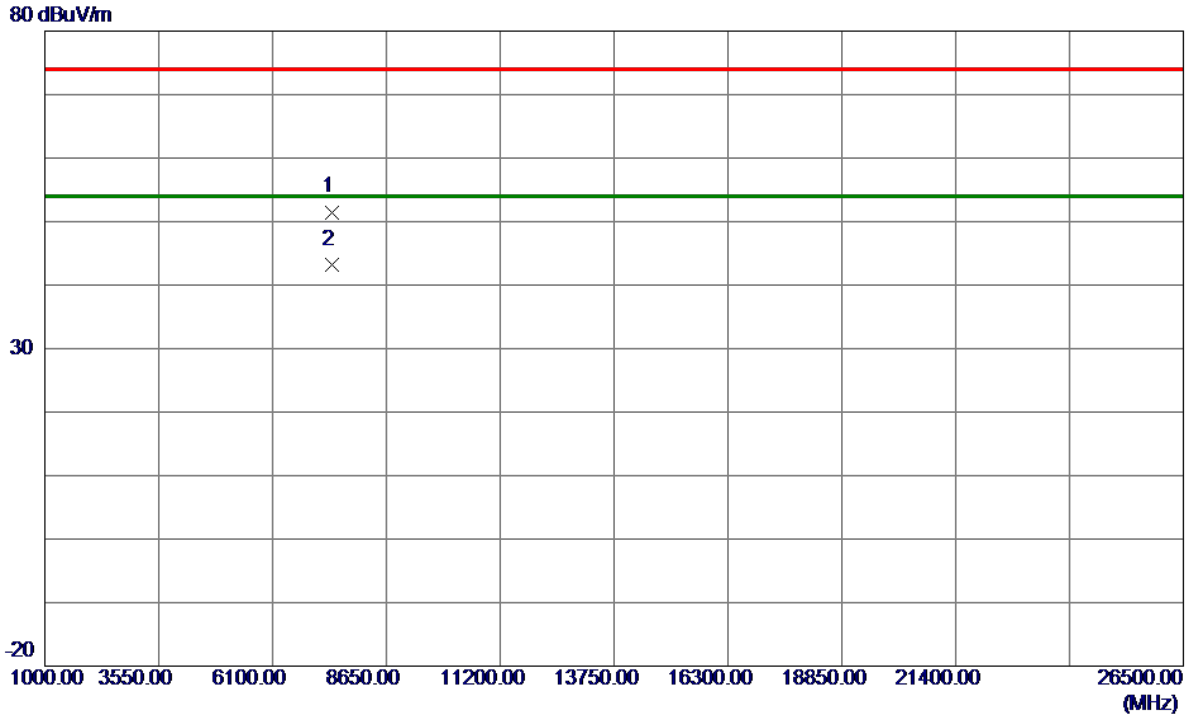


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2480.0000	89.79	6.61	96.40	54.00	42.40	AVG	No Limit
2	2480.2500	92.59	6.61	99.20	74.00	25.20	Peak	No Limit
3	2483.5000	39.68	6.61	46.29	74.00	-27.71	Peak	
4	2483.5000	30.73	6.61	37.34	54.00	-16.66	AVG	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps

Horizontal

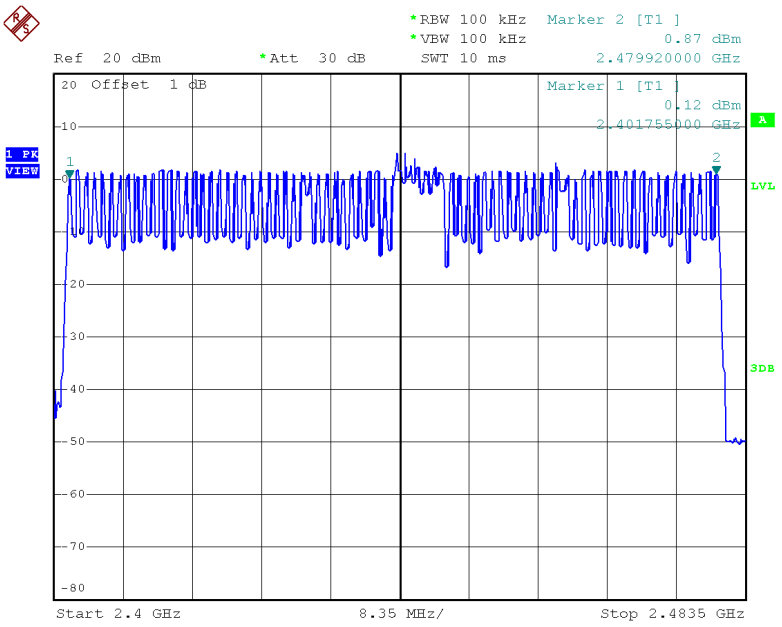


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7439.9550	41.54	9.96	51.50	74.00	-22.50	Peak	
2 *	7439.9670	33.20	9.96	43.16	54.00	-10.84	AVG	

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

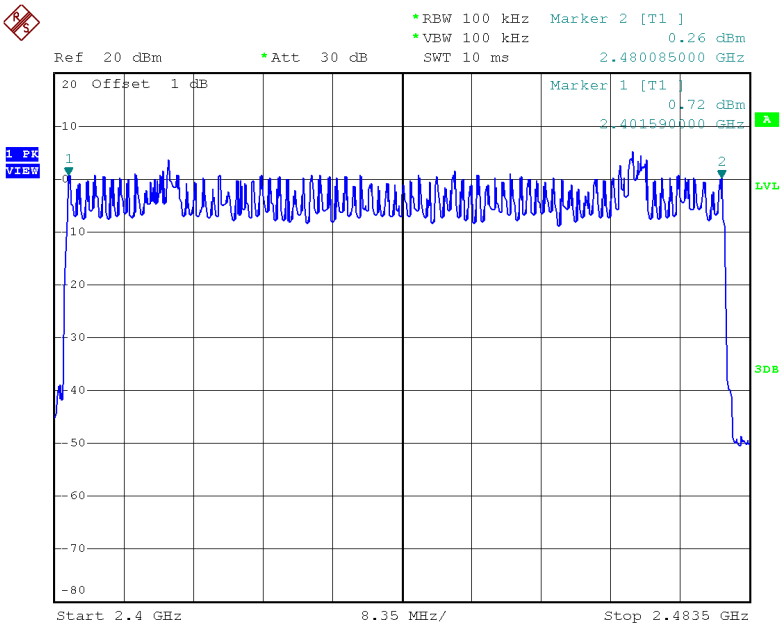
APPENDIX E - NUMBER OF HOPPING CHANNEL

Test Mode	Hopping Mode_1Mbps
Number of Hopping Channel	79



Date: 24.DEC.2018 09:39:32

Test Mode	Hopping Mode_3Mbps
Number of Hopping Channel	79



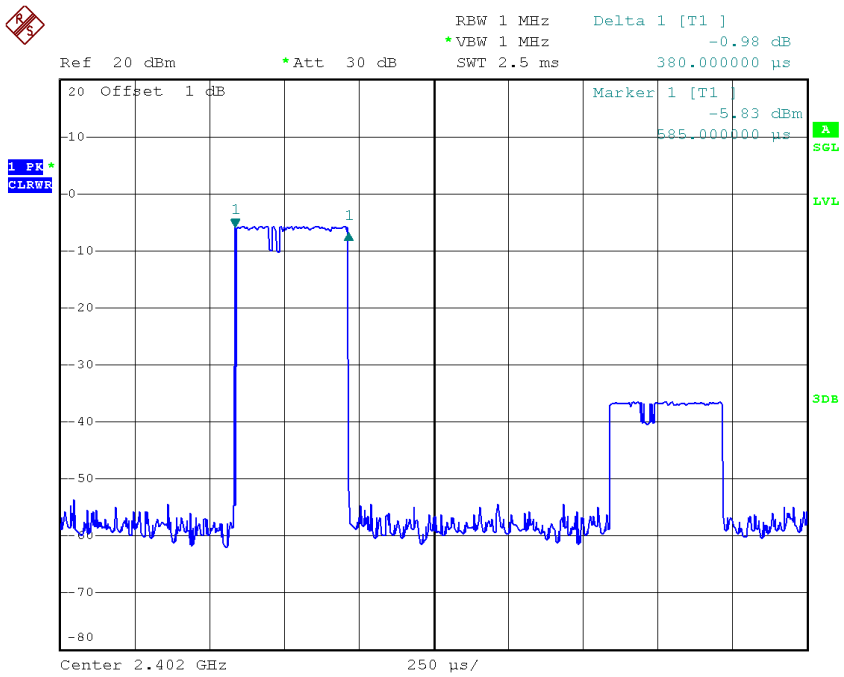
Date: 24.DEC.2018 09:10:48

APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode:	TX Mode_1Mbps

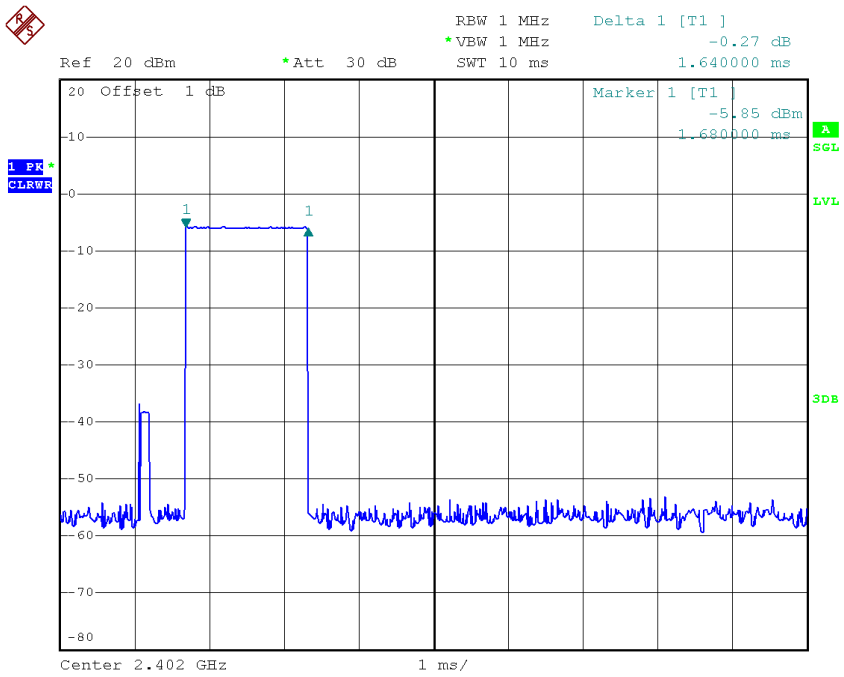
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH5	2402	2.8800	0.3072	0.4000	Pass
DH3	2402	1.6400	0.2624	0.4000	Pass
DH1	2402	0.3800	0.1216	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH1	2441	0.3750	0.1200	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH1	2480	0.3750	0.1200	0.4000	Pass

CH00-DH1



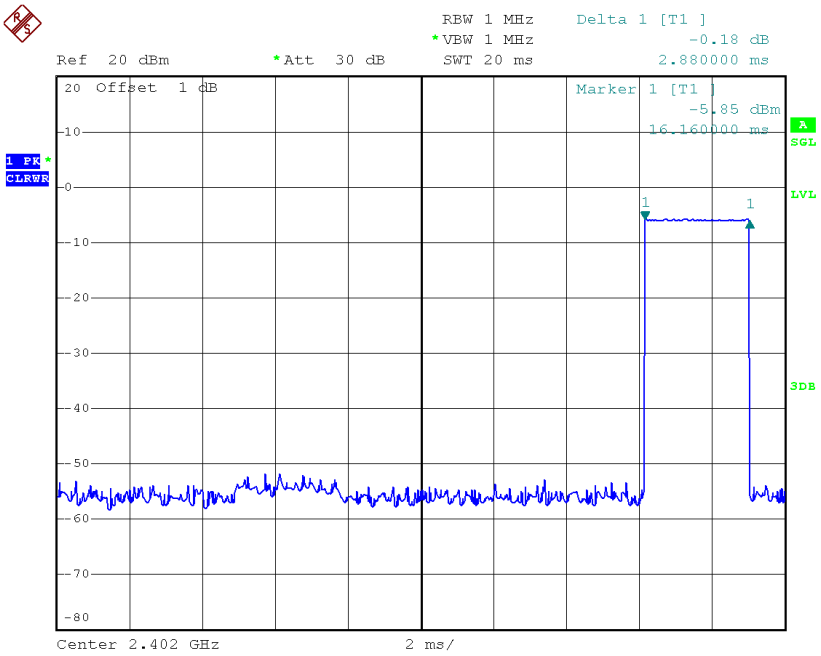
Date: 24.DEC.2018 09:59:42

CH00-DH3



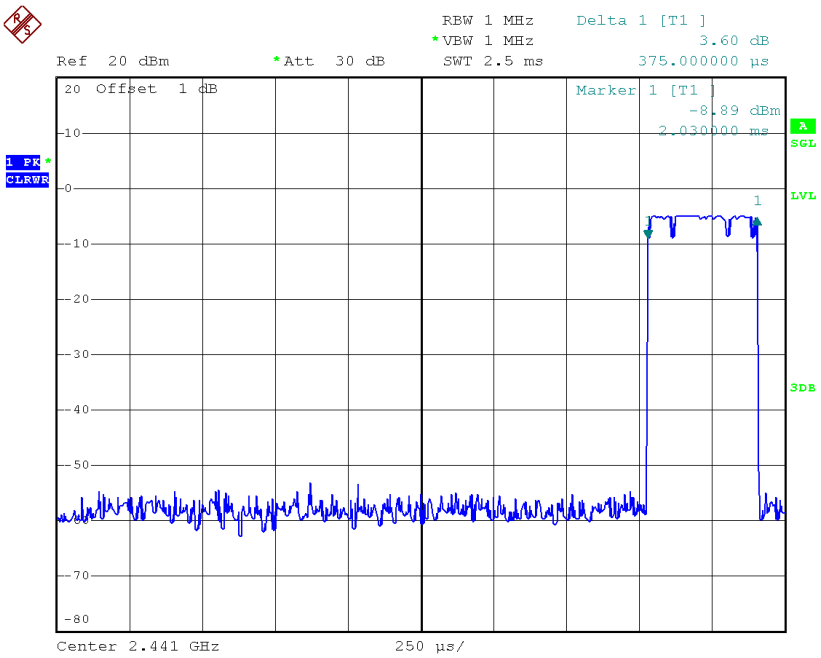
Date: 24.DEC.2018 09:43:08

CH00-DH5



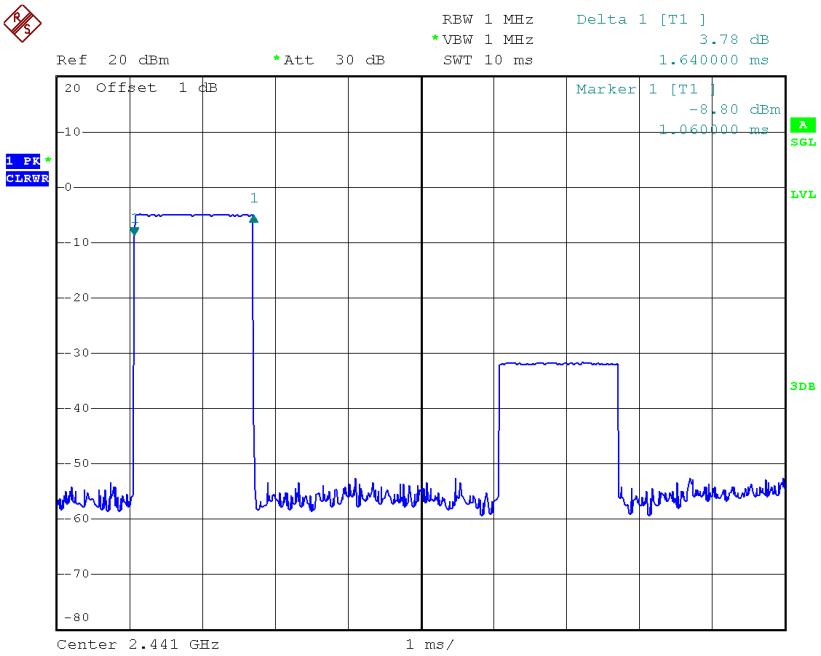
Date: 24.DEC.2018 09:44:59

CH39-DH1



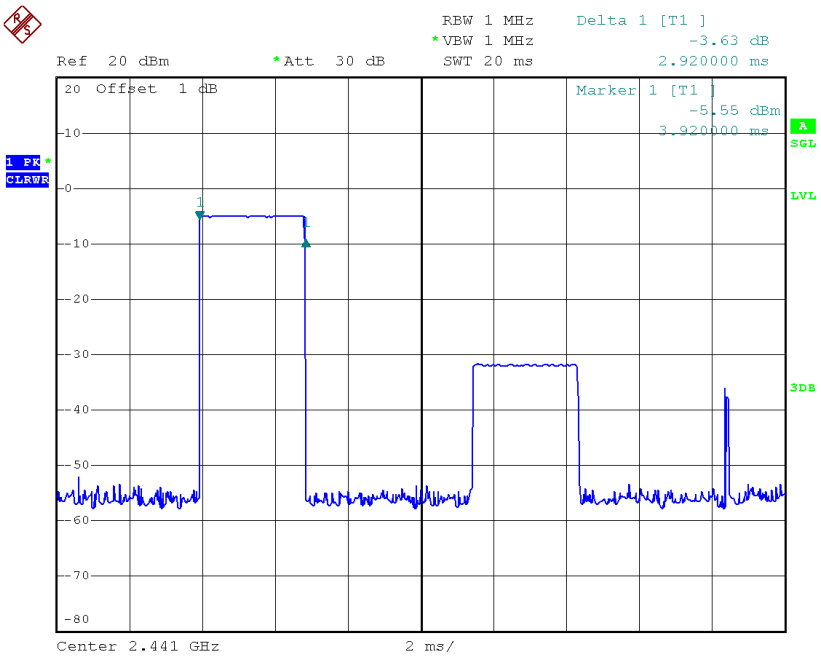
Date: 24.DEC.2018 09:59:08

CH39-DH3



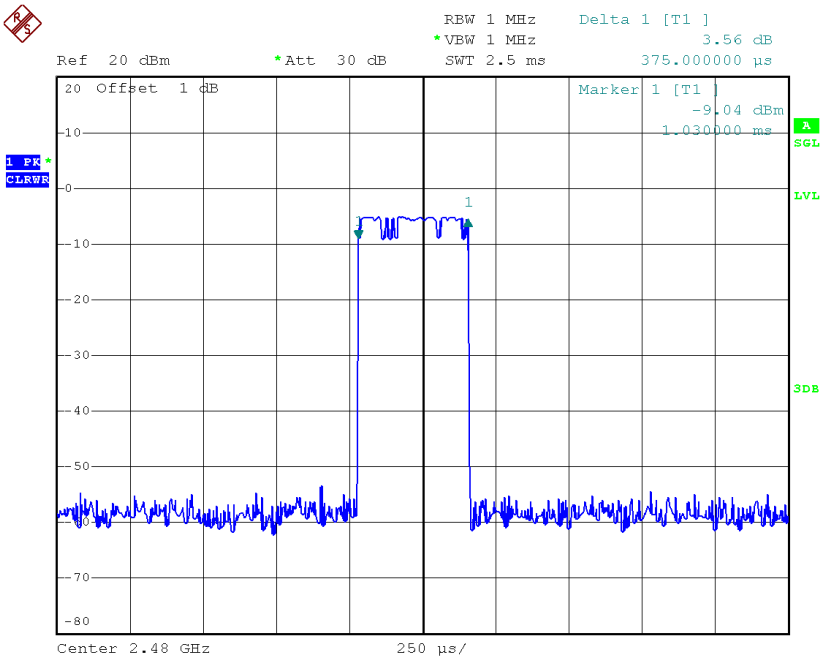
Date: 24.DEC.2018 09:43:14

CH39-DH5



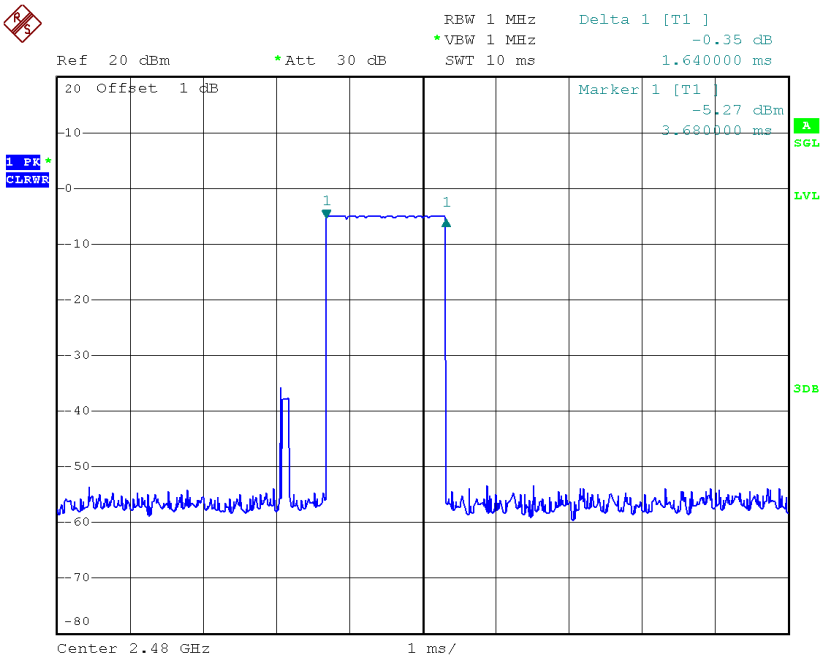
Date: 24.DEC.2018 09:45:05

CH78-DH1



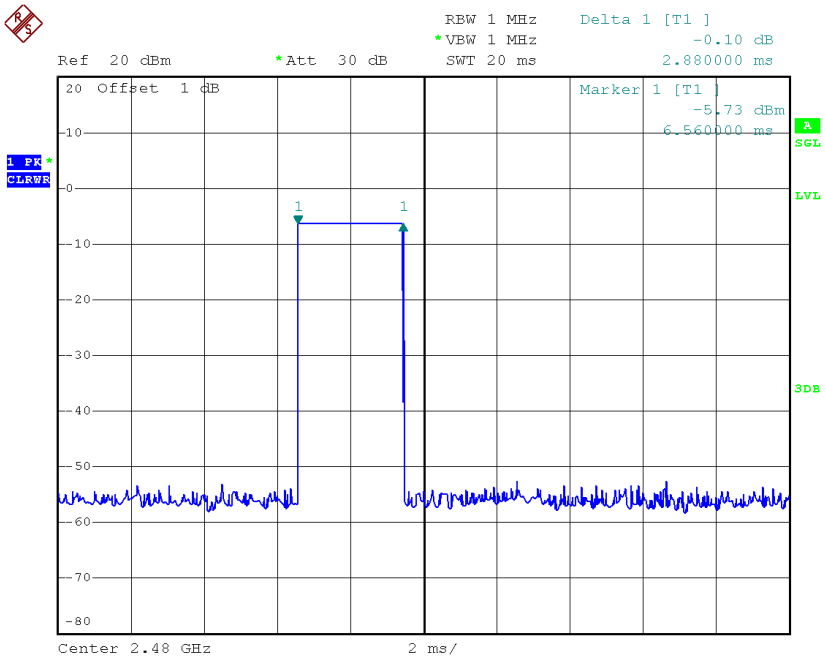
Date: 24.DEC.2018 10:00:18

CH78-DH3



Date: 24.DEC.2018 09:43:21

CH78-DH5

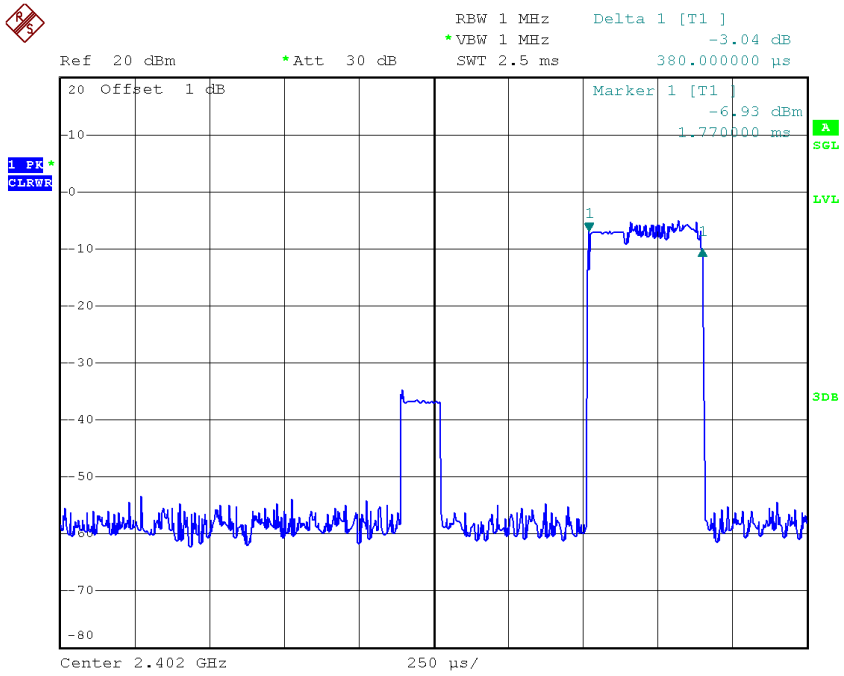


Date: 24.DEC.2018 09:48:33

Test Mode:	TX Mode_3Mbps

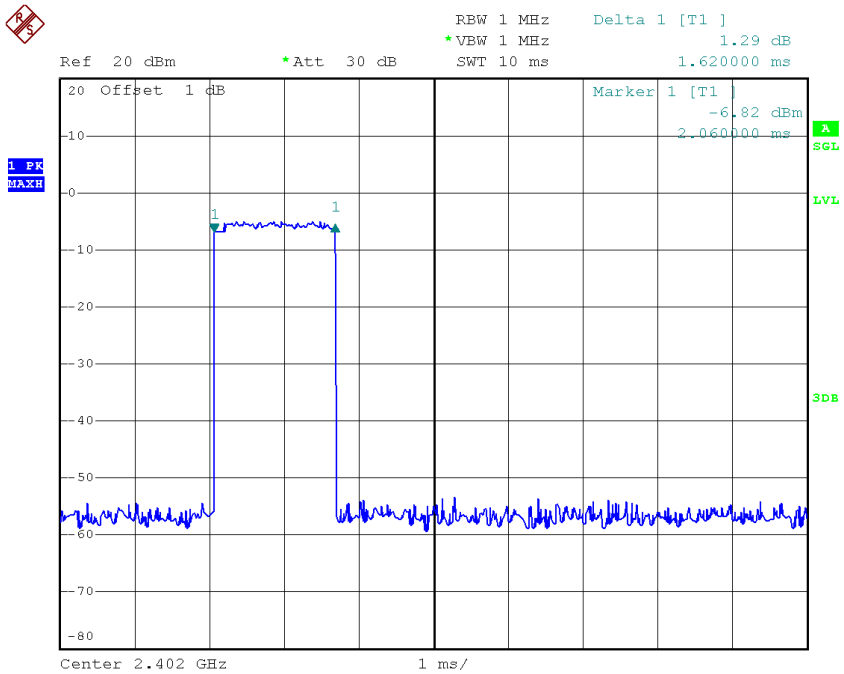
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
DH5	2402	2.8800	0.3072	0.4000	Pass
DH3	2402	1.6200	0.2592	0.4000	Pass
DH1	2402	0.3800	0.1216	0.4000	Pass
DH5	2441	2.8800	0.3072	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH1	2441	0.3800	0.1216	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH1	2480	0.3750	0.1200	0.4000	Pass

CH00-DH1



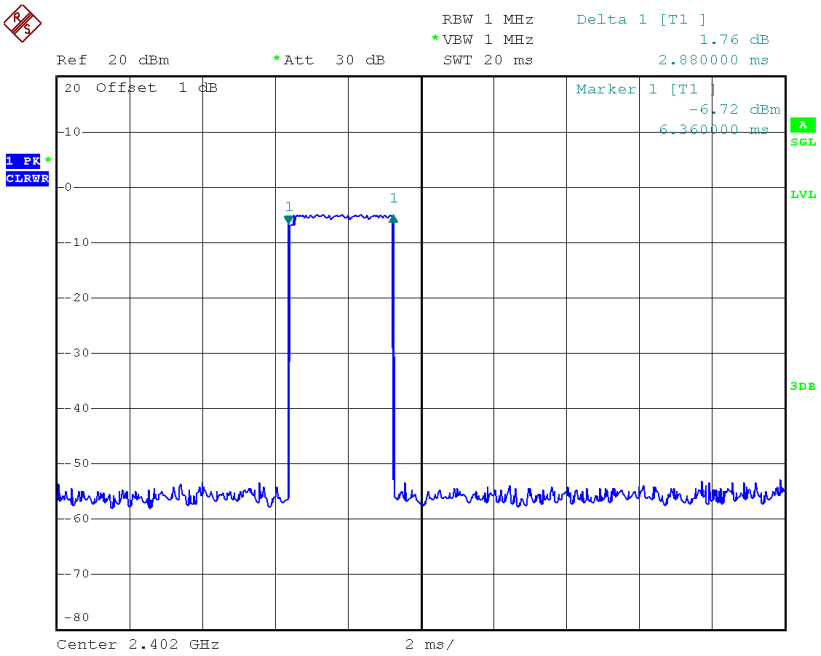
Date: 24.DEC.2018 09:00:42

CH00-DH3



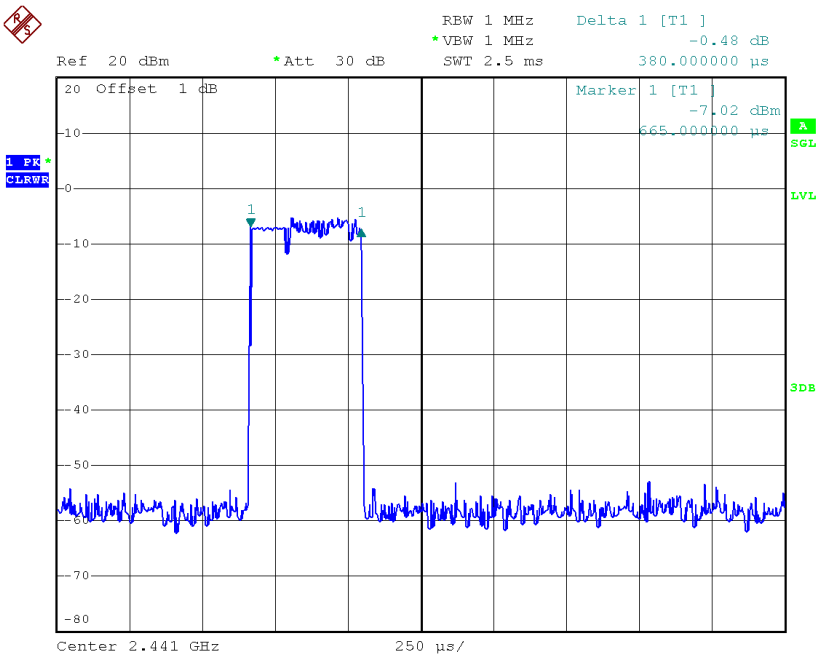
Date: 24.DEC.2018 09:12:29

CH00-DH5



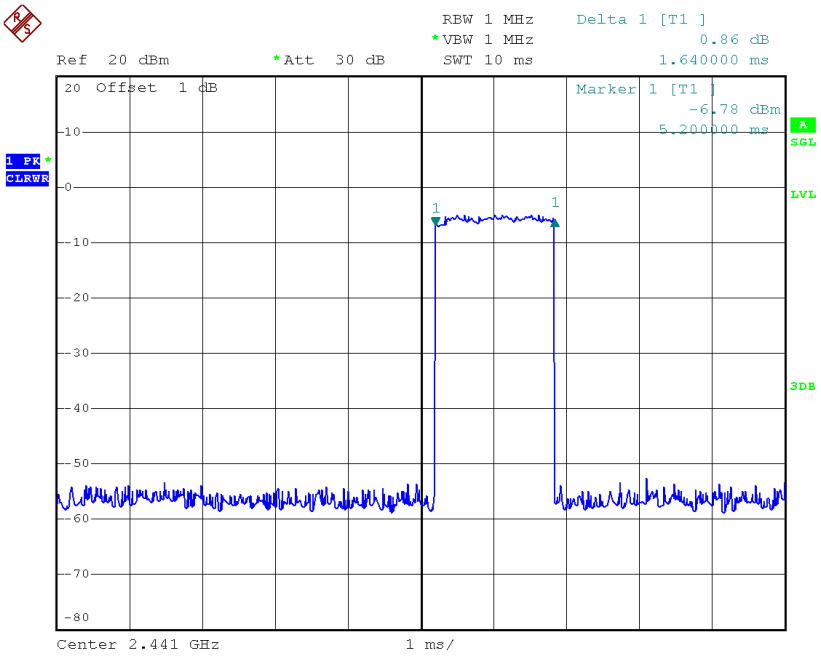
Date: 24.DEC.2018 09:19:46

CH39-DH1



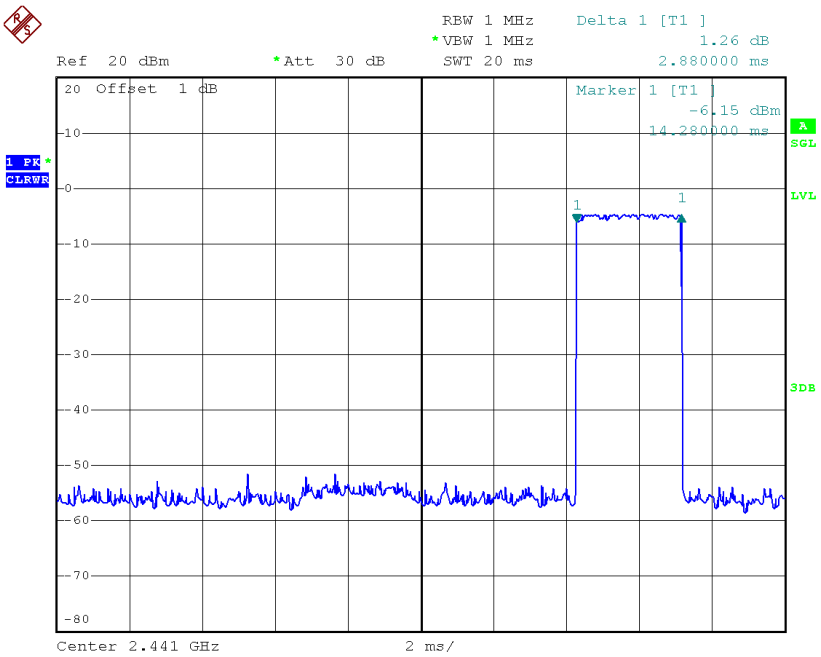
Date: 24.DEC.2018 09:00:48

CH39-DH3



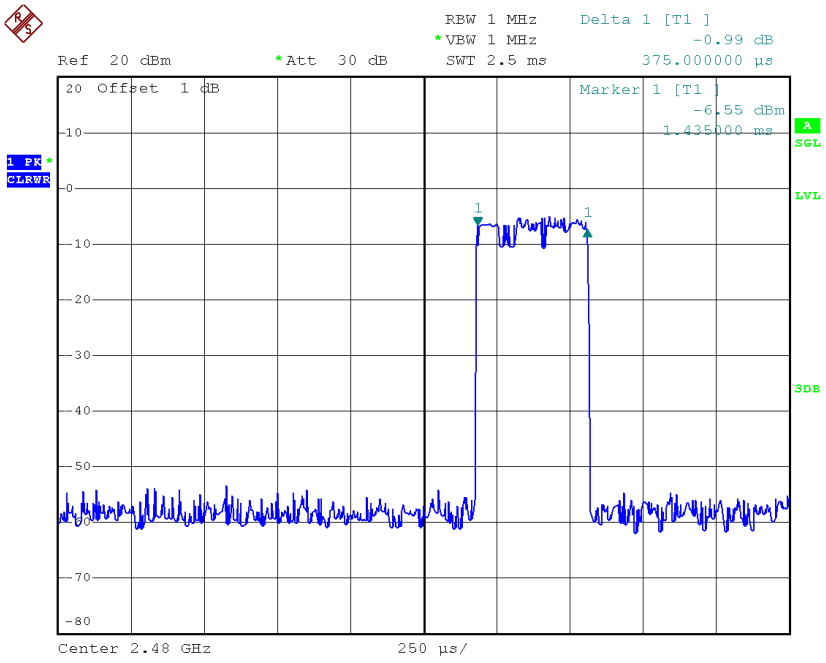
Date: 24.DEC.2018 09:16:42

CH39-DH5



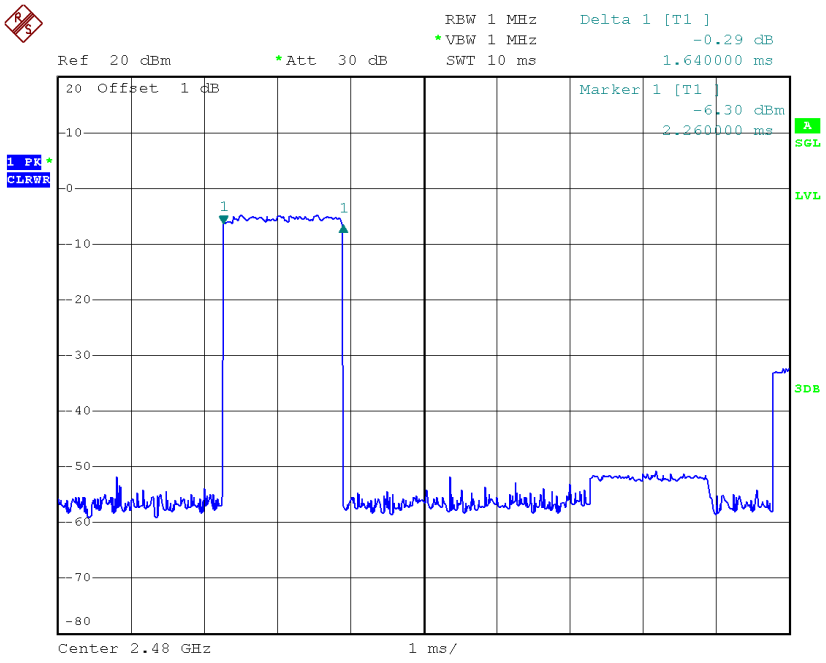
Date: 24.DEC.2018 09:17:15

CH78-DH1



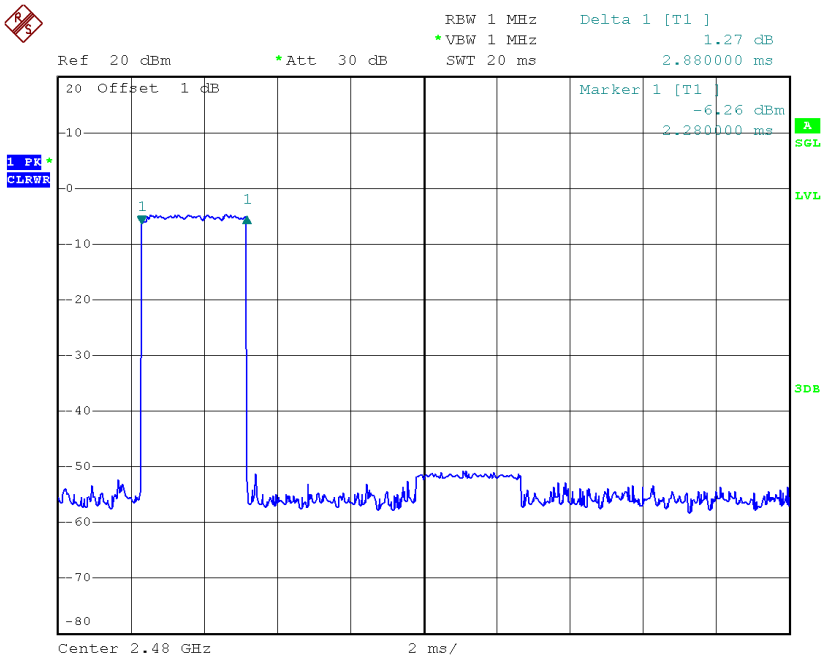
Date: 24.DEC.2018 09:02:10

CH78-DH3



Date: 24.DEC.2018 09:16:50

CH78-DH5



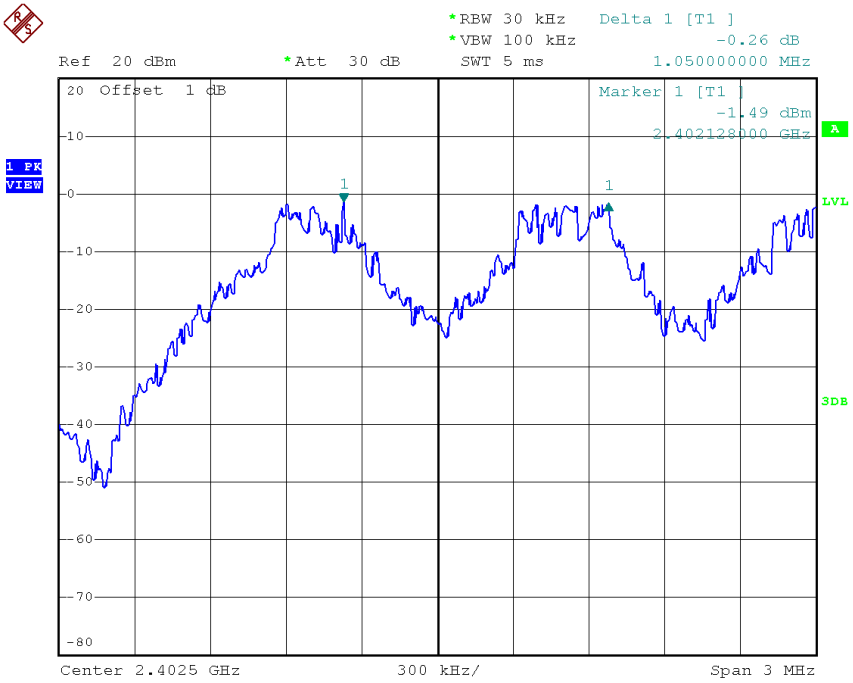
Date: 24.DEC.2018 09:18:40

APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT

Test Mode:	Hopping on _1Mbps

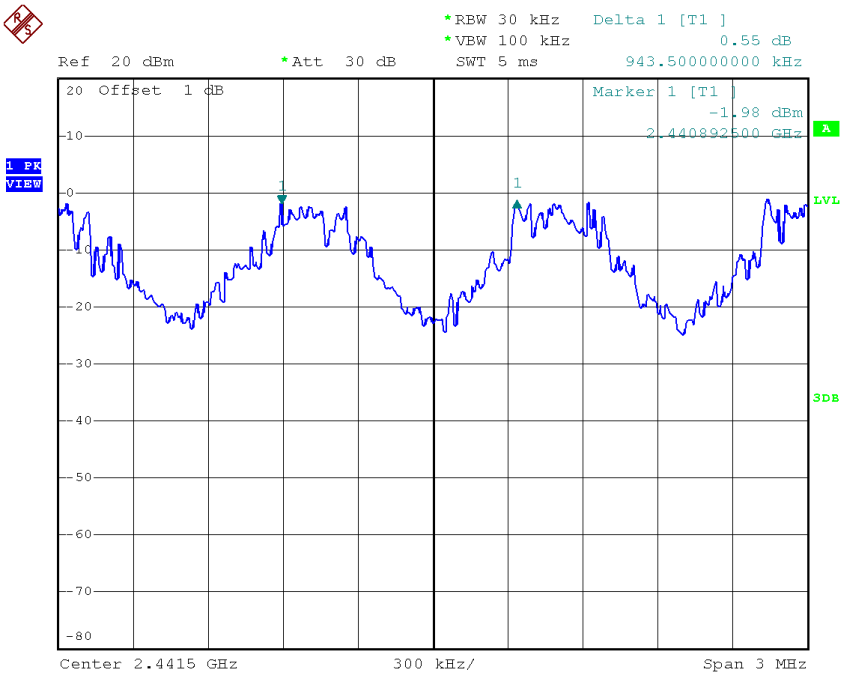
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Result
00	2402	1.050	0.695	Pass
39	2441	0.944	0.668	Pass
79	2480	1.263	0.676	Pass

CH00



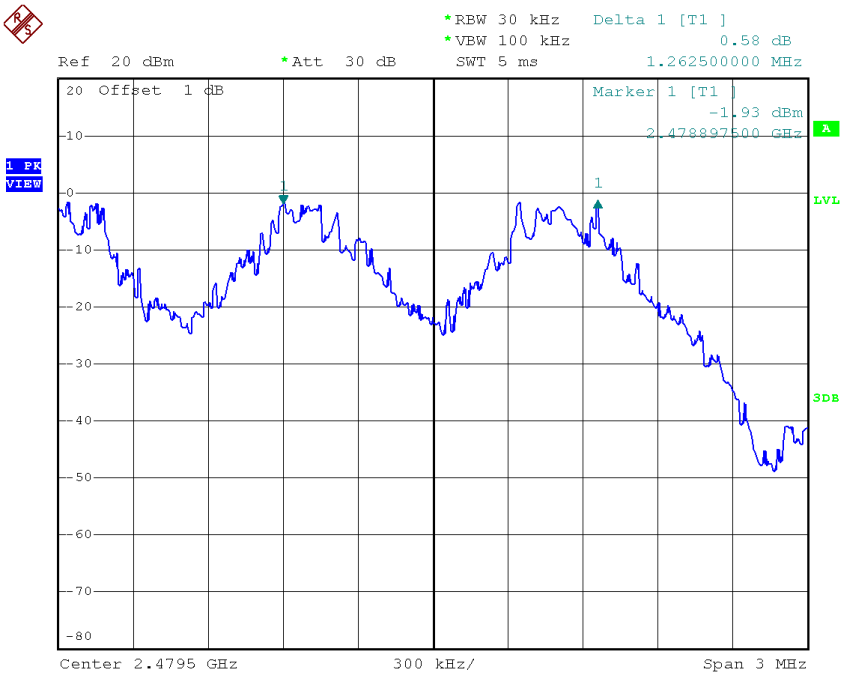
Date: 24.DEC.2018 09:31:18

CH39



Date: 24.DEC.2018 09:37:44

CH78

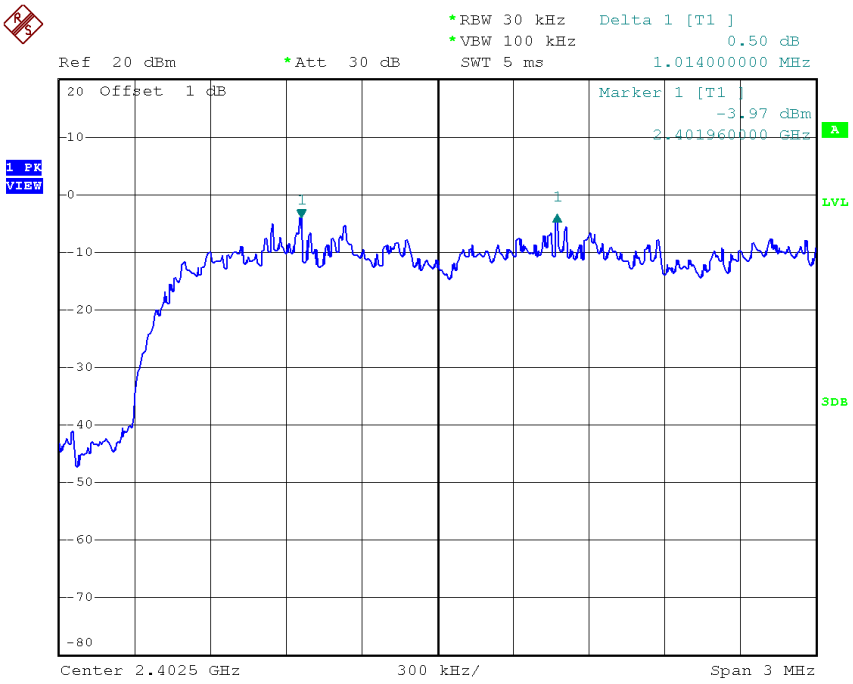


Date: 24.DEC.2018 09:33:37

Test Mode:	Hopping on _3Mbps

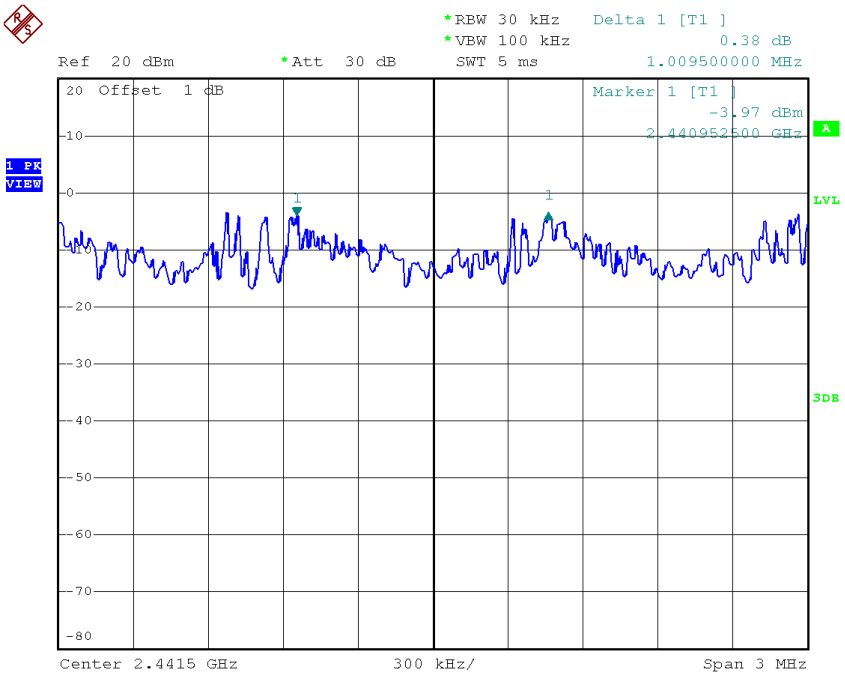
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Result
00	2402	1.014	0.881	Pass
39	2441	1.010	0.847	Pass
79	2480	0.994	0.861	Pass

CH00



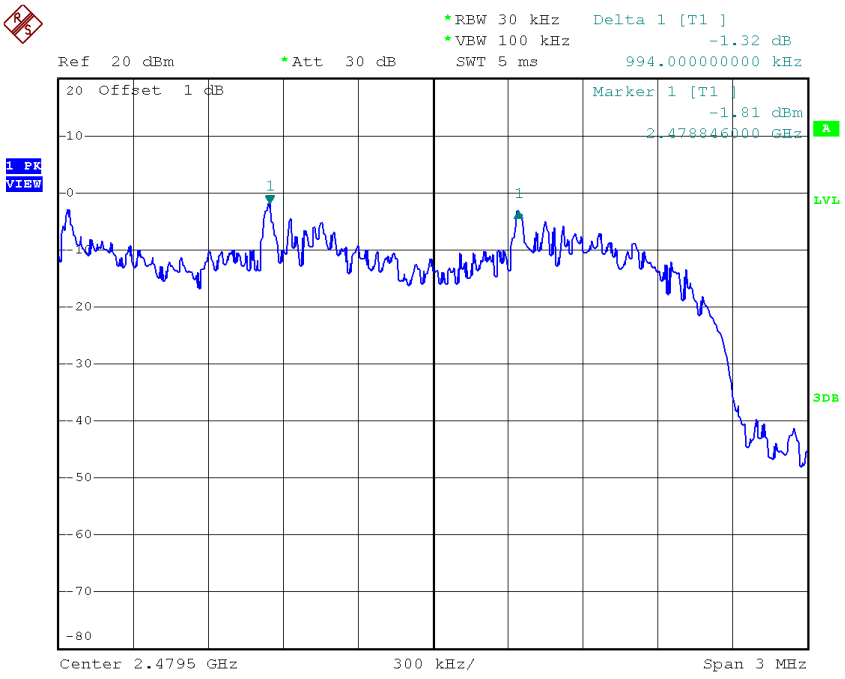
Date: 24.DEC.2018 10:05:46

CH39



Date: 24.DEC.2018 09:07:50

CH78



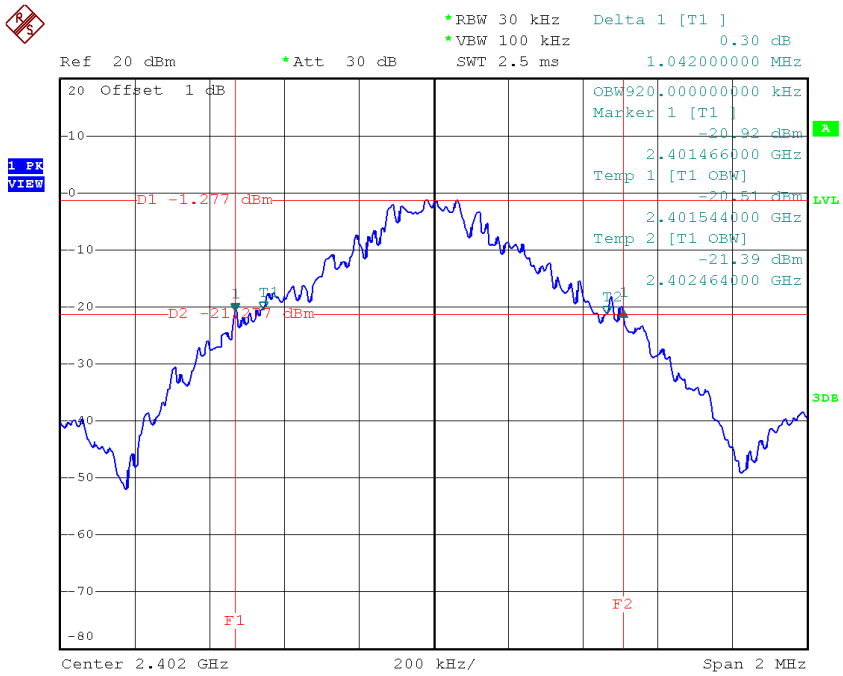
Date: 24.DEC.2018 09:08:59

APPENDIX H - BANDWIDTH

Test Mode:	TX Mode _1Mbps

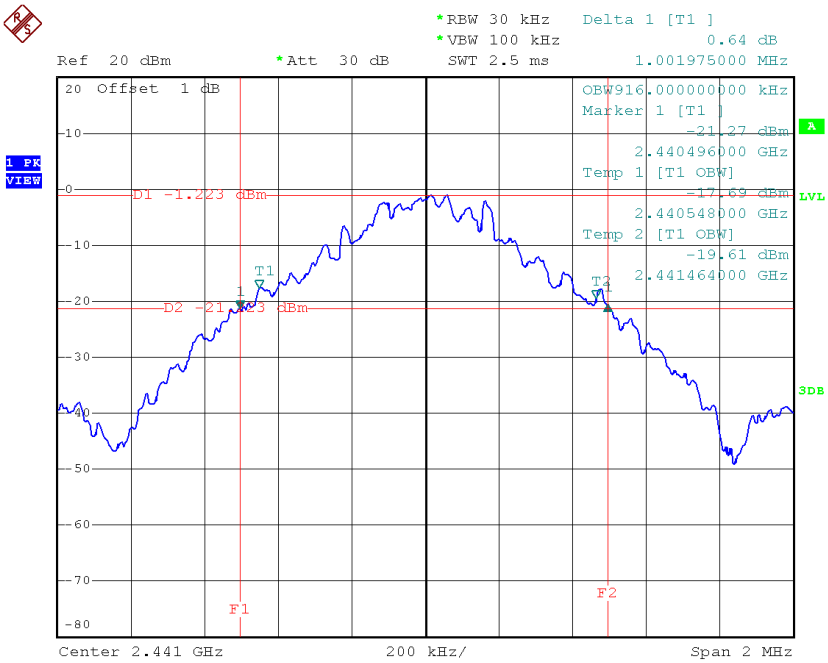
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Result
00	2402	1.042	0.920	Pass
39	2441	1.002	0.916	Pass
78	2480	1.014	0.916	Pass

CH00



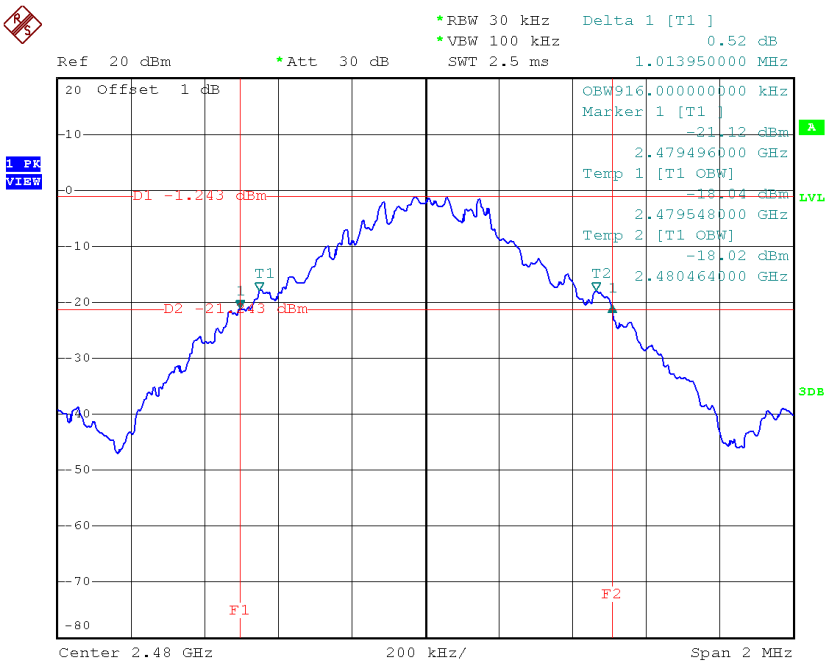
Date: 24.DEC.2018 09:22:40

CH39



Date: 24.DEC.2018 09:24:36

CH78

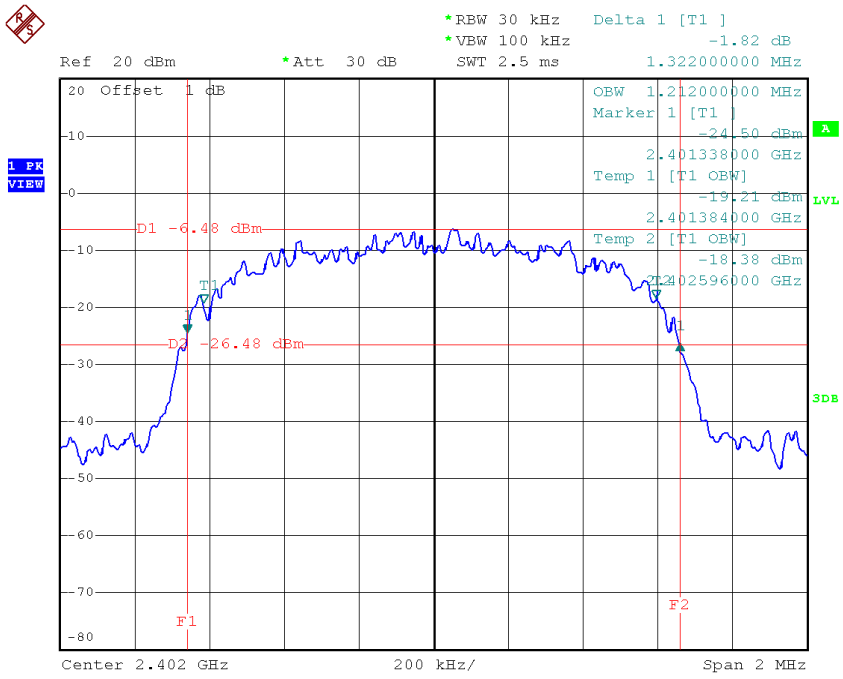


Date: 24.DEC.2018 09:25:22

Test Mode:	TX Mode _3Mbps

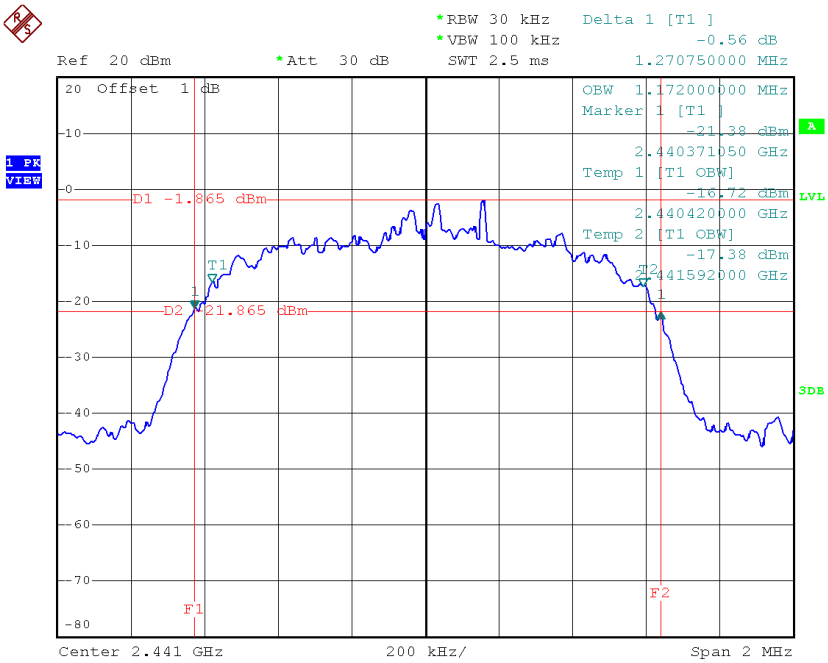
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied BW (MHz)	Result
00	2402	1.322	1.212	Pass
39	2441	1.271	1.172	Pass
78	2480	1.292	1.196	Pass

CH00



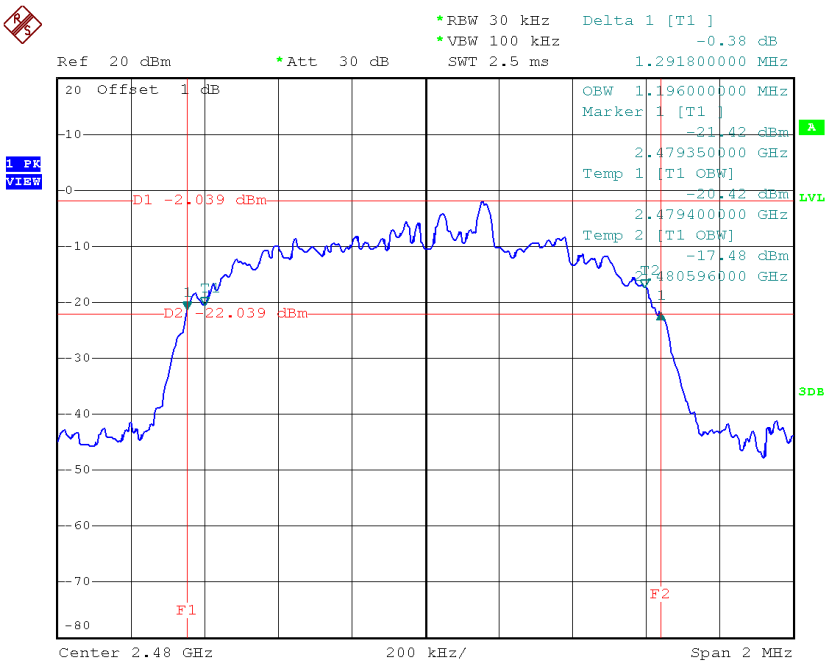
Date: 24.DEC.2018 08:47:54

CH39



Date: 24.DEC.2018 08:49:43

CH78



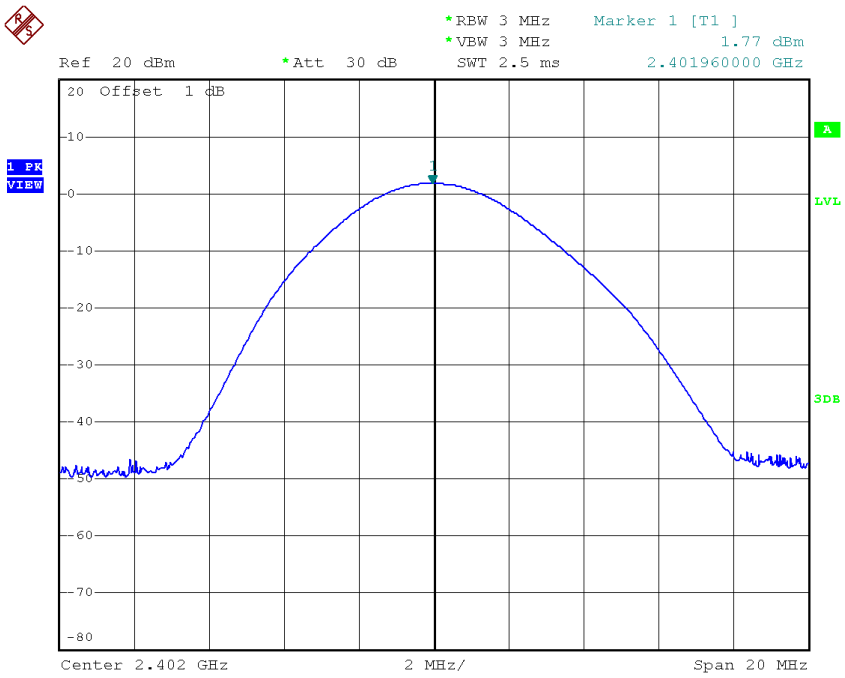
Date: 24.DEC.2018 08:46:36

APPENDIX I - MAXIMUM OUTPUT POWER

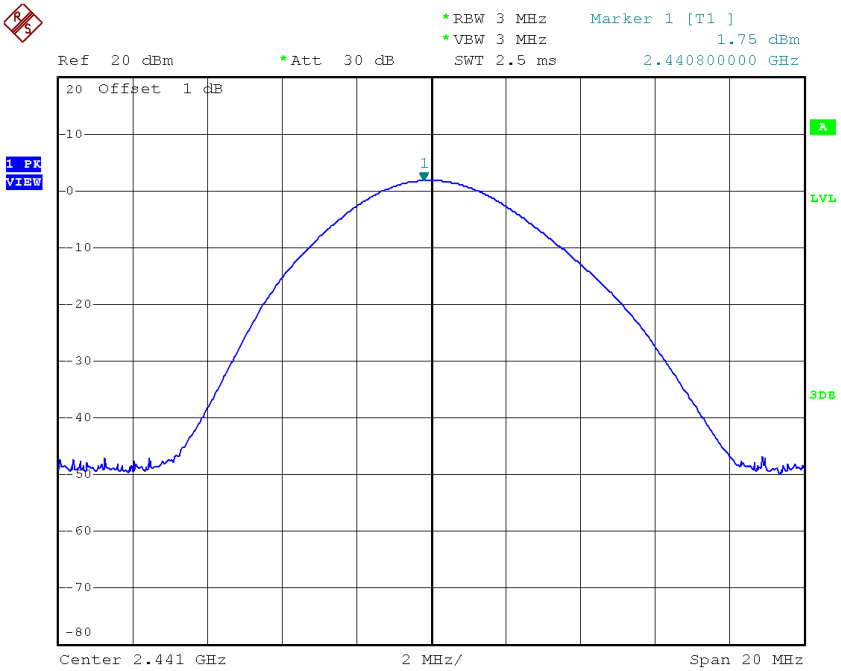
Test Mode:	TX Mode _1Mbps

Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
00	2402	1.77	0.0015	21.00	0.125	Pass
39	2441	1.75	0.0015	21.00	0.125	Pass
78	2480	1.55	0.0014	21.00	0.125	Pass

CH00

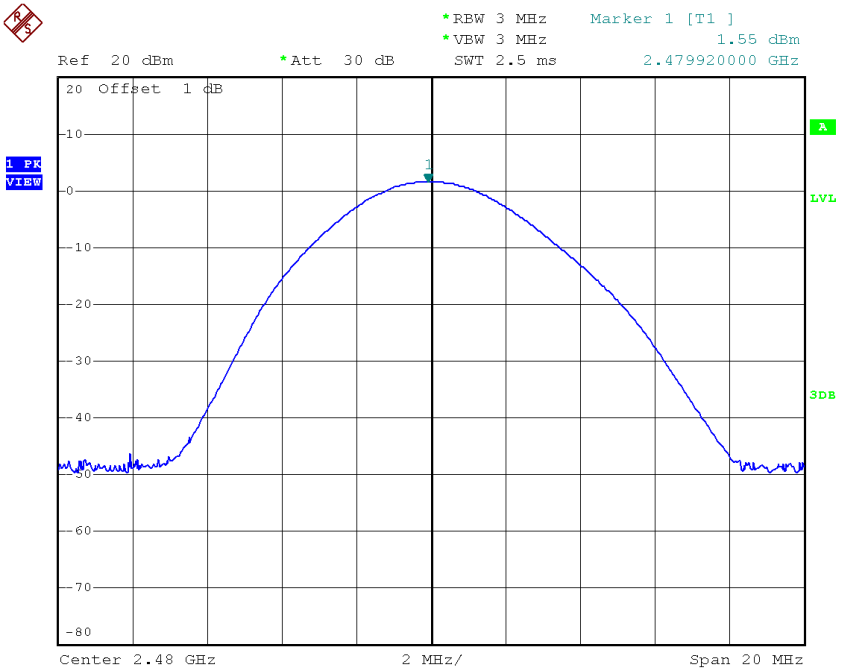


CH39



Date: 24.DEC.2018 08:39:08

CH78

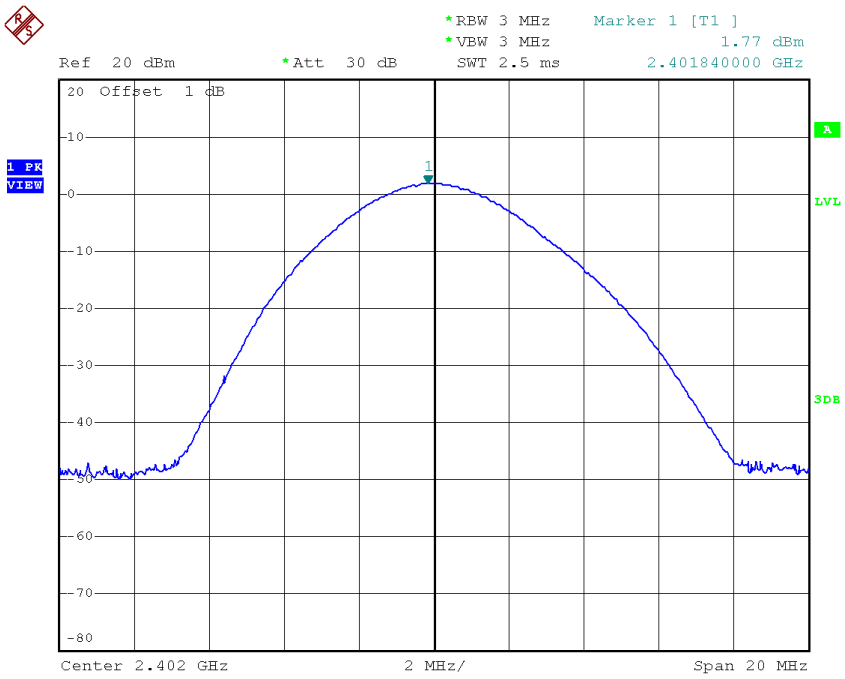


Date: 24.DEC.2018 08:39:25

Test Mode:	TX Mode _3Mbps

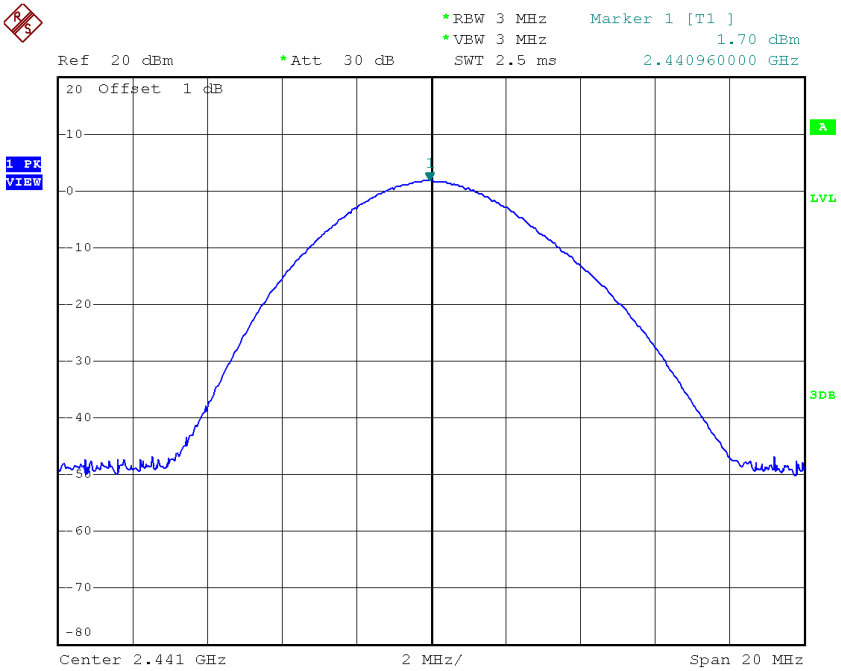
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
00	2402	1.77	0.0015	21.00	0.125	Pass
39	2441	1.70	0.0015	21.00	0.125	Pass
78	2480	1.58	0.0014	21.00	0.125	Pass

CH00



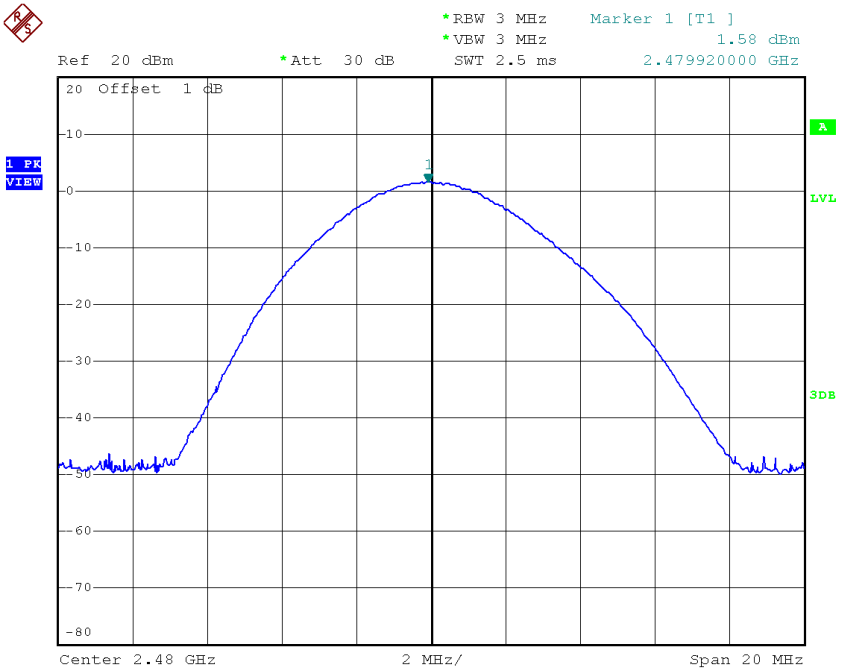
Date: 24.DEC.2018 08:42:34

CH39



Date: 24.DEC.2018 08:43:13

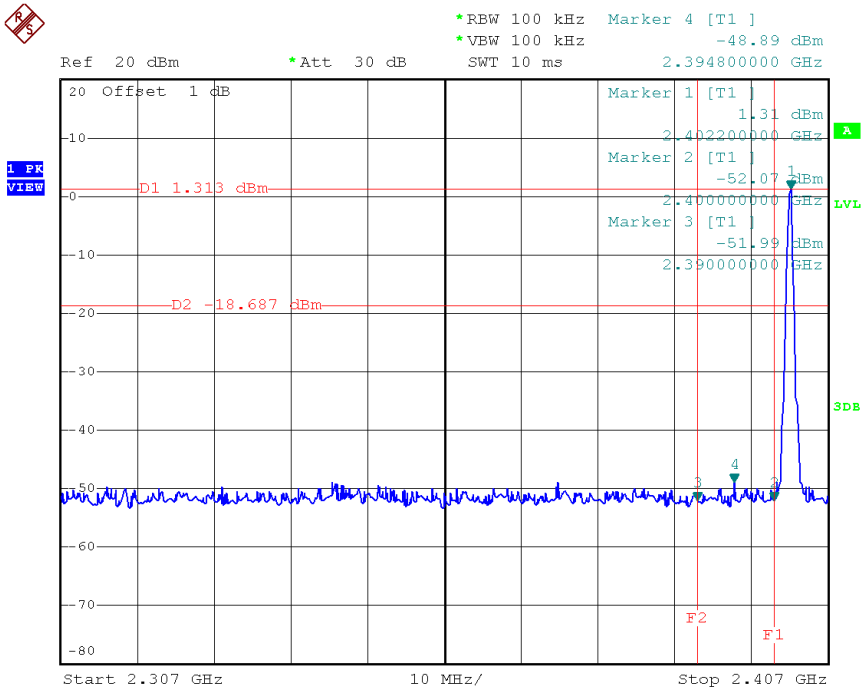
CH78



Date: 24.DEC.2018 08:43:49

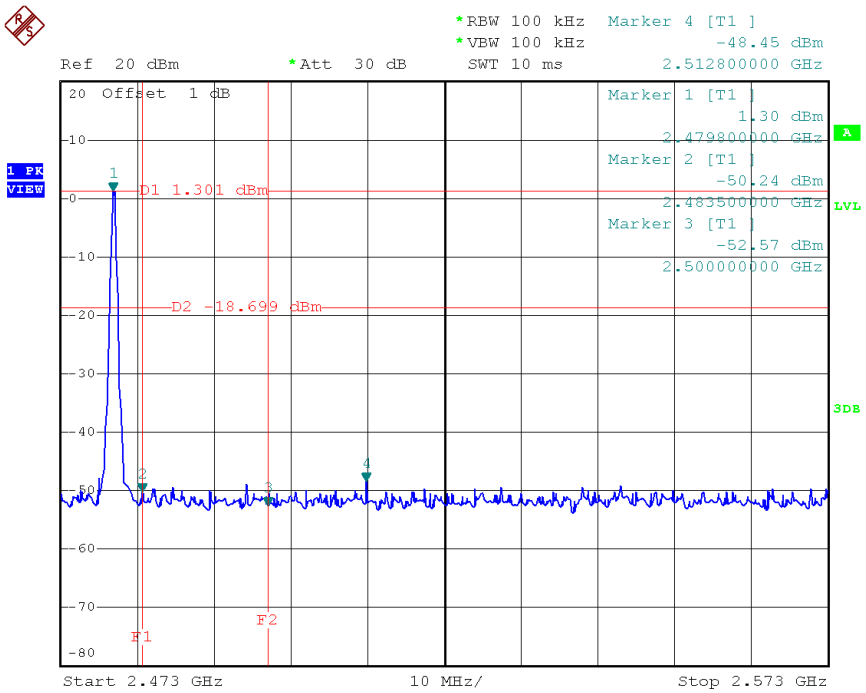
APPENDIX J - ANTENNA CONDUCTED SPURIOUS EMISSION

CH00 (Lower)_1Mbps



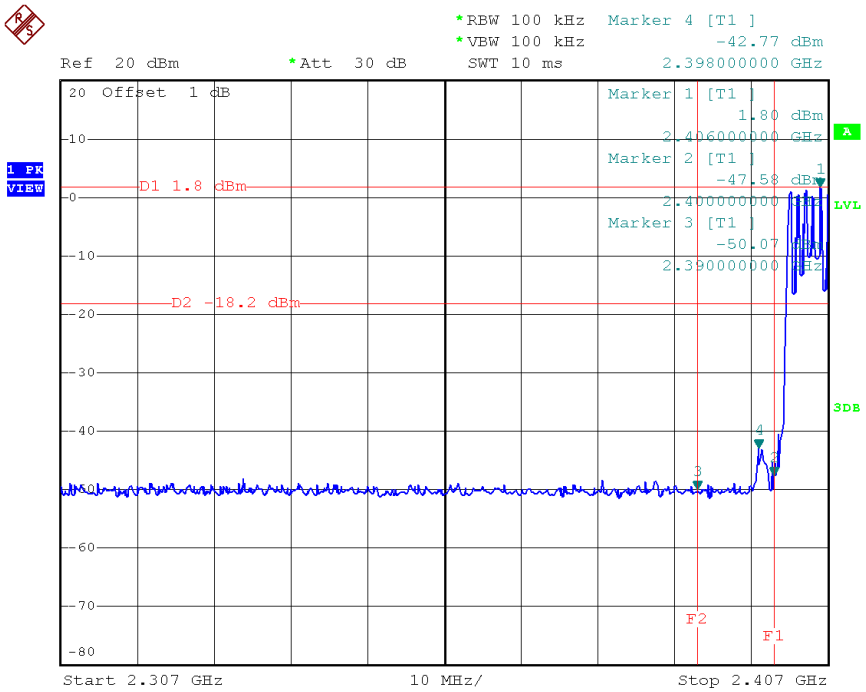
Date: 24.DEC.2018 09:22:14

CH78 (Upper) _1Mbps



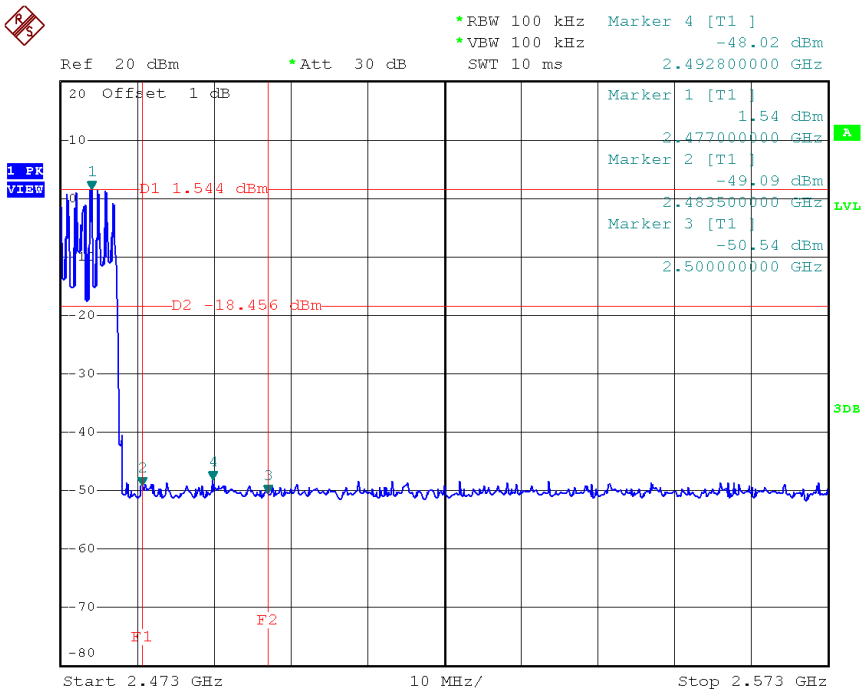
Date: 24.DEC.2018 09:24:57

CH00 Hopping on mode (Lower)_1Mbps



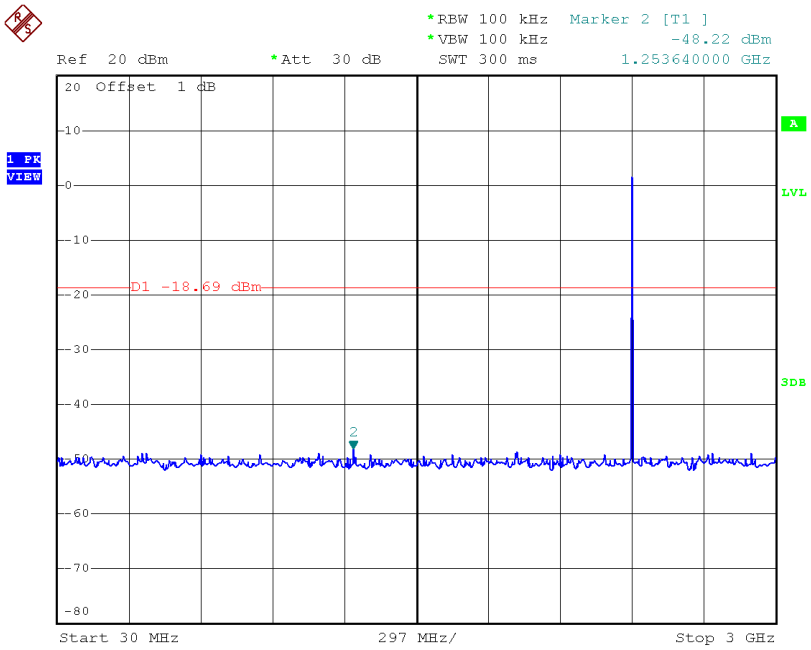
Date: 24.DEC.2018 09:40:07

CH78 Hopping on mode (Upper) _1Mbps

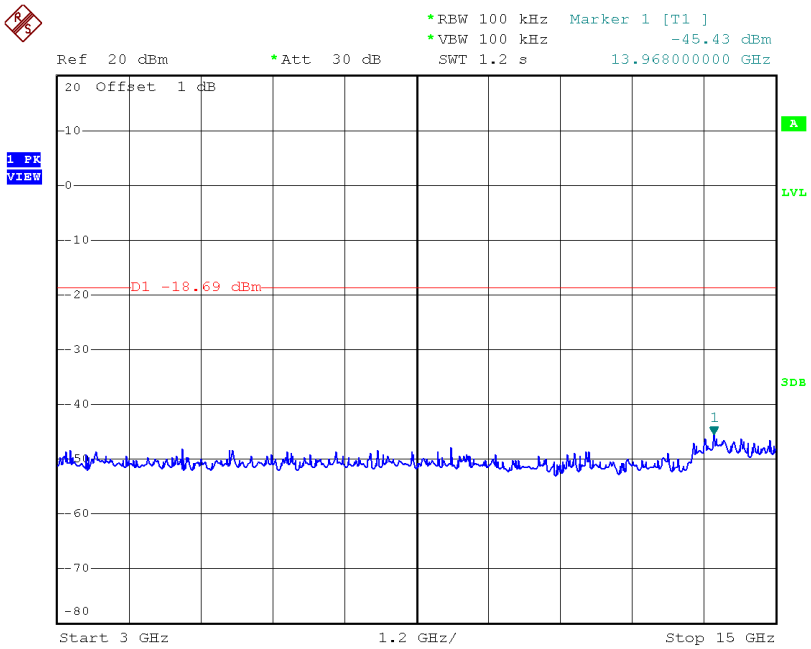


Date: 24.DEC.2018 09:40:43

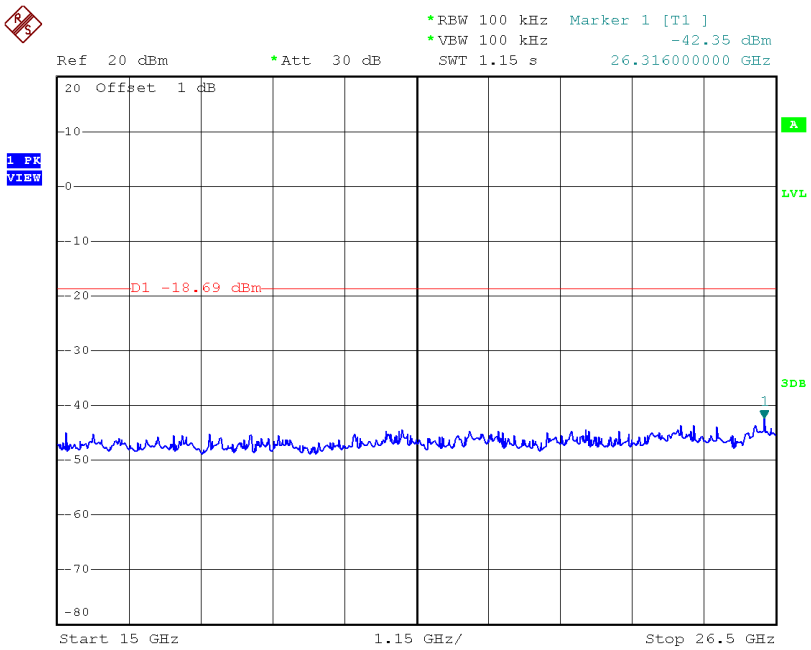
CH00 (10 Harmonic of the frequency) _1Mbps



Date: 24.DEC.2018 09:22:54

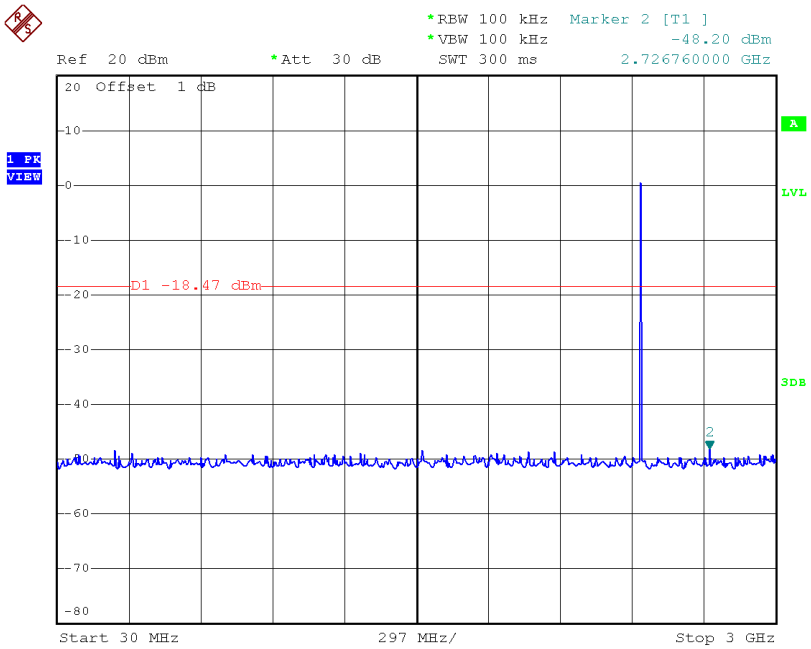


Date: 24.DEC.2018 09:23:02

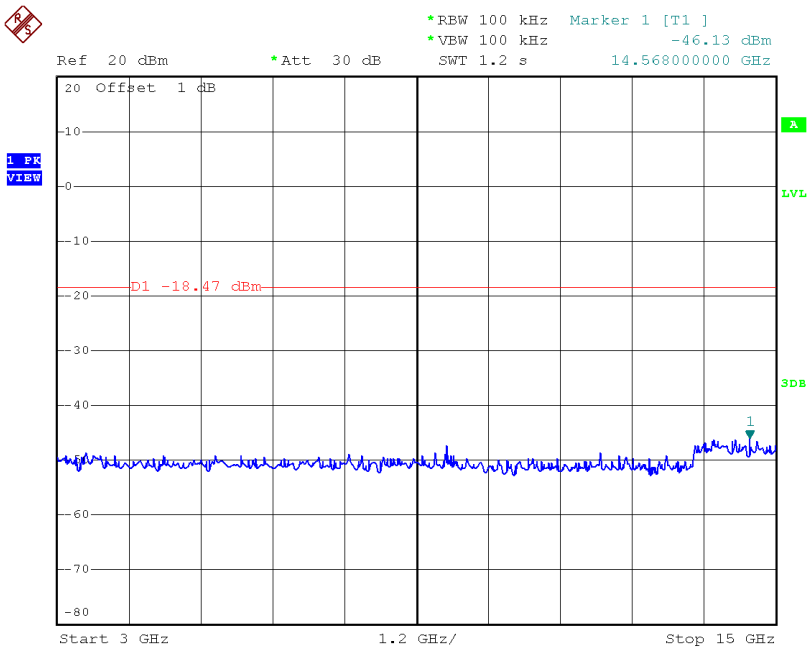


Date: 24.DEC.2018 09:23:11

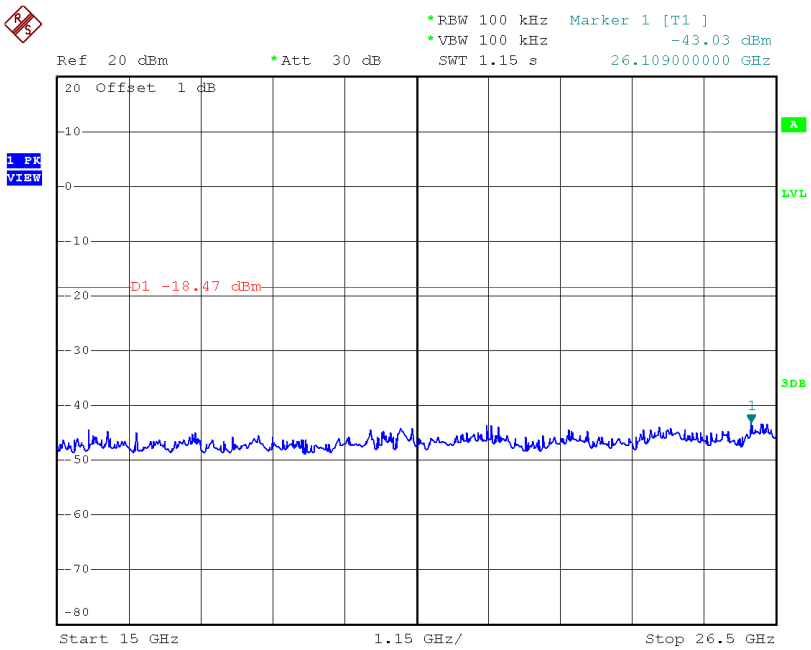
CH39 (10 Harmonic of the frequency) _1Mbps



Date: 24.DEC.2018 09:23:52

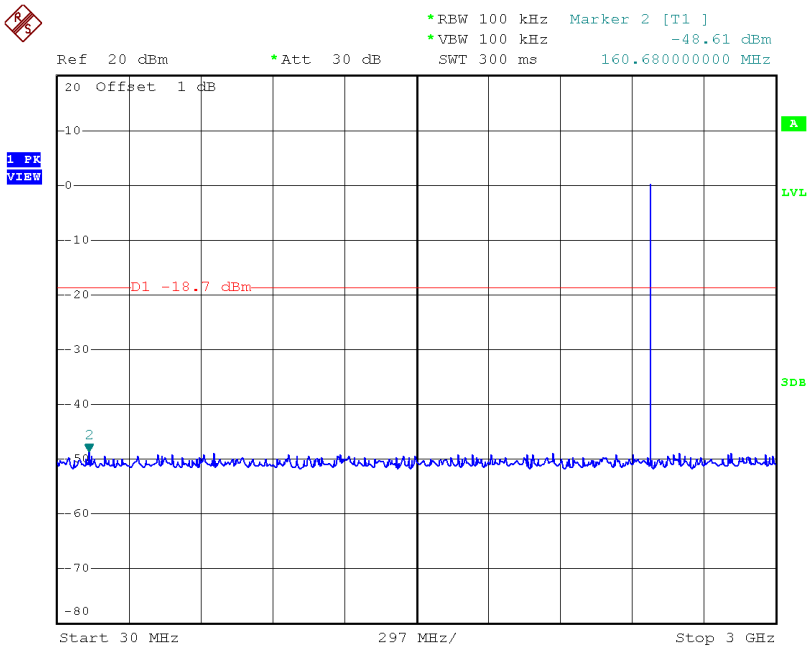


Date: 24.DEC.2018 09:24:00

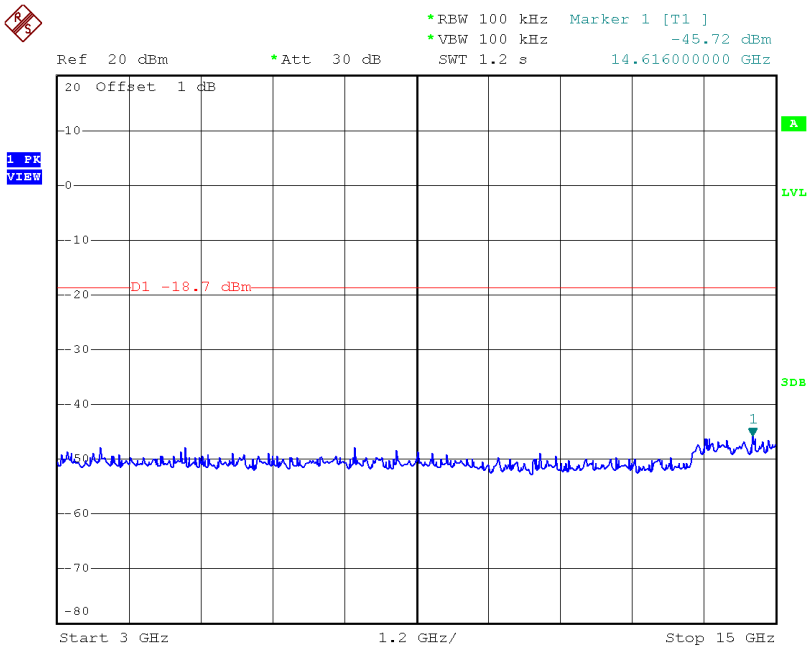


Date: 24.DEC.2018 09:24:09

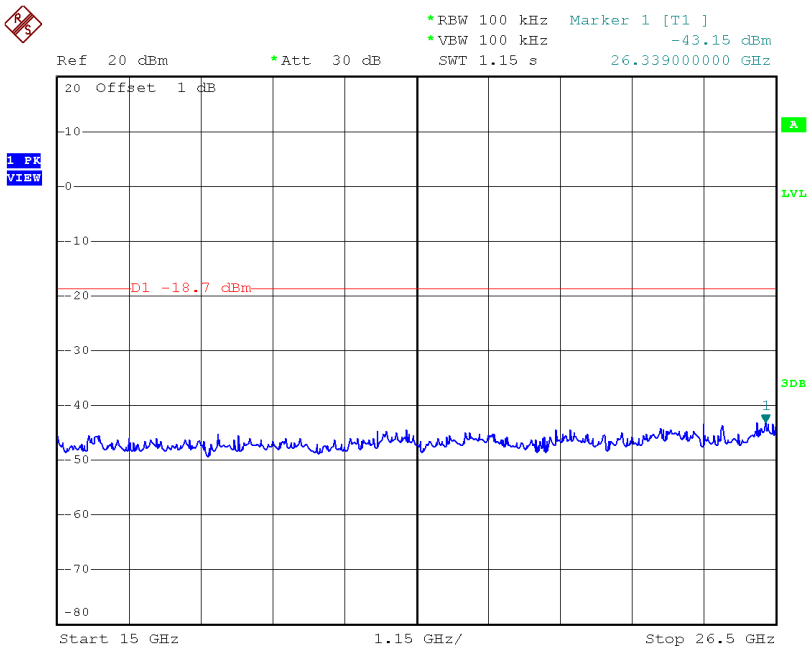
CH78 (10 Harmonic of the frequency) _1Mbps



Date: 24.DEC.2018 09:25:36

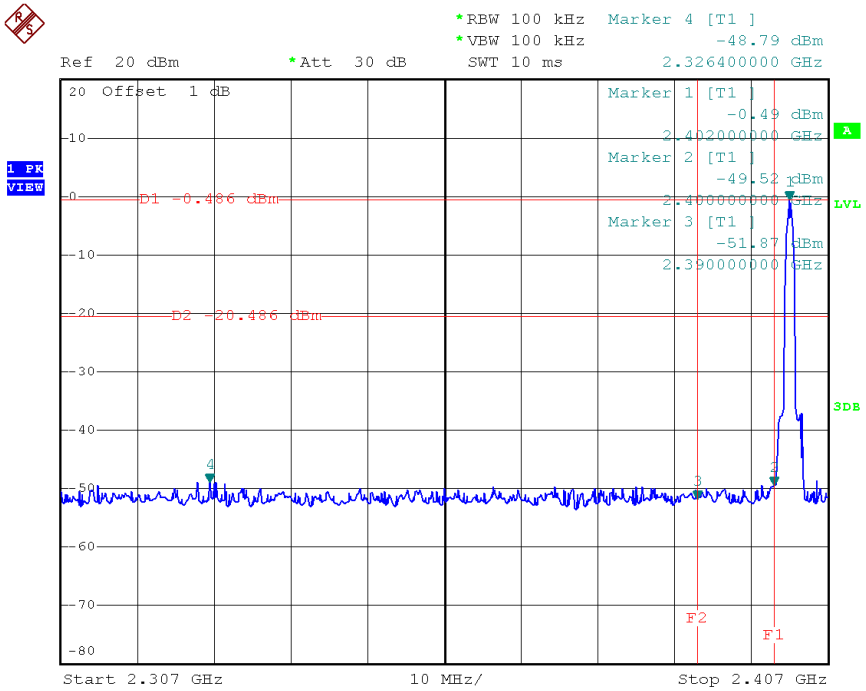


Date: 24.DEC.2018 09:25:45



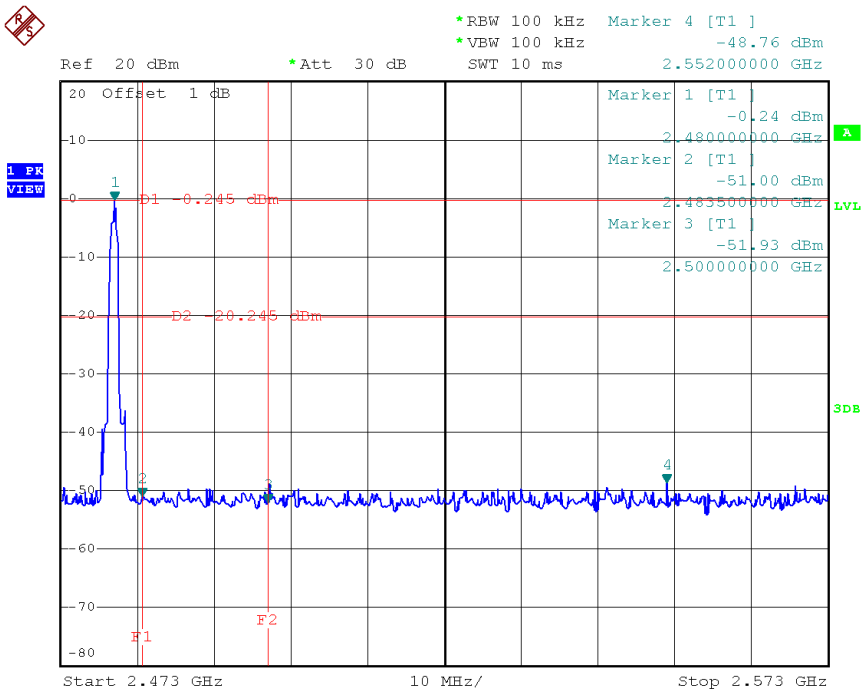
Date: 24.DEC.2018 09:25:53

CH00 (Lower) _3Mbps



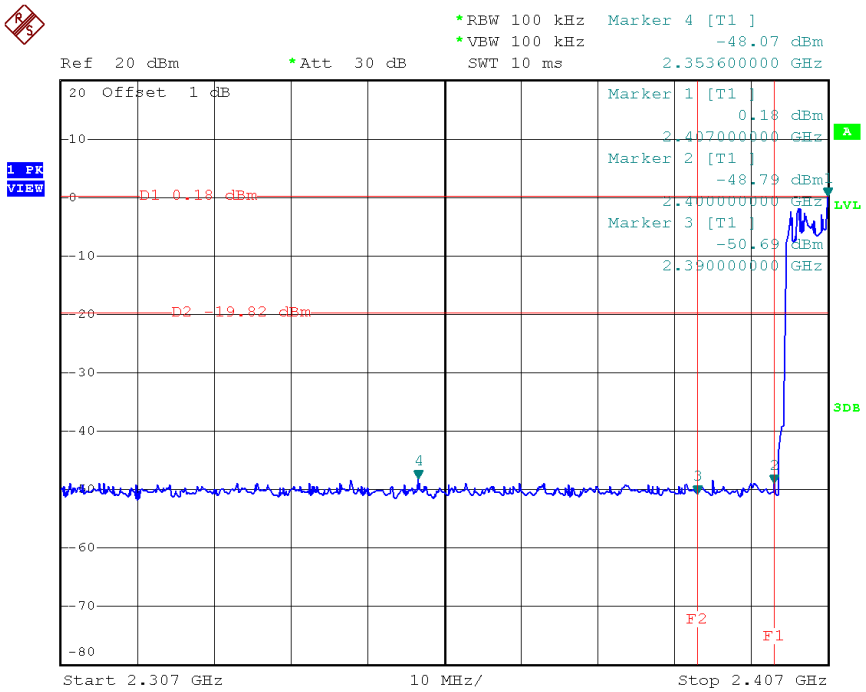
Date: 24.DEC.2018 08:47:34

CH78 (Upper) _3Mbps



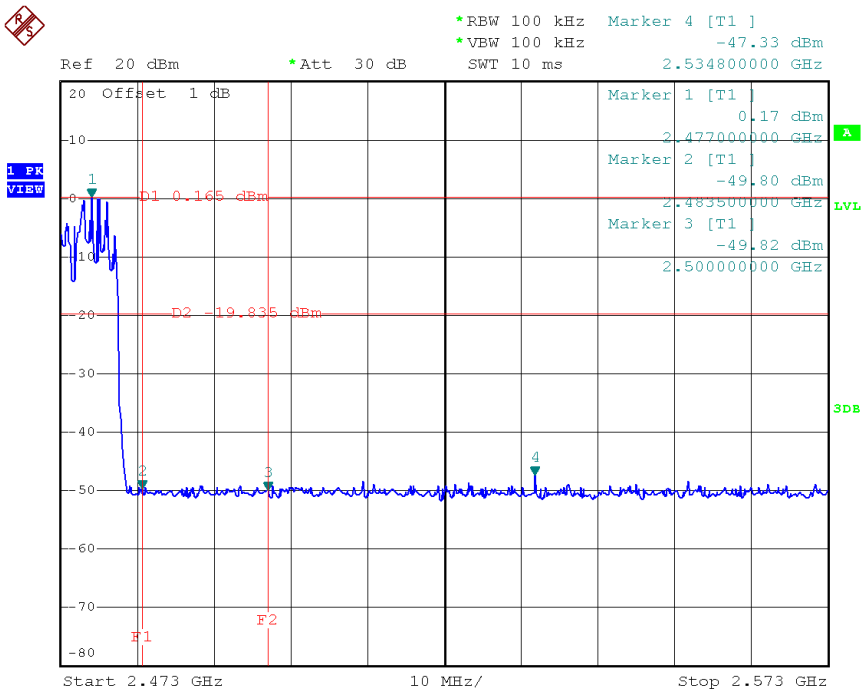
Date: 24.DEC.2018 08:46:15

CH00 Hopping on mode (Lower)_3Mbps



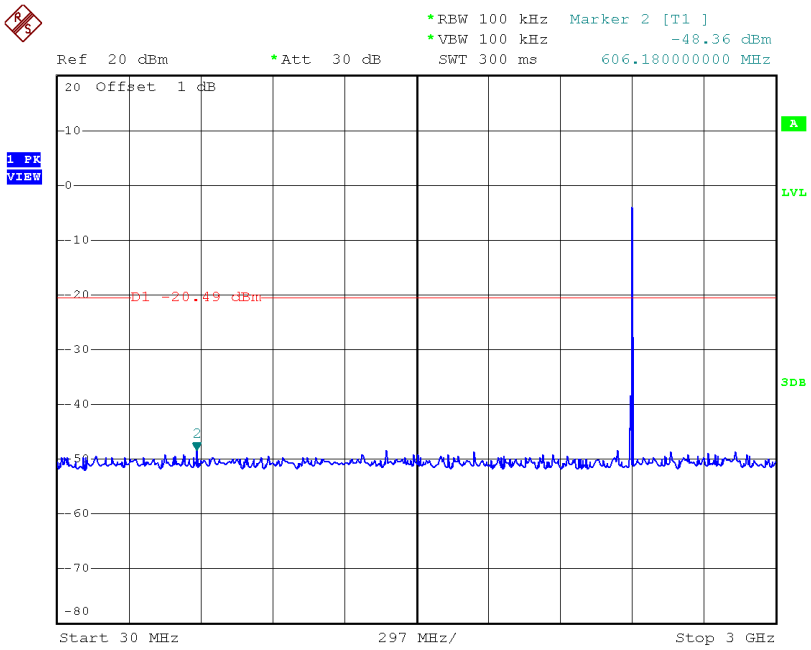
Date: 24.DEC.2018 10:06:21

CH78 Hopping on mode (Upper) _3Mbps

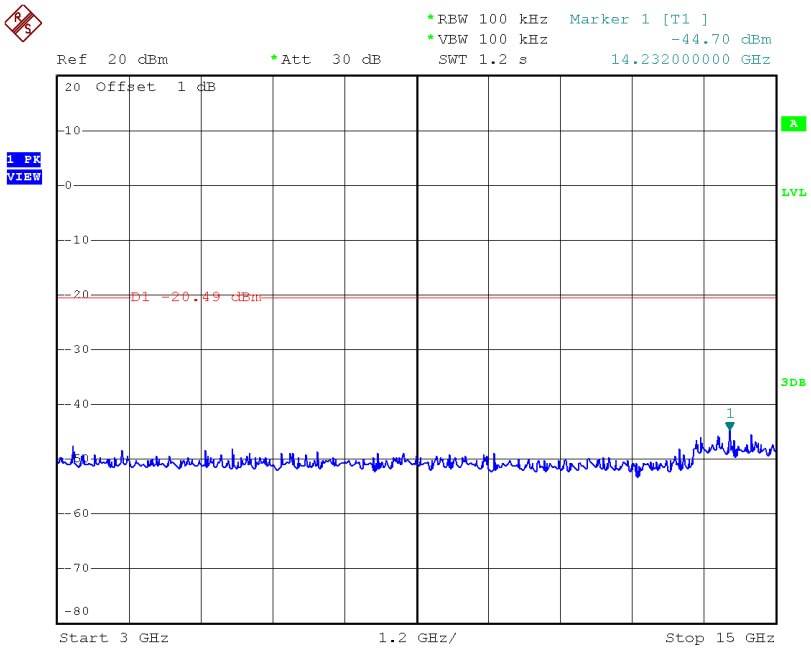


Date: 24.DEC.2018 09:11:58

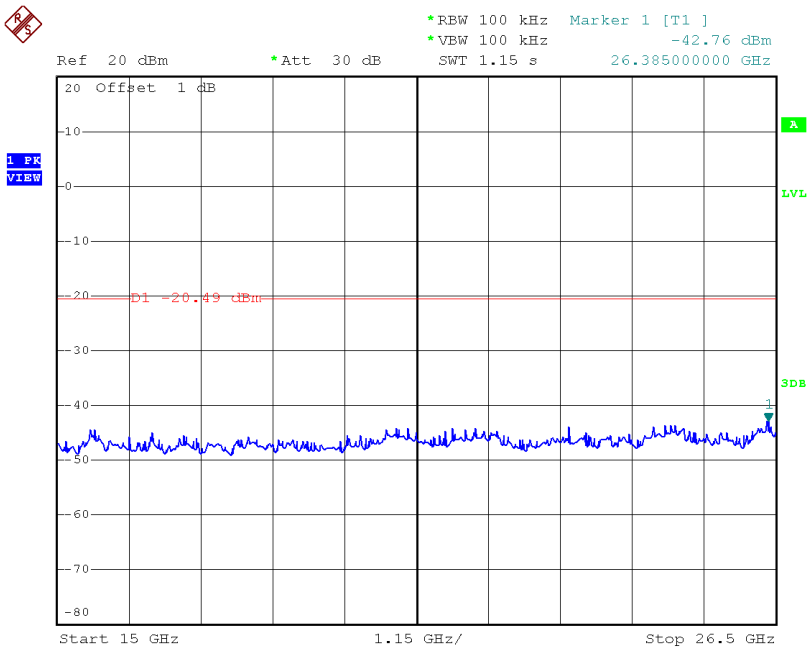
CH00 (10 Harmonic of the frequency) _3Mbps



Date: 24.DEC.2018 08:48:08

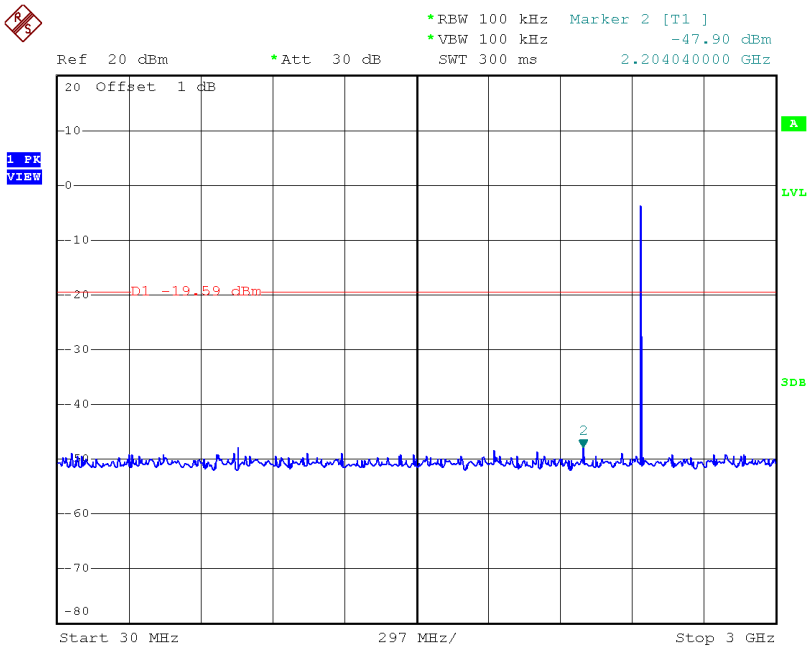


Date: 24.DEC.2018 08:48:16

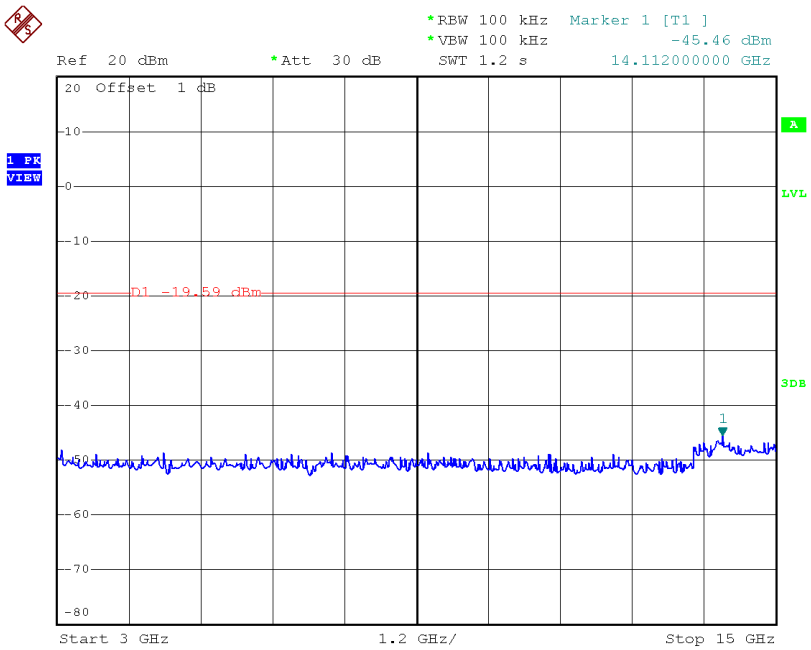


Date: 24.DEC.2018 08:48:25

CH39 (10 Harmonic of the frequency) _3Mbps



Date: 24.DEC.2018 08:49:04



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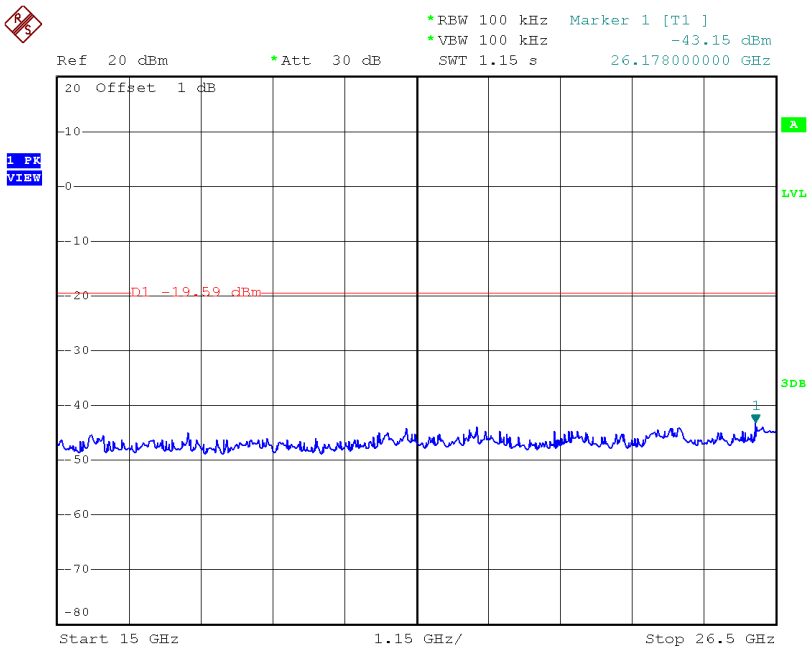

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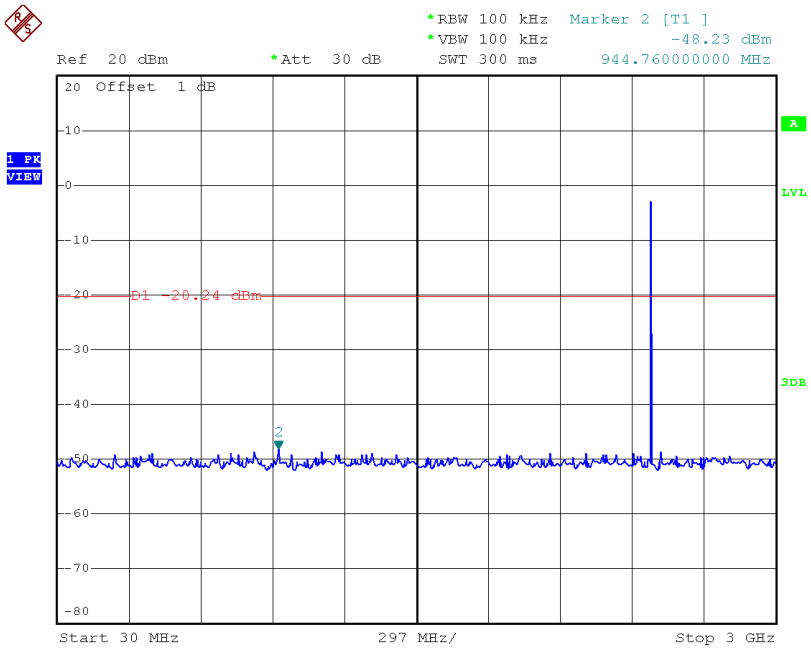
CH78 (10 Harmonic of the frequency) _3Mbps



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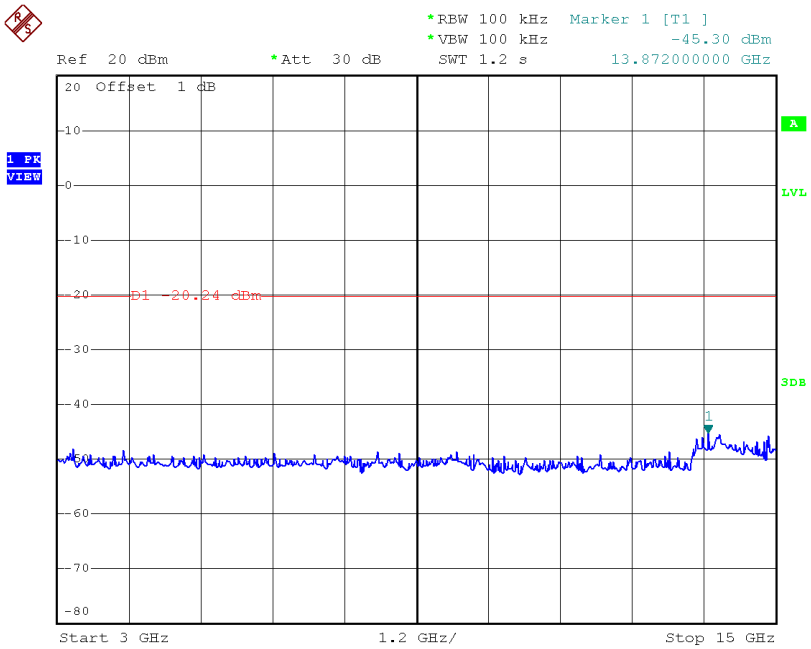

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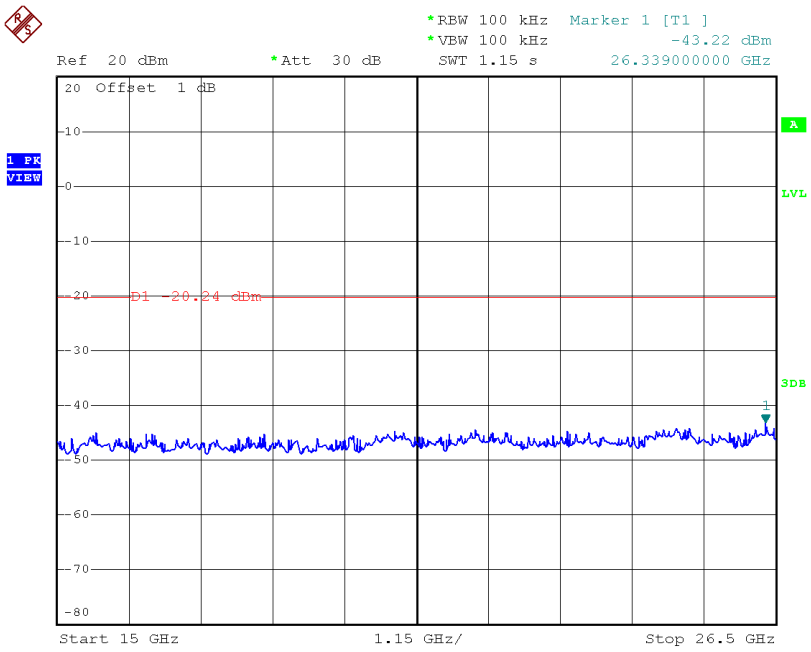

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End of Test Report