

FCC Radio Test Report

FCC ID: 2AIMRMITVMDZ22AG

This report concerns: Original Grant

Project No. : 2012C059
Equipment : MI BOX
Brand Name : MI
Test Model : MDZ-22-AG
Series Model : N/A
Applicant : Beijing Xiaomi Electronics Co., Ltd.
Address : Room 707, 7F, Building 5, No 58, JinghaiWulu Road, Beijing
Economic and Technological Development Zone, China.
Manufacturer : Beijing Xiaomi Electronics Co., Ltd.
Address : Room 707, 7F, Building 5, No 58, JinghaiWulu Road, Beijing
Economic and Technological Development Zone, China.
Factory : SHENZHEN 3NOD ELECTRONICS CO.,LTD
Address : No.74 Yangyong Road, Yanluostreet, Tangxiayong Community,
Songgang, Baoan, Shenzhen, China
Date of Receipt : Dec. 14, 2020
Date of Test : Jan. 25, 2021 ~ Feb. 03, 2021
Issued Date : Feb. 26, 2021
Report Version : R00
Test Sample : Engineering Sample No.: DG2021012236-1
Standard(s) : FCC Part15, Subpart C (15.247)
ANSI C63.10-2013
FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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

Nick Chen

Prepared by : Nick Chen

Ethan Ma

Approved by : Ethan Ma



Certificate #5123.02

Add: No.3, Jinshagang 1st Road, Shixia, Dalang Town,Dongguan, Guangdong, China.

Tel: +86-769-8318-3000

Web: www.newbtl.com

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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

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.

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

Table of Contents	Page
REPORT ISSUED HISTORY	6
1 . SUMMARY OF TEST RESULTS	7
1.1 TEST FACILITY	8
1.2 MEASUREMENT UNCERTAINTY	8
1.3 TEST ENVIRONMENT CONDITIONS	9
2 . GENERAL INFORMATION	10
2.1 GENERAL DESCRIPTION OF EUT	10
2.2 DESCRIPTION OF TEST MODES	12
2.3 PARAMETERS OF TEST SOFTWARE	13
2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	14
2.5 SUPPORT UNITS	14
3 . AC POWER LINE CONDUCTED EMISSIONS TEST	15
3.1 LIMIT	15
3.2 TEST PROCEDURE	15
3.3 DEVIATION FROM TEST STANDARD	15
3.4 TEST SETUP	16
3.5 EUT OPERATING CONDITIONS	16
3.6 TEST RESULTS	16
4 . RADIATED EMISSION TEST	17
4.1 LIMIT	17
4.2 TEST PROCEDURE	18
4.3 DEVIATION FROM TEST STANDARD	18
4.4 TEST SETUP	19
4.5 EUT OPERATING CONDITIONS	20
4.6 TEST RESULTS - 9 KHZ TO 30 MHZ	20
4.7 TEST RESULTS - 30 MHZ TO 1000 MHZ	20
4.8 TEST RESULTS - ABOVE 1000 MHZ	20
5 . NUMBER OF HOPPING FREQUENCY	21
5.1 LIMIT	21
5.2 TEST PROCEDURE	21
5.3 DEVIATION FROM STANDARD	21
5.4 TEST SETUP	21
5.5 EUT OPERATION CONDITIONS	21
5.6 TEST RESULTS	21

Table of Contents**Page**

6 . AVERAGE TIME OF OCCUPANCY	22
6.1 LIMIT	22
6.2 TEST PROCEDURE	22
6.3 DEVIATION FROM STANDARD	22
6.4 TEST SETUP	22
6.5 EUT OPERATION CONDITIONS	22
6.6 TEST RESULTS	22
7 . HOPPING CHANNEL SEPARATION MEASUREMENT	23
7.1 LIMIT	23
7.2 TEST PROCEDURE	23
7.3 DEVIATION FROM STANDARD	23
7.4 TEST SETUP	23
7.5 EUT OPERATION CONDITIONS	23
7.6 TEST RESULTS	23
8 . BANDWIDTH TEST	24
8.1 LIMIT	24
8.2 TEST PROCEDURE	24
8.3 DEVIATION FROM STANDARD	24
8.4 TEST SETUP	24
8.5 EUT OPERATION CONDITIONS	24
8.6 TEST RESULTS	24
9 . MAXIMUM OUTPUT POWER	25
9.1 LIMIT	25
9.2 TEST PROCEDURE	25
9.3 DEVIATION FROM STANDARD	25
9.4 TEST SETUP	25
9.5 EUT OPERATION CONDITIONS	25
9.6 TEST RESULTS	25
10 . CONDUCTED SPURIOUS EMISSION	26
10.1 LIMIT	26
10.2 TEST PROCEDURE	26
10.3 DEVIATION FROM STANDARD	26
10.4 TEST SETUP	26
10.5 EUT OPERATION CONDITIONS	26

Table of Contents**Page**

10.6 TEST RESULTS	26
11 . MEASUREMENT INSTRUMENTS LIST	27
12 . EUT TEST PHOTO	29
APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS	33
APPENDIX B - RADIATED EMISSION - 9 KHZ-30 MHZ	36
APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ	41
APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ	44
APPENDIX E - NUMBER OF HOPPING FREQUENCY	69
APPENDIX F - AVERAGE TIME OF OCCUPANCY	71
APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT	76
APPENDIX H - BANDWIDTH	78
APPENDIX I - MAXIMUM OUTPUT POWER	80
APPENDIX J - CONDUCTED SPURIOUS EMISSION	83

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Feb. 26, 2021

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.247)				
Standard(s) Section	Test Item	Test Result	Judgment	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS	-----
15.247(d) 15.205(a) 15.209(a)	Radiated Emission	APPENDIX B APPENDIX C APPENDIX D	PASS	-----
15.247 (a)(1)(iii)	Number of Hopping Frequency	APPENDIX E	PASS	-----
15.247 (a)(1)(iii)	Average Time Of Occupancy	APPENDIX F	PASS	-----
15.247(a)(1)	Hopping Channel Separation	APPENDIX G	PASS	-----
15.247(a)(1)	Bandwidth	APPENDIX H	PASS	-----
15.247(a)(1)	Maximum Output Power	APPENDIX I	PASS	-----
15.247(d)	Conducted Spurious Emission	APPENDIX J	PASS	-----
15.203	Antenna Requirement	-----	PASS	Note(2)

Note:

- (1) "N/A" denotes test is not applicable in this test report
- (2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

1.1 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

1.2 MEASUREMENT UNCERTAINTY

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

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.68

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9kHz ~ 30MHz	-	3.02
		30MHz ~ 200MHz	V	4.26
		30MHz ~ 200MHz	H	3.38
		200MHz ~ 1,000MHz	V	3.98
		200MHz ~ 1,000MHz	H	3.94
		1GHz ~ 6GHz	-	3.96
		6GHz ~ 18GHz	-	5.24
		18GHz ~ 26.5GHz	-	3.62
		26.5GHz ~ 40GHz	-	4.00

C. Other Measurement:

Test Item	Uncertainty
Conducted Spurious Emission	±2.71 dB
Hopping Channel Separation	±53.46 Hz
Maximum Output Power	±0.95 dB
Number of Hopping Frequency	±53.46 Hz
Bandwidth	±3.8 %
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.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25°C	53%	AC 120V/60Hz	Hand Huang
Radiated Emissions-9K-30MHz	25°C	60%	DC 5.2V	Kwok Guo
Radiated Emissions-30 MHz to 1GHz	26°C	52%	DC 5.2V	Kwok Guo
Radiated Emissions-Above 1000 MHz	26°C	52%	DC 5.2V	Kwok Guo
Number of Hopping Frequency	25°C	60%	DC 5.2V	Hayden Chen
Average Time Of Occupancy	25°C	60%	DC 5.2V	Hayden Chen
Hopping Channel Separation	25°C	60%	DC 5.2V	Hayden Chen
Bandwidth	25°C	60%	DC 5.2V	Hayden Chen
Maximum Output Power	25°C	60%	DC 5.2V	Evan Yang
Conducted Spurious Emission	25°C	60%	DC 5.2V	Hayden Chen

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	MI BOX
Brand Name	MI
Test Model	MDZ-22-AG
Series Model	N/A
Model Difference(s)	N/A
Power Source	DC Voltage supplied from AC adapter. Model: AY11BA-AF0522102
Power Rating	I/P:100-240V~ 0.5A 50/60Hz O/P:5.2V --- 2.1A
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Technology	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Bit Rate of Transmitter	1 Mbps, 2 Mbps, 3Mbps
Max. Output Power	1 Mbps: 11.29 dBm (0.0135 W) 2 Mbps: 11.24 dBm (0.0133 W) 3 Mbps: 11.49 dBm (0.0141 W)

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	MI	MDZ-22-AG	PCB	N/A	0.5

Note:

The antenna gain is provided by the manufacturer.

2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX Mode NOTE (1)
Mode 2	TX Mode_3Mbps Channel 00

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

AC power line conducted emissions test	
Final Test Mode	Description
Mode 2	TX Mode_3Mbps Channel 00

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 2	TX Mode_3Mbps Channel 00

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

Conducted test	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

Note:

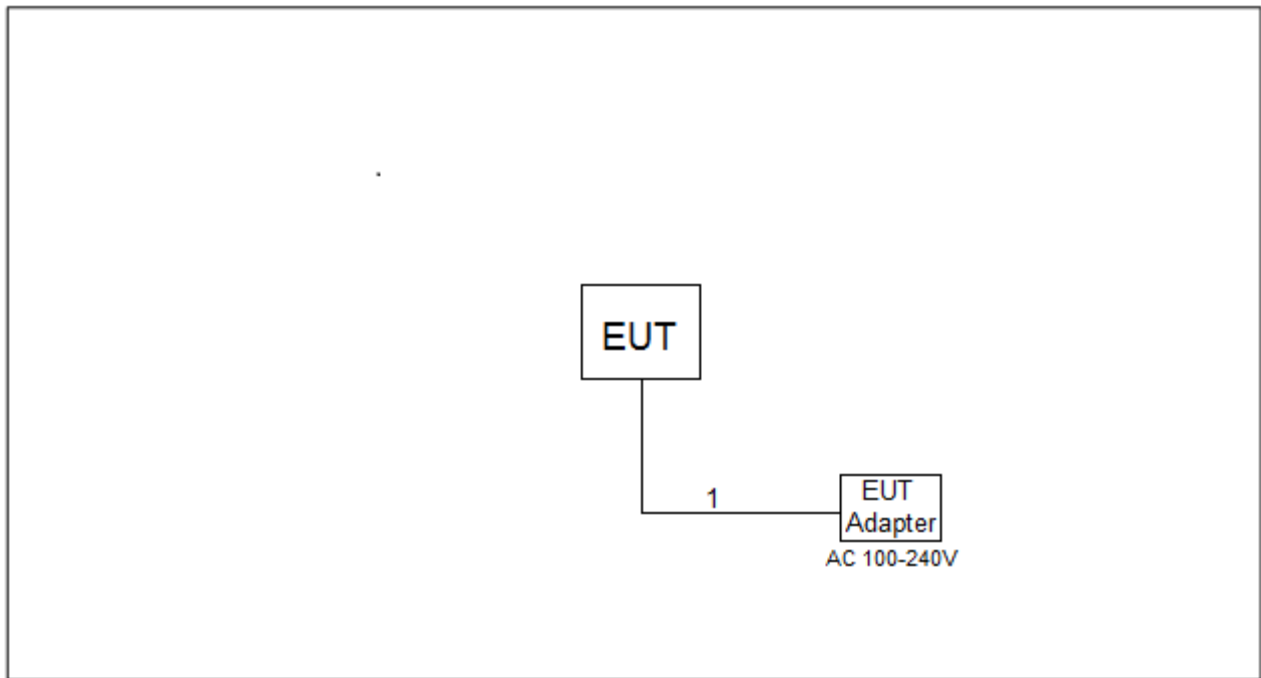
- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurement for Maximum Output Power are tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only the worst cases are documented.
- (3) For AC power line conducted emissions and radiated spurious emissions below 1 GHz test, the 3Mbps channel 00 is found to be the worst case and recorded.
- (4) 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.

2.3 PARAMETERS OF TEST SOFTWARE

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test Software	IPOP V4.1		
Frequency (MHz)	2402	2441	2480
Parameters(1Mbps)	1F	1F	1F
Parameters(2Mbps)	1F	1F	1F
Parameters(3Mbps)	1F	1F	1F

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

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

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.2m

3. AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

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

Note:

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

The following table is the setting of the receiver

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

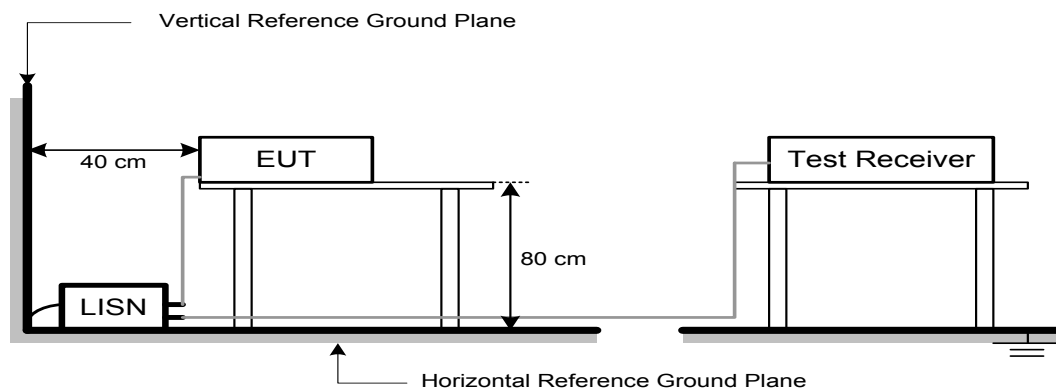
3.2 TEST PROCEDURE

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

3.3 DEVIATION FROM TEST STANDARD

No deviation

3.4 TEST SETUP



3.5 EUT OPERATING CONDITIONS

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

3.6 TEST RESULTS

Please refer to the APPENDIX A.

Remark:

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

4. RADIATED EMISSION TEST

4.1 LIMIT

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

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

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

LIMITS OF RADIATED EMISSION MEASUREMENT (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).

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

4.2 TEST PROCEDURE

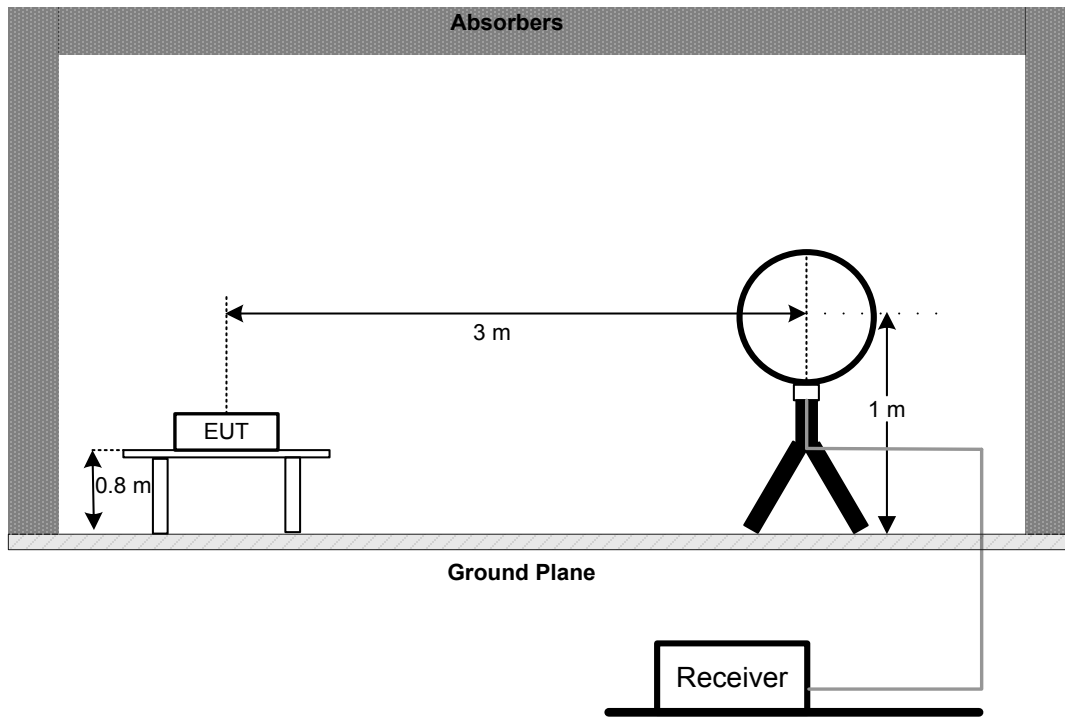
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The height of the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

4.3 DEVIATION FROM TEST STANDARD

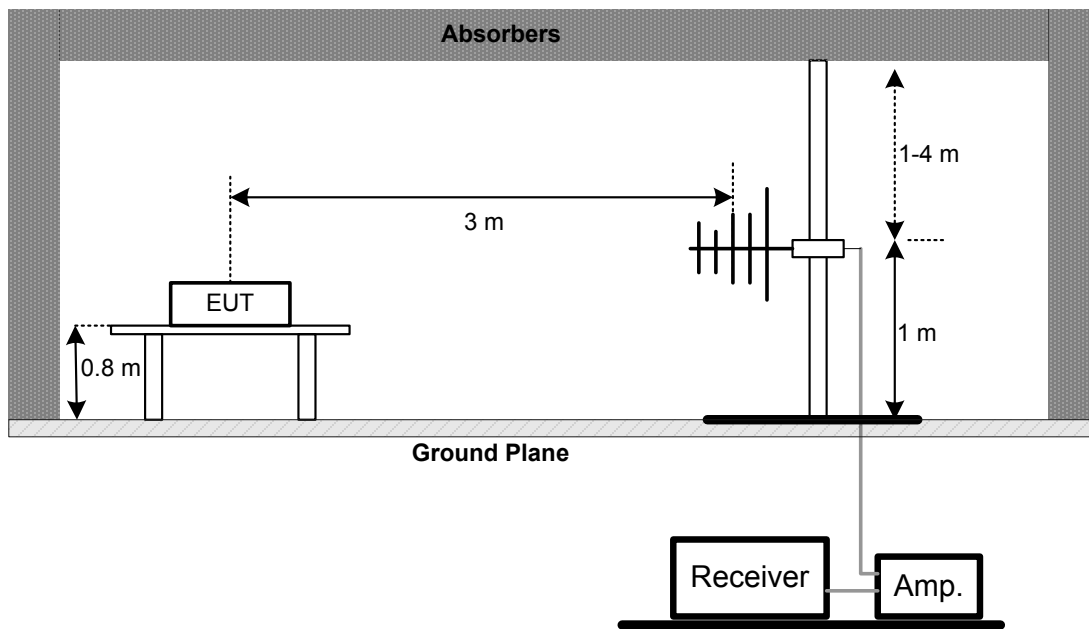
No deviation

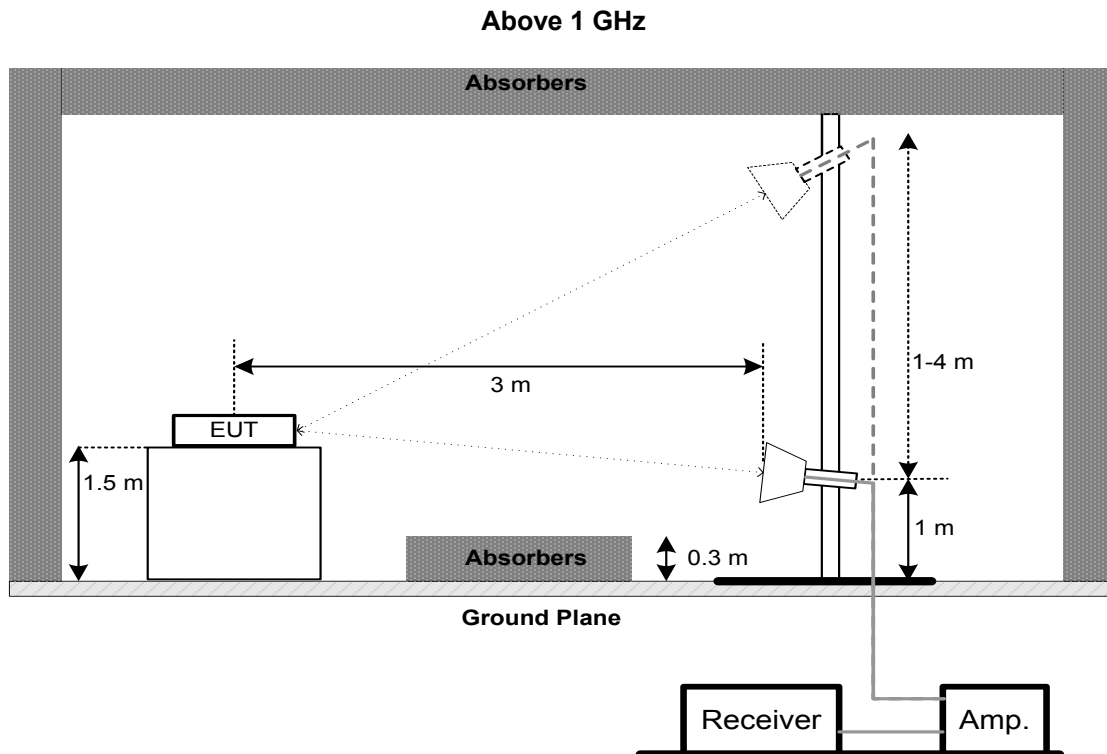
4.4 TEST SETUP

9 kHz-30 MHz



30 MHz to 1 GHz





4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULTS - 9 kHz TO 30 MHz

Please refer to the APPENDIX B

Remark:

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

4.7 TEST RESULTS - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

4.8 TEST RESULTS - ABOVE 1000 MHz

Please refer to the APPENDIX D.

Remark:

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

5. NUMBER OF HOPPING FREQUENCY

5.1 LIMIT

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

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

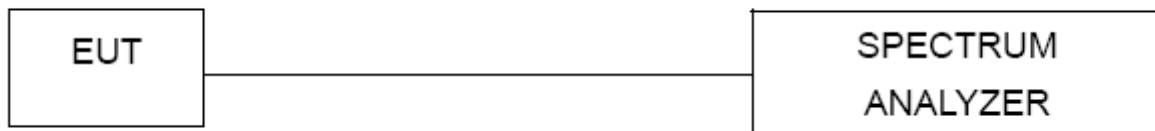
5.2 TEST PROCEDURE

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

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Please refer to the APPENDIX E

6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

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

6.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz
- Use a video trigger with the trigger level set to enable triggering only on full pulses
- Sweep Time is more than once pulse time
- Set the center frequency on any frequency would be measure and set the frequency span to zero span
- Measure the maximum time duration of one single pulse
- Set the EUT for DH1, DH3 and DH5 packet transmitting
- Measure the maximum time duration of one single pulse
 - DH1 Packet permit maximum $1600 / 79 / 2 = 10.12$ hops per second in each channel (1 time slot TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds
 - DH3 Packet permit maximum $1600 / 79 / 4 = 5.06$ hops per second in each channel (3 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds
 - DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

Please refer to the APPENDIX F

7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 LIMIT

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

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

7.2 TEST PROCEDURE

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

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Please refer to the APPENDIX G

8. BANDWIDTH TEST

8.1 LIMIT

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

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

8.2 TEST PROCEDURE

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

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

Please refer to the APPENDIX H

9. MAXIMUM OUTPUT POWER

9.1 LIMIT

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

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

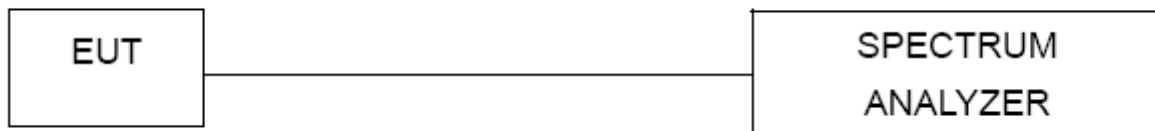
9.2 TEST PROCEDURE

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

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

9.6 TEST RESULTS

Please refer to the APPENDIX I

10. CONDUCTED SPURIOUS EMISSION

10.1 LIMIT

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

10.2 TEST PROCEDURE

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

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

10.6 TEST RESULTS

Please refer to the APPENDIX J

11. MEASUREMENT INSTRUMENTS LIST

AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Feb. 28, 2021
2	LISN	EMCO	3816/2	52765	Mar. 01, 2021
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 28, 2021
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 01, 2021
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Mar. 10, 2021
7	643 Shield Room	ETS	6*4*3m	N/A	N/A

Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	EM	EM-6876-1	230	Apr. 16, 2021
2	Cable	N/A	RG 213/U	N/A	May 29, 2021
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 28, 2021
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
5	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021

Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2021
2*	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021
3	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 22, 2021
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
8	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021

Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	May 12, 2021
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jul. 07, 2021
3	Amplifier	Agilent	8449B	3008A02333	Mar. 01, 2021
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 07, 2021
5	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	N/A	EMC104-SM-SM-6000	N/A	May 09, 2021
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
10	Filter	STI	STI15-9912	N/A	Jul. 25, 2021
11	966 Chambe Room	RM	9*6*6m	N/A	Jul. 25, 2021

Number of Hopping Frequency & Average Time of Occupancy & Hopping Channel Separation & Bandwidth & Maximum Output Power & Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Jul. 25, 2021
2	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 11, 2021
3	DC Block	Mini	N/A	N/A	N/A
4	RF Cable	Tongkaichuan	N/A	N/A	N/A

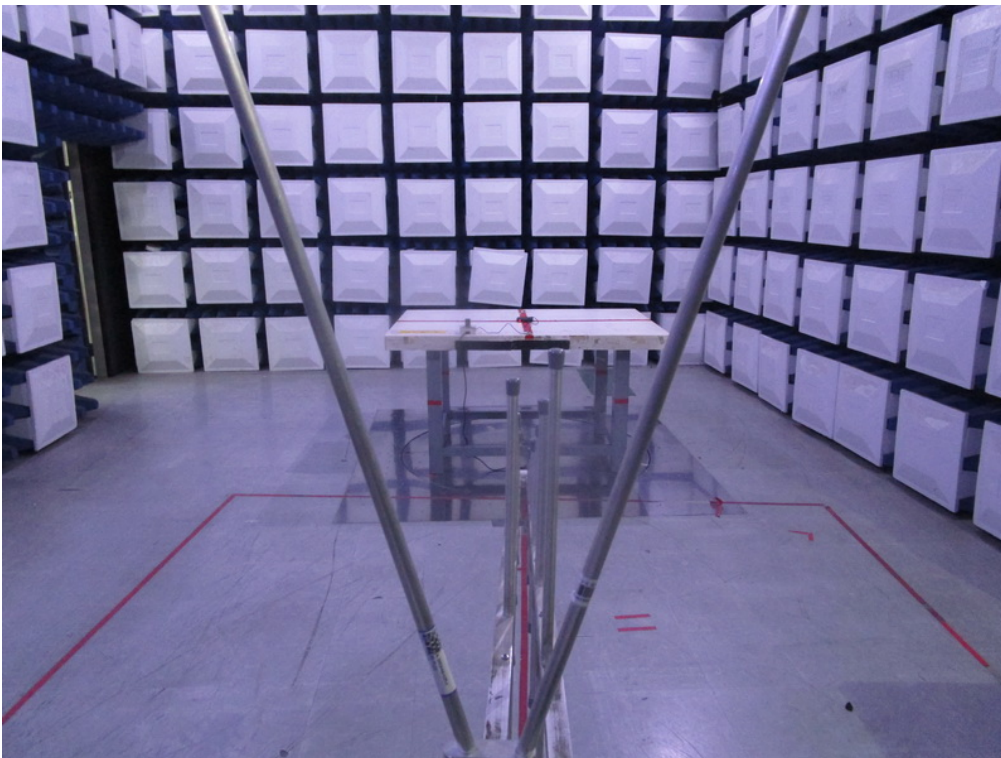
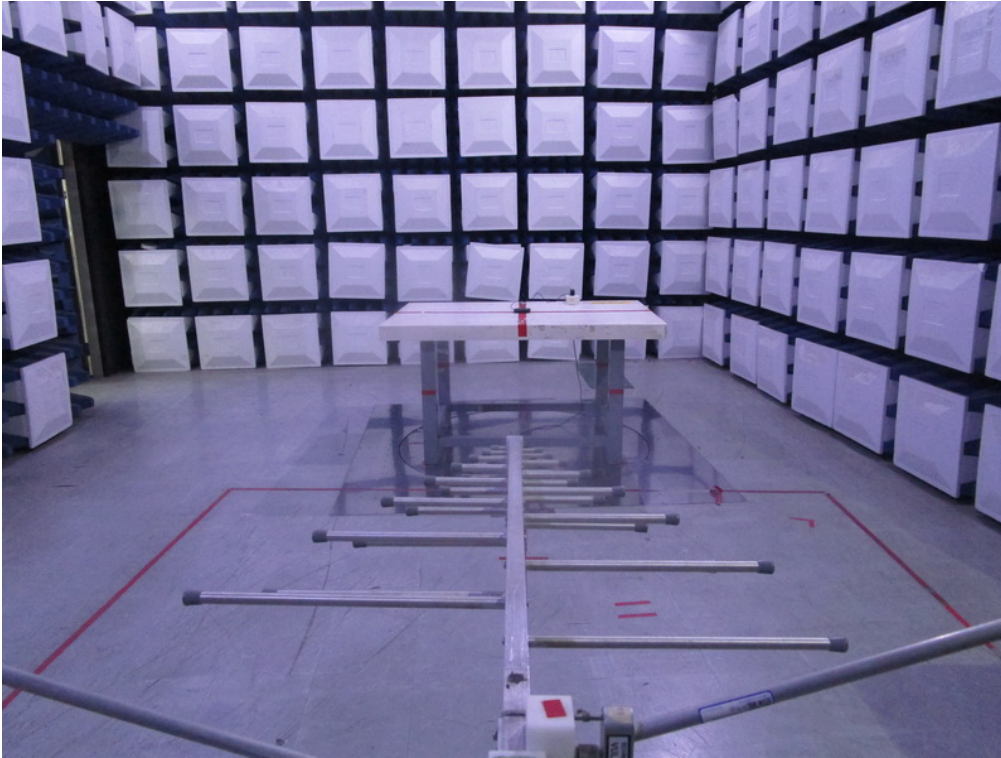
Remark "N/A" denotes no model name, serial no. or calibration specified.

"*" calibration period of equipment list is three year.

Except * item, all calibration period of equipment list is one year.

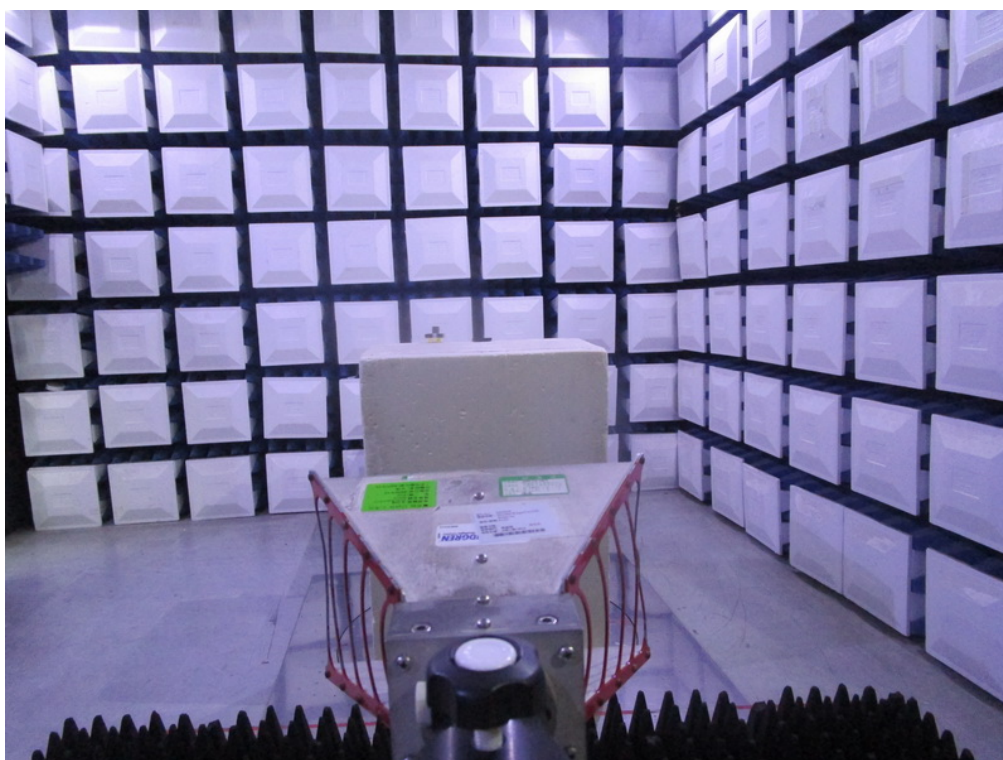
12. EUT TEST PHOTO**AC Power Line Conducted Emissions Test Photos**

Radiated Emissions Test Photos**9 kHz to 30 MHz**

Radiated Emissions Test Photos**30 MHz to 1000 MHz**

Radiated Emissions Test Photos

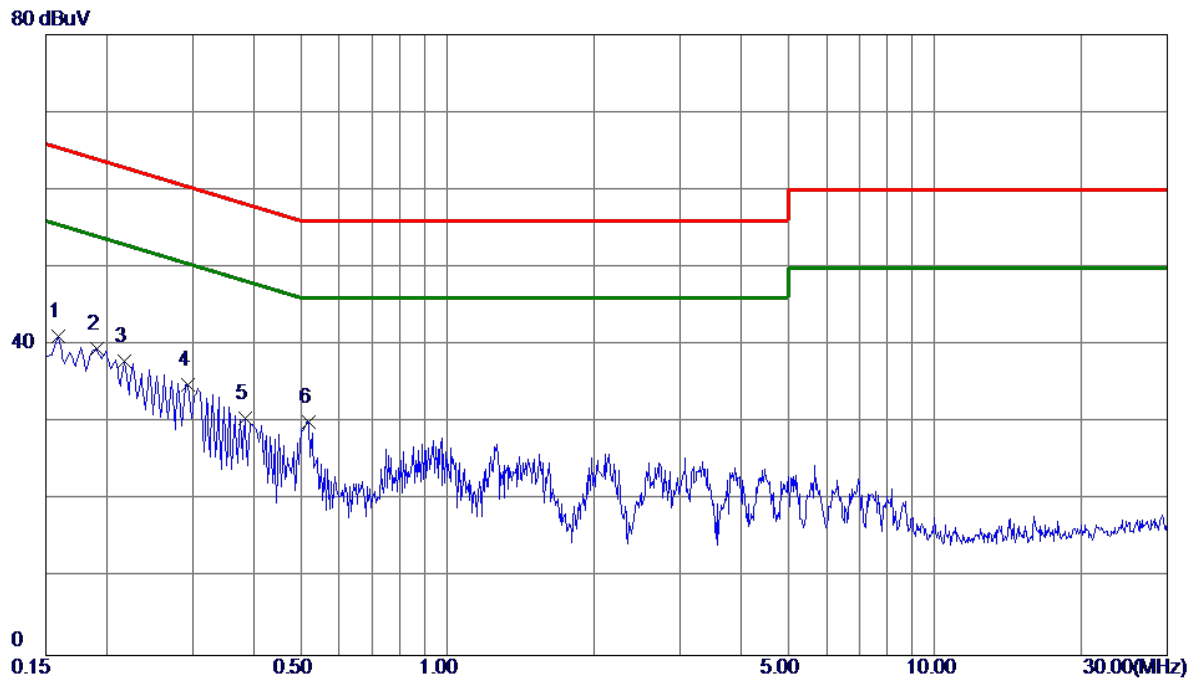
Above 1 GHz



APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode: TX Mode Channel 00_3Mbps

Line



No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1590	31.44	9.74	41.18	65.52	-24.34	Peak	
2	0.1905	29.68	9.88	39.56	64.01	-24.45	Peak	
3	0.2175	28.02	9.90	37.92	62.91	-24.99	Peak	
4	0.2940	25.06	9.88	34.94	60.41	-25.47	Peak	
5	0.3840	20.59	9.90	30.49	58.19	-27.70	Peak	
6	0.5190	20.17	9.93	30.10	56.00	-25.90	Peak	

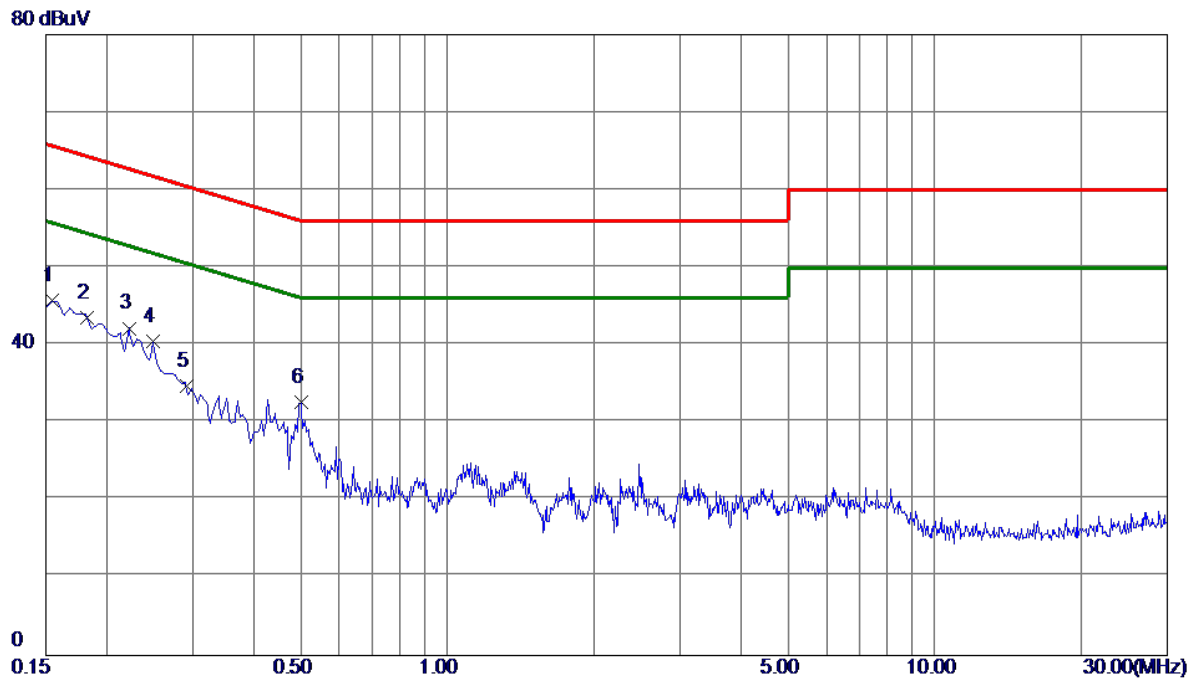
REMARKS:

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

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

Test Mode: TX Mode Channel 00_3Mbps

Line



No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1545	36.03	9.70	45.73	65.75	-20.02	Peak	
2	0.1825	33.70	9.86	43.56	64.37	-20.81	Peak	
3	0.2220	32.27	9.89	42.16	62.74	-20.58	Peak	
4	0.2490	30.55	9.87	40.42	61.79	-21.37	Peak	
5	0.2909	24.88	9.88	34.76	60.50	-25.74	Peak	
6	0.5010	22.75	9.93	32.68	56.00	-23.32	Peak	

REMARKS:

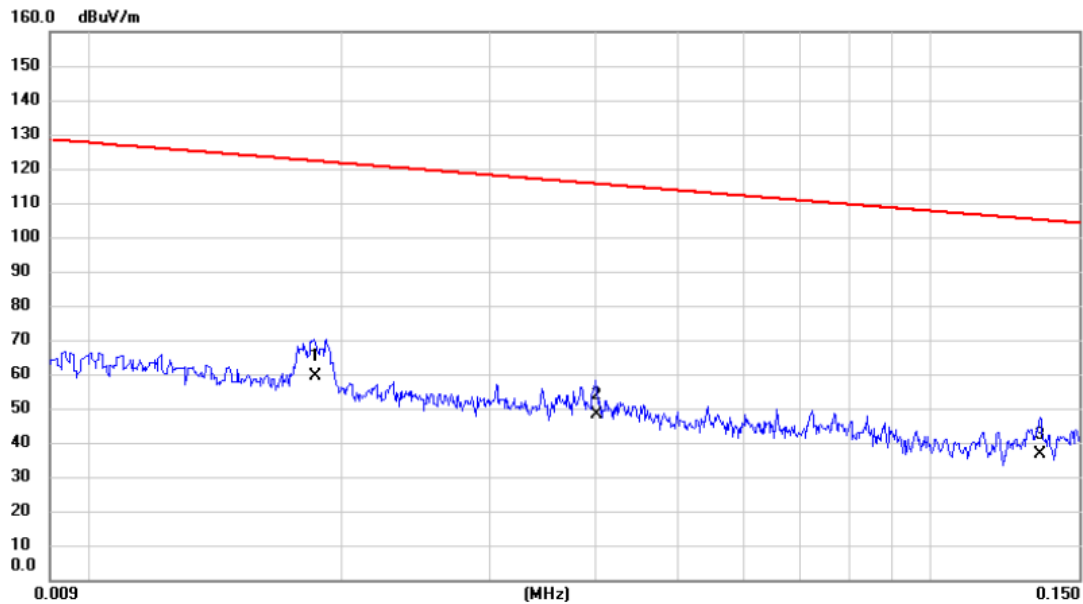
(1) Measurement Value = Reading Level + Correct Factor.

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

APPENDIX B - RADIATED EMISSION - 9 KHZ-30 MHZ

Test Mode: TX Mode Channel 00 _3Mbps

Ant 0°

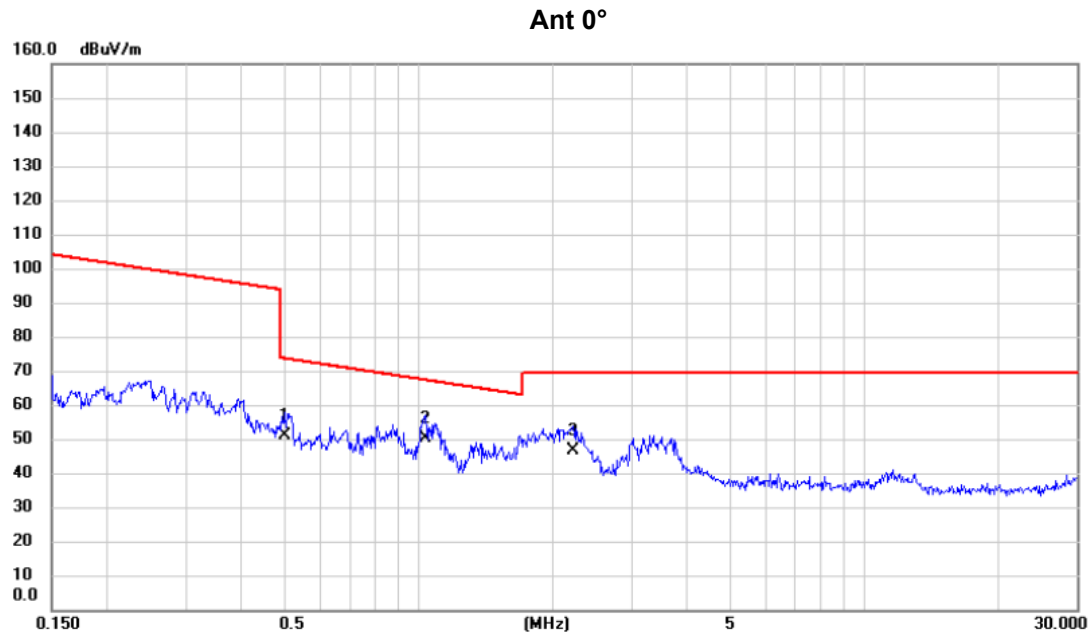


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0186	45.12	14.24	59.36	122.21	-62.85	AVG	
2		0.0401	34.24	13.90	48.14	115.54	-67.40	AVG	
3		0.1348	23.12	13.55	36.67	105.01	-68.34	AVG	

REMARKS:

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

Test Mode: TX Mode Channel 00 _3Mbps

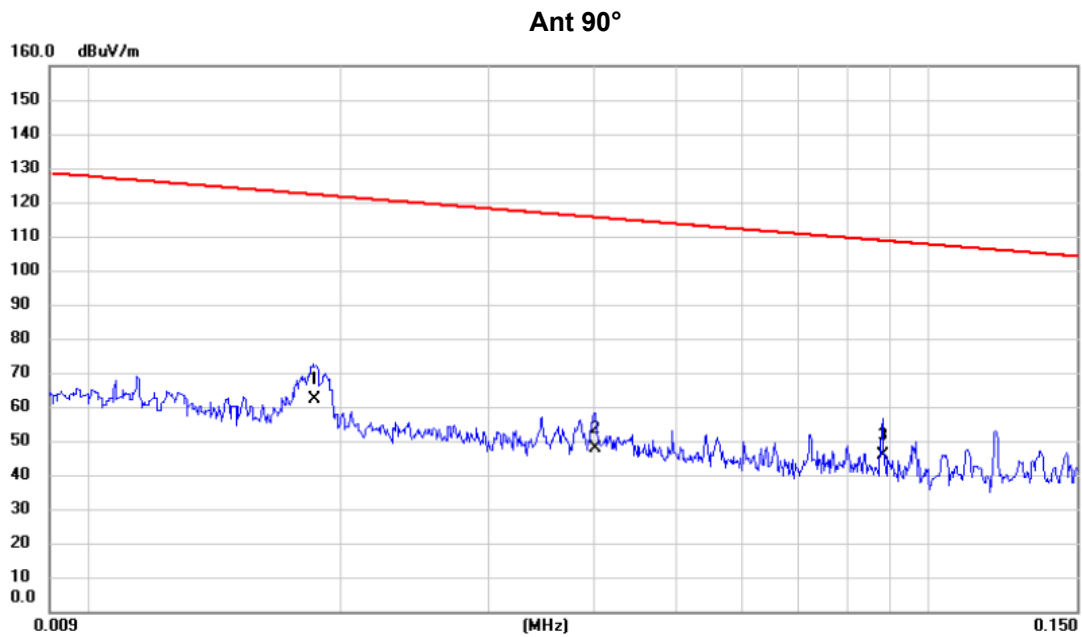


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.5020	38.12	13.06	51.18	73.59	-22.41	AVG	
2	*	1.0320	37.73	12.48	50.21	67.33	-17.12	QP	
3		2.2250	35.01	11.68	46.69	69.54	-22.85	QP	

REMARKS:

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

Test Mode: TX Mode Channel 00 _3Mbps

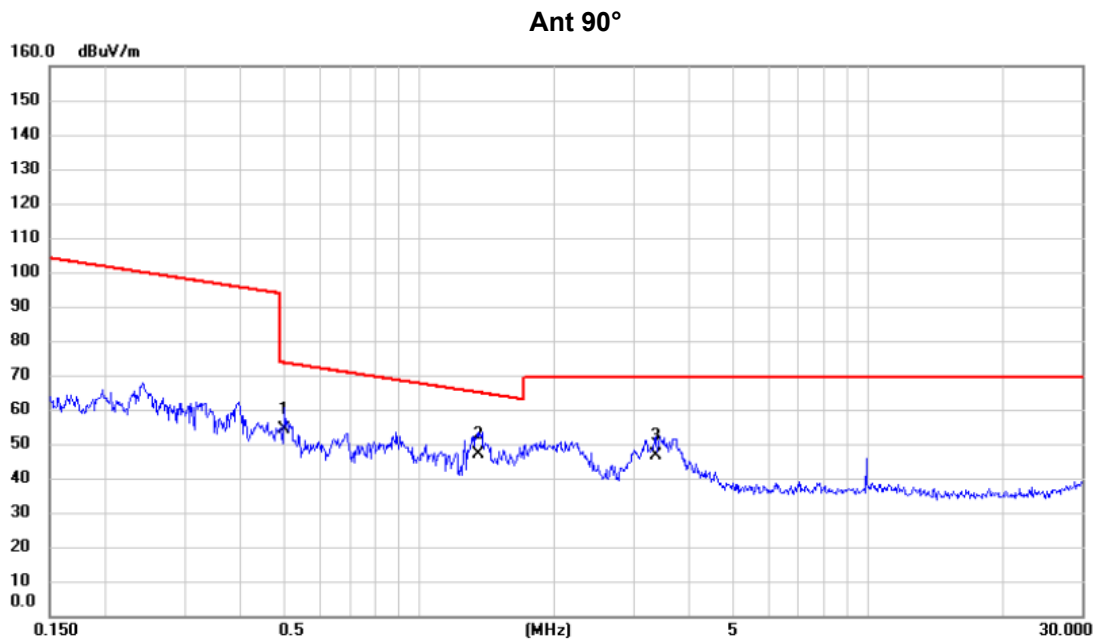


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0186	48.04	14.24	62.28	122.21	-59.93	AVG	
2		0.0401	33.93	13.90	47.83	115.54	-67.71	AVG	
3		0.0881	32.25	13.54	45.79	108.71	-62.92	AVG	

REMARKS:

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

Test Mode: TX Mode Channel 00 _3Mbps



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.4994	41.33	13.06	54.39	73.63	-19.24	QP	
2	*	1.3521	34.56	12.26	46.82	64.98	-18.16	QP	
3		3.3635	35.54	11.13	46.67	69.54	-22.87	QP	

REMARKS:

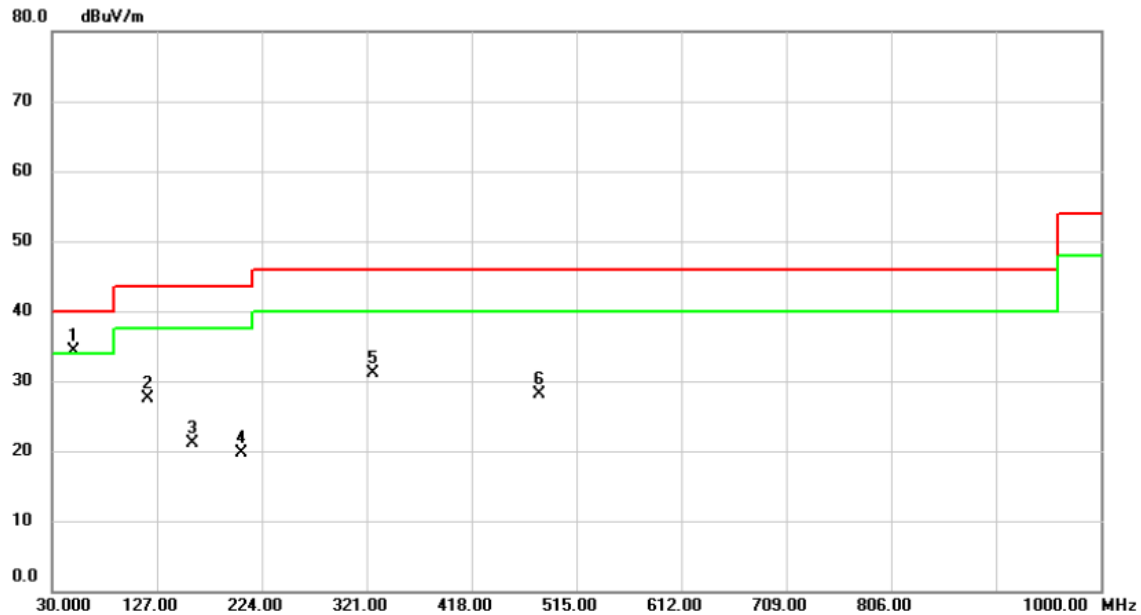
(1) Measurement Value = Reading Level + Correct Factor.

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

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

Test Mode: TX Mode Channel 00_3Mbps

Vertical

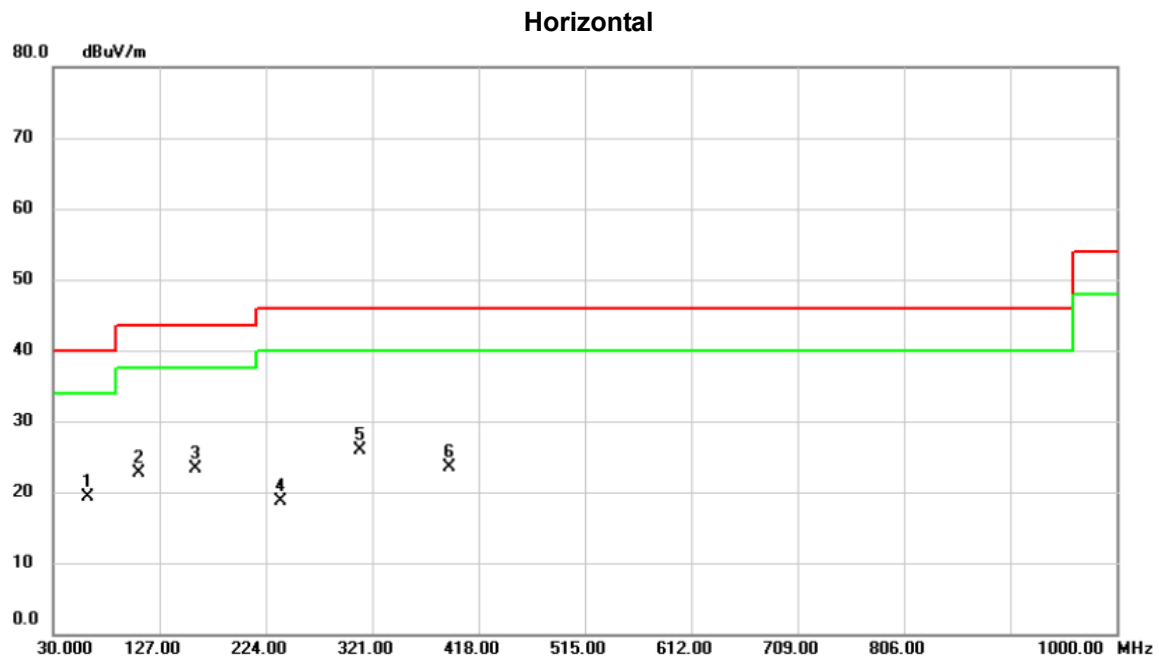


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	49.4000	48.00	-13.65	34.35	40.00	-5.65	peak	
2		118.2700	40.45	-12.99	27.46	43.50	-16.04	peak	
3		159.9800	31.79	-10.67	21.12	43.50	-22.38	peak	
4		204.6000	34.64	-15.00	19.64	43.50	-23.86	peak	
5		326.8200	41.70	-10.57	31.13	46.00	-14.87	peak	
6		480.0800	35.53	-7.41	28.12	46.00	-17.88	peak	

REMARKS:

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

Test Mode: TX Mode Channel 00_3Mbps



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		61.0400	33.90	-14.58	19.32	40.00	-20.68	peak	
2		108.5700	37.10	-14.33	22.77	43.50	-20.73	peak	
3		159.9800	33.92	-10.67	23.25	43.50	-20.25	peak	
4		237.5800	32.31	-13.65	18.66	46.00	-27.34	peak	
5	*	309.3600	36.76	-10.85	25.91	46.00	-20.09	peak	
6		391.8100	32.64	-9.21	23.43	46.00	-22.57	peak	

REMARKS:

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

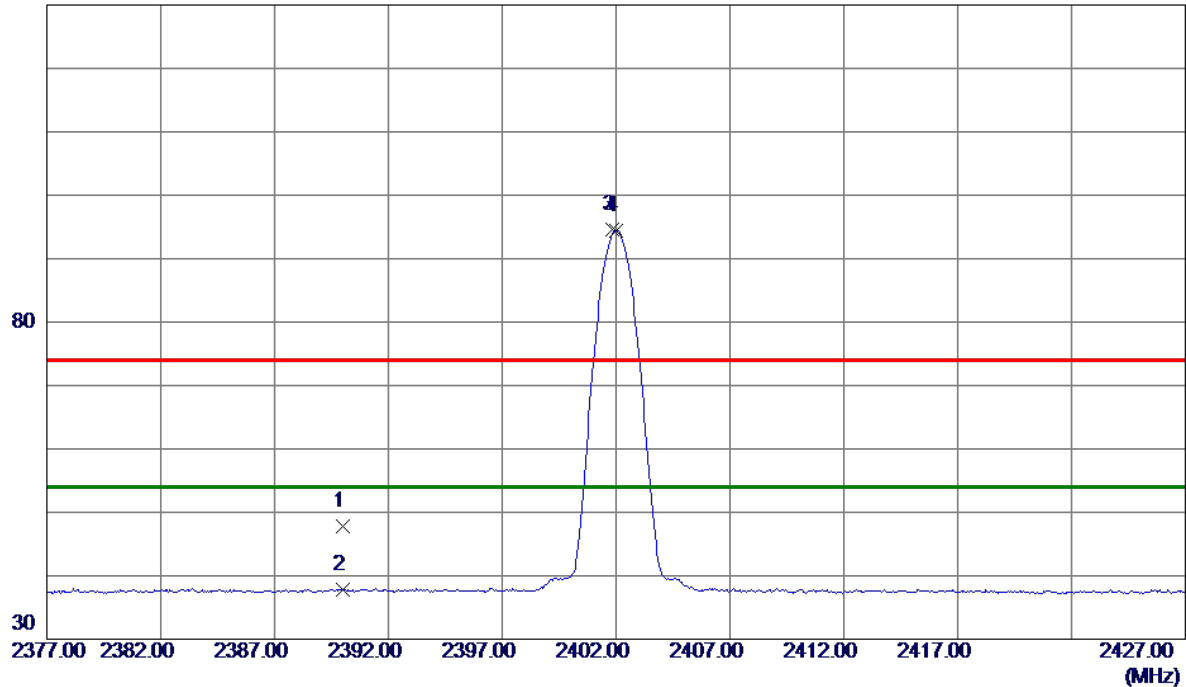
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

Test Mode: TX 2402 MHz _CH00_1Mbps

Vertical

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	40.46	7.26	47.72	74.00	-26.28	Peak	
2	2390.0000	30.46	7.26	37.72	54.00	-16.28	AVG	
3	2401.8500	87.38	7.26	94.64	74.00	20.64	Peak	No Limit
4 *	2402.0000	87.13	7.26	94.39	54.00	40.39	AVG	No Limit

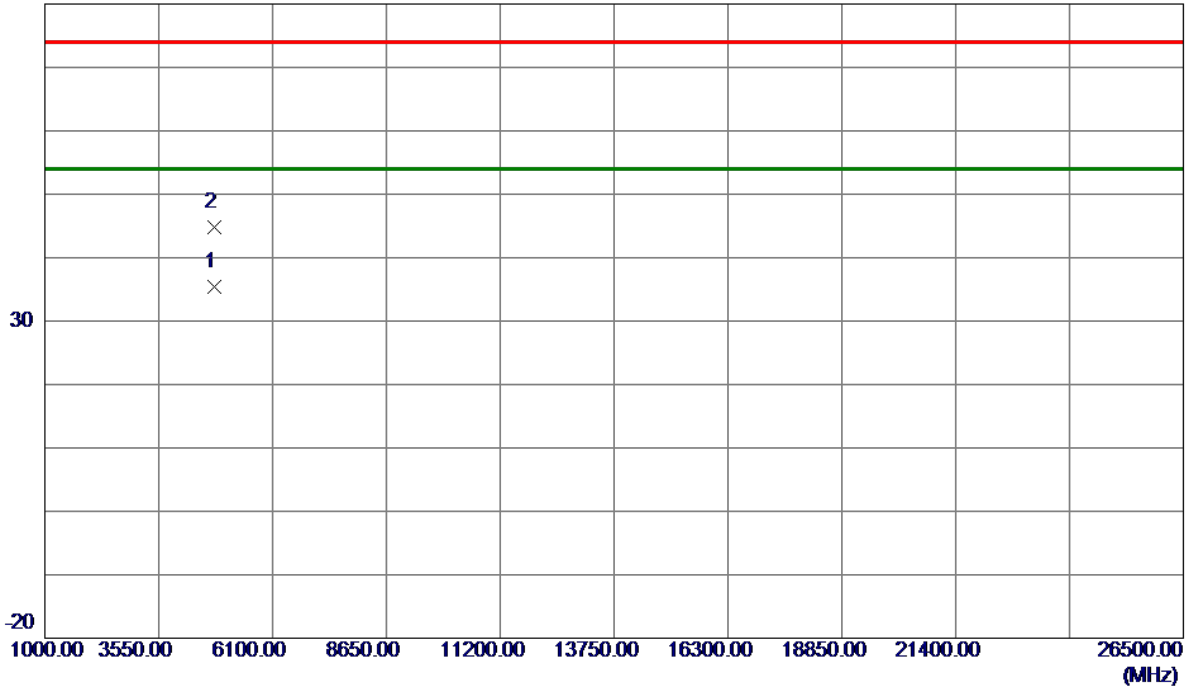
REMARKS:

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

Test Mode:	TX 2402 MHz _CH00_1Mbps
------------	-------------------------

Vertical

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4803.8740	30.91	4.40	35.31	54.00	-18.69	AVG	
2	4804.4780	40.32	4.40	44.72	74.00	-29.28	Peak	

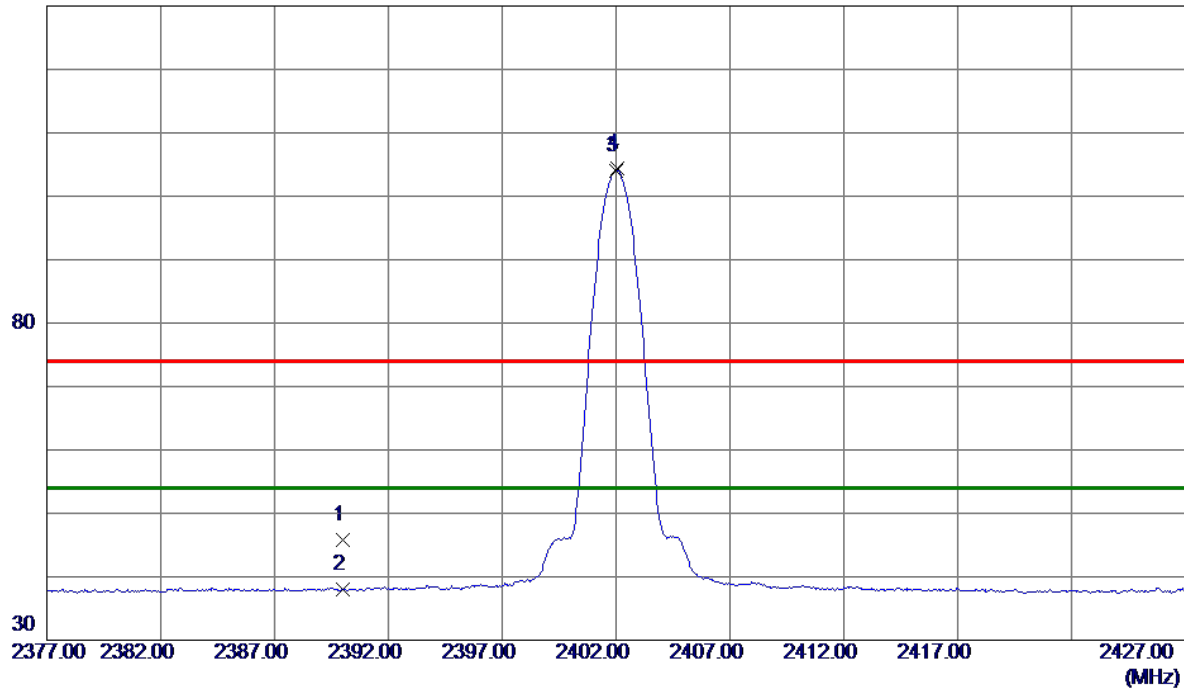
REMARKS:

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

Test Mode: TX 2402 MHz _CH00_1Mbps

Horizontal

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	38.61	7.26	45.87	74.00	-28.13	Peak	
2	2390.0000	30.65	7.26	37.91	54.00	-16.09	AVG	
3 *	2402.0000	96.83	7.26	104.09	54.00	50.09	AVG	No Limit
4	2402.0500	97.12	7.26	104.38	74.00	30.38	Peak	No Limit

REMARKS:

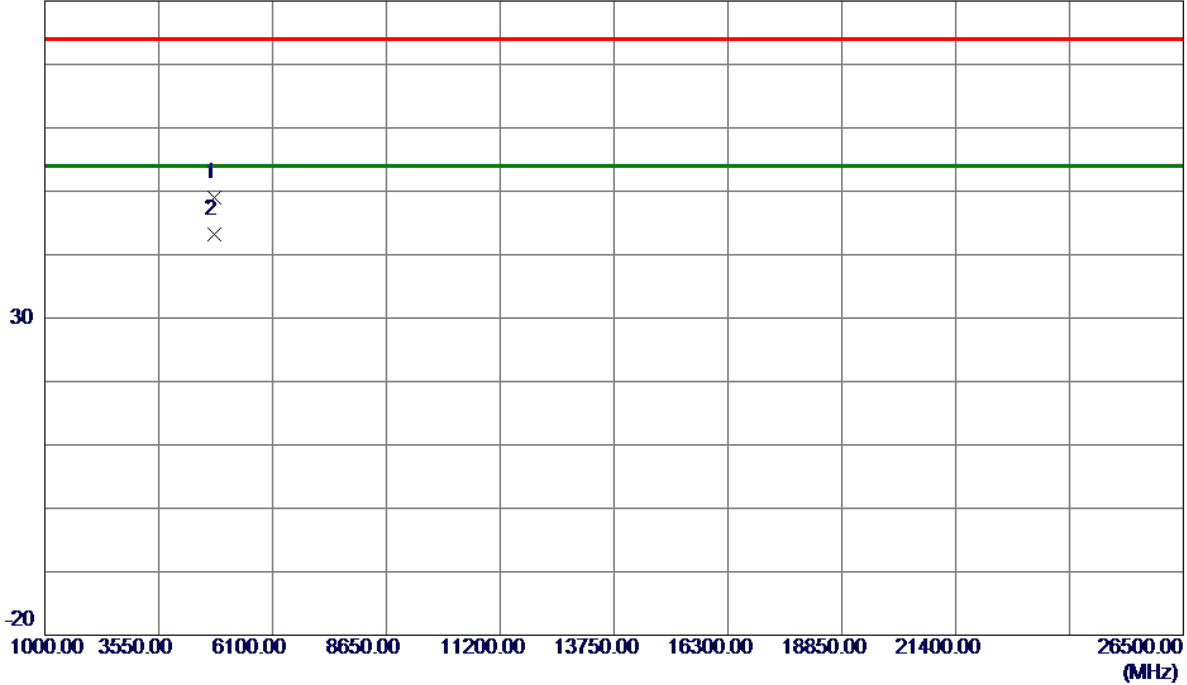
(1) Measurement Value = Reading Level + Correct Factor.

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

Test Mode:	TX 2402 MHz _CH00_1Mbps
------------	-------------------------

Horizontal

80 dBuV/m



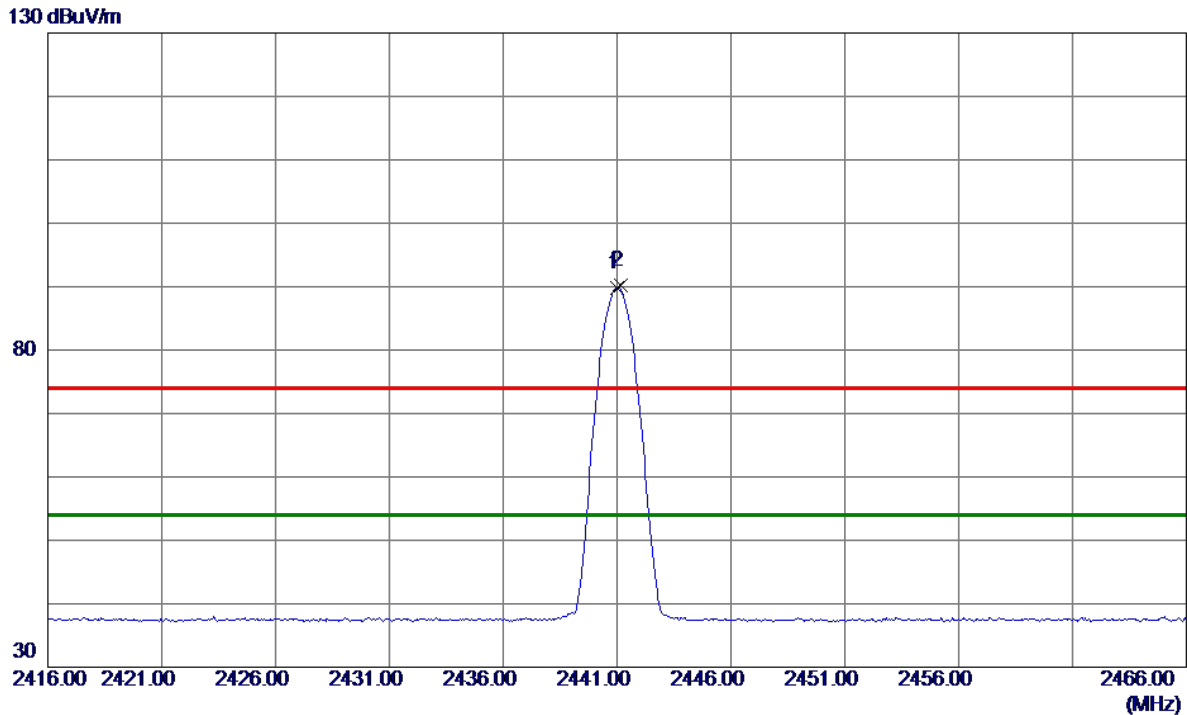
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4804.0099	44.63	4.40	49.03	74.00	-24.97	Peak	
2 *	4804.0170	38.86	4.40	43.26	54.00	-10.74	AVG	

REMARKS:

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

Test Mode:	TX 2441 MHz _CH39_1Mbps
------------	-------------------------

Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2441.0000	82.59	7.25	89.84	54.00	35.84	AVG	No Limit
2	2441.1500	82.92	7.25	90.17	74.00	16.17	Peak	No Limit

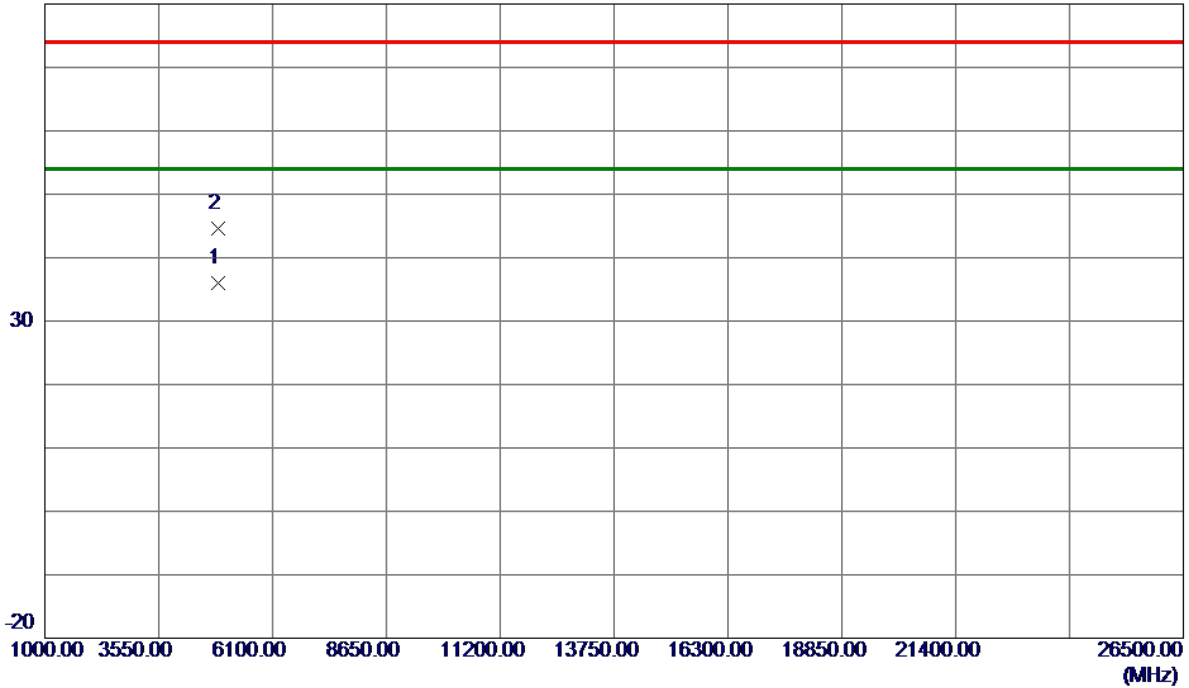
REMARKS:

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

Test Mode:	TX 2441 MHz _CH39_1Mbps
------------	-------------------------

Vertical

80 dBuV/m



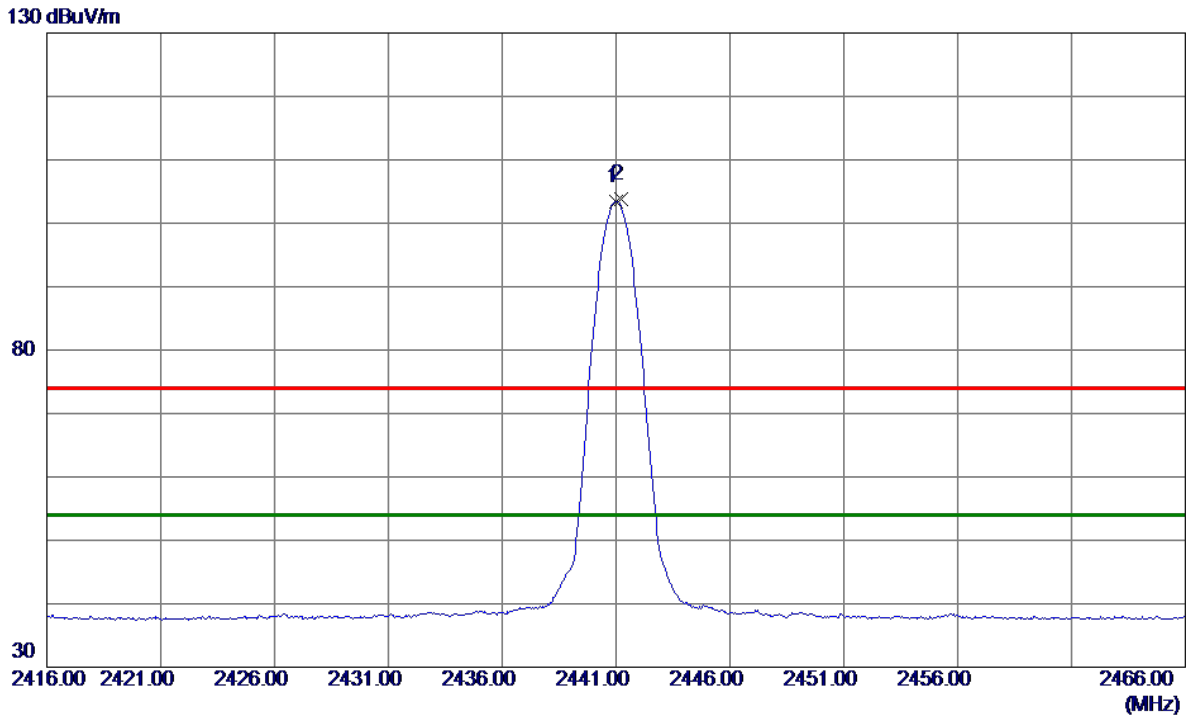
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4881.7190	31.47	4.60	36.07	54.00	-17.93	AVG	
2	4882.6900	39.91	4.61	44.52	74.00	-29.48	Peak	

REMARKS:

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

Test Mode: TX 2441 MHz _CH39_1Mbps

Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2441.0000	96.17	7.25	103.42	54.00	49.42	AVG	No Limit
2	2441.2000	96.49	7.25	103.74	74.00	29.74	Peak	No Limit

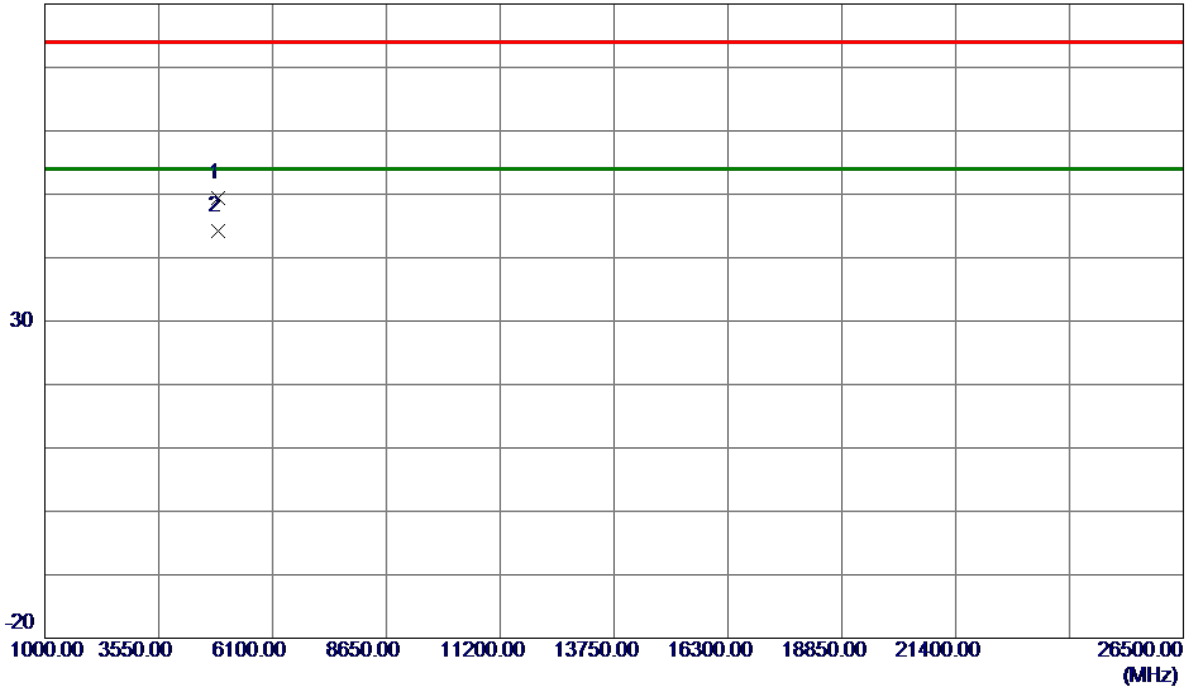
REMARKS:

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

Test Mode:	TX 2441 MHz _CH39_1Mbps
------------	-------------------------

Horizontal

80 dBuV/m



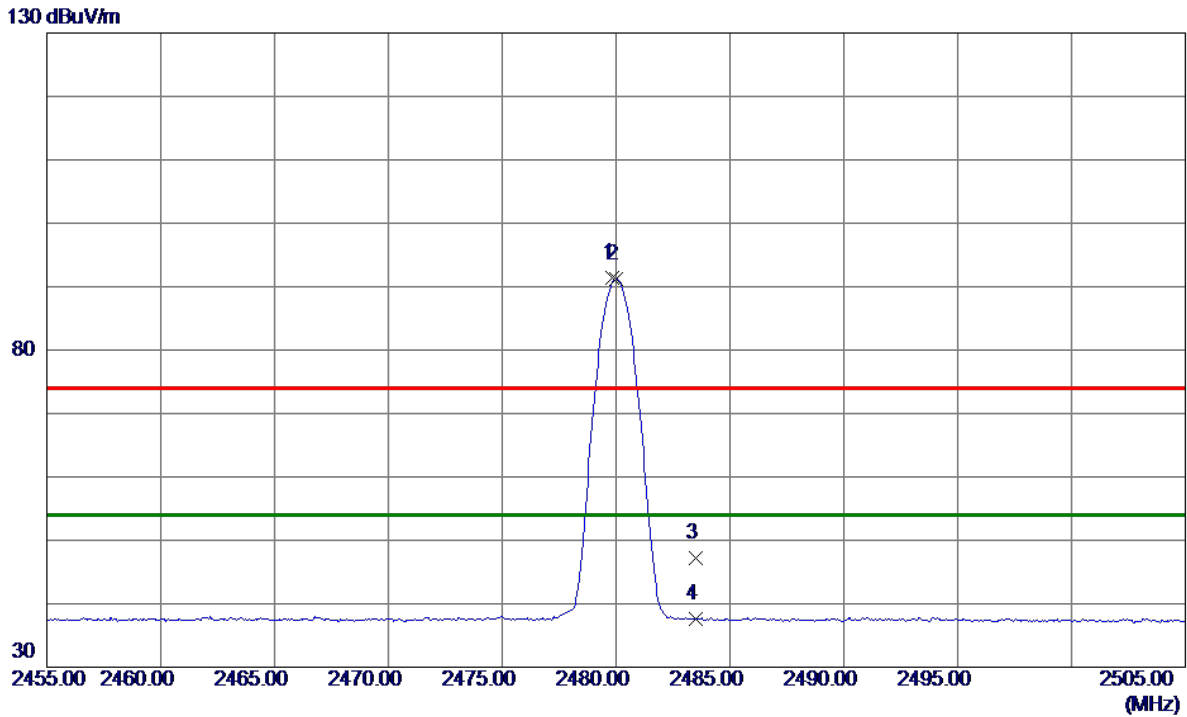
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4881.5350	44.84	4.60	49.44	74.00	-24.56	Peak	
2 *	4881.9780	39.51	4.60	44.11	54.00	-9.89	AVG	

REMARKS:

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

Test Mode: TX 2480 MHz _CH78_1Mbps

Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.8500	84.15	7.25	91.40	74.00	17.40	Peak	No Limit
2 *	2480.0000	83.87	7.25	91.12	54.00	37.12	AVG	No Limit
3	2483.5000	39.91	7.25	47.16	74.00	-26.84	Peak	
4	2483.5000	30.33	7.25	37.58	54.00	-16.42	AVG	

REMARKS:

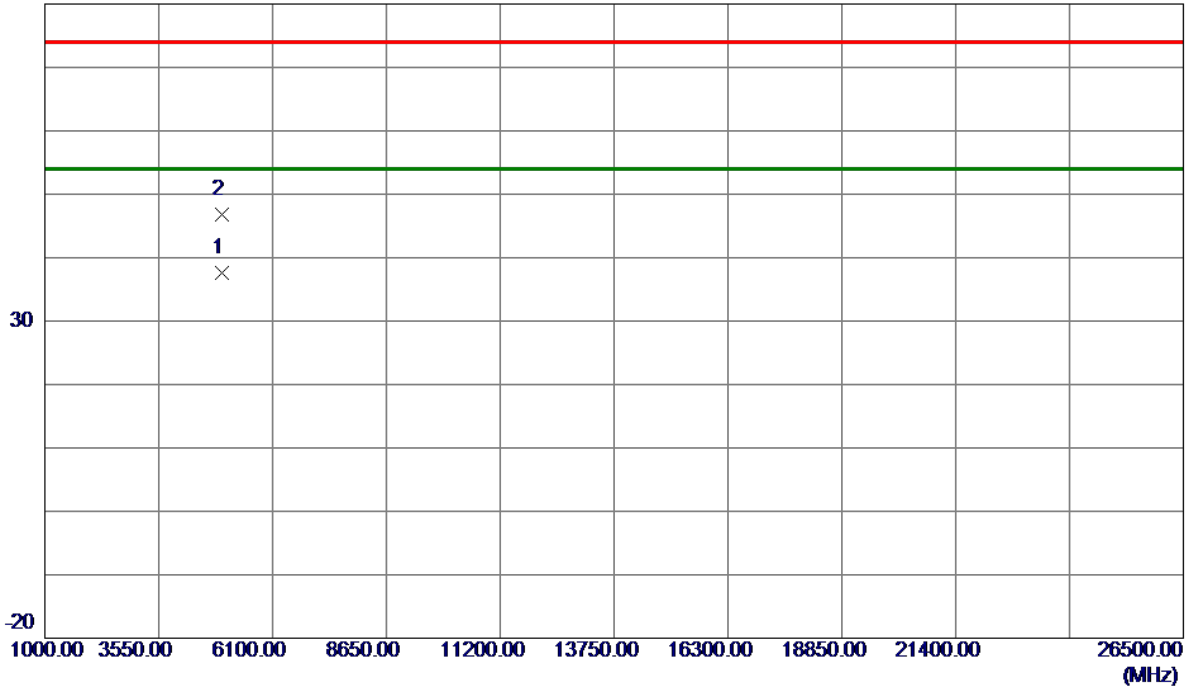
(1) Measurement Value = Reading Level + Correct Factor.

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

Test Mode:	TX 2480 MHz _CH78_1Mbps
------------	-------------------------

Vertical

80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4959.7719	32.75	4.81	37.56	54.00	-16.44	AVG	
2	4960.1090	42.00	4.81	46.81	74.00	-27.19	Peak	

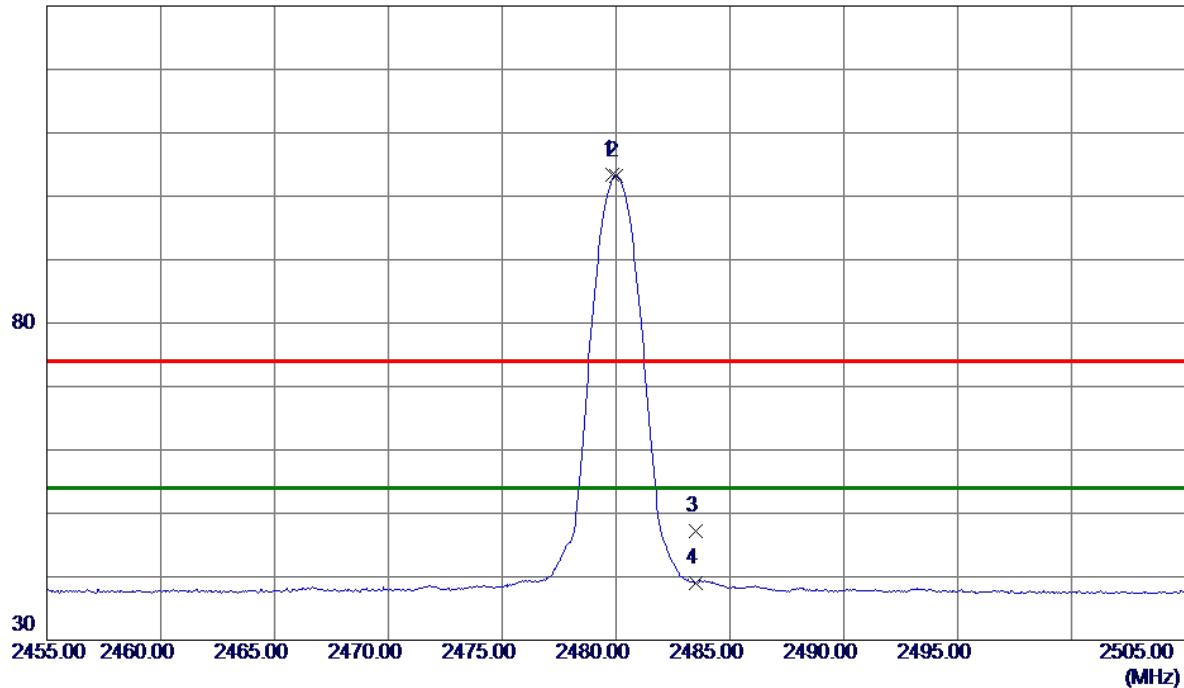
REMARKS:

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

Test Mode: TX 2480 MHz _CH78_1Mbps

Horizontal

130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.8500	96.21	7.25	103.46	74.00	29.46	Peak	No Limit
2 *	2480.0000	95.91	7.25	103.16	54.00	49.16	AVG	No Limit
3	2483.5000	40.04	7.25	47.29	74.00	-26.71	Peak	
4	2483.5000	31.69	7.25	38.94	54.00	-15.06	AVG	

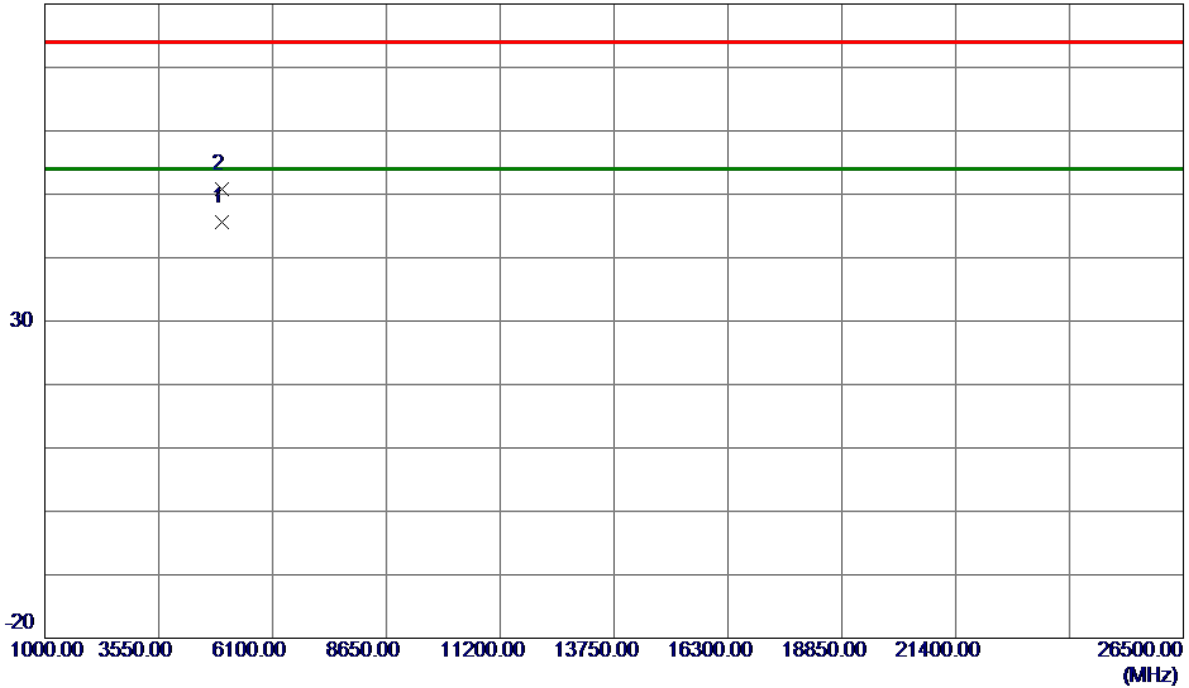
REMARKS:

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

Test Mode:	TX 2480 MHz _CH78_1Mbps
------------	-------------------------

Horizontal

80 dBuV/m



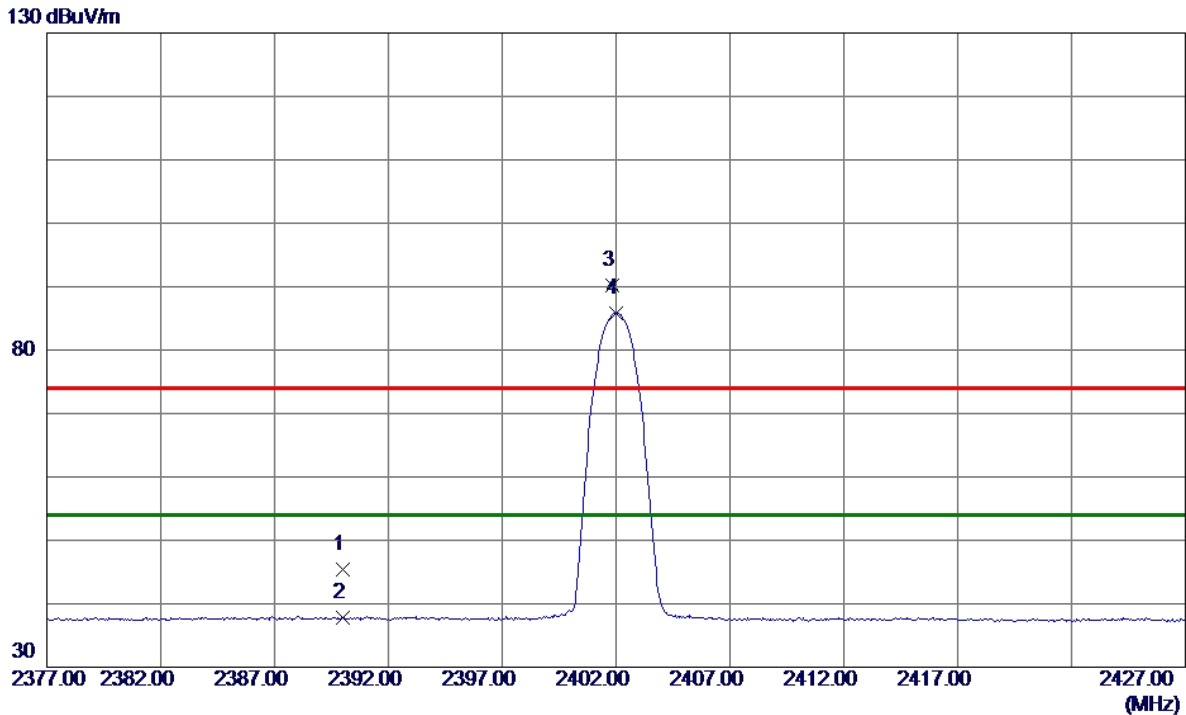
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4960.0170	40.87	4.81	45.68	54.00	-8.32	AVG	
2	4960.3910	46.07	4.81	50.88	74.00	-23.12	Peak	

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. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	38.19	7.26	45.45	74.00	-28.55	Peak	
2	2390.0000	30.59	7.26	37.85	54.00	-16.15	AVG	
3	2401.8500	82.87	7.26	90.13	74.00	16.13	Peak	No Limit
4 *	2402.0000	78.56	7.26	85.82	54.00	31.82	AVG	No Limit

REMARKS:

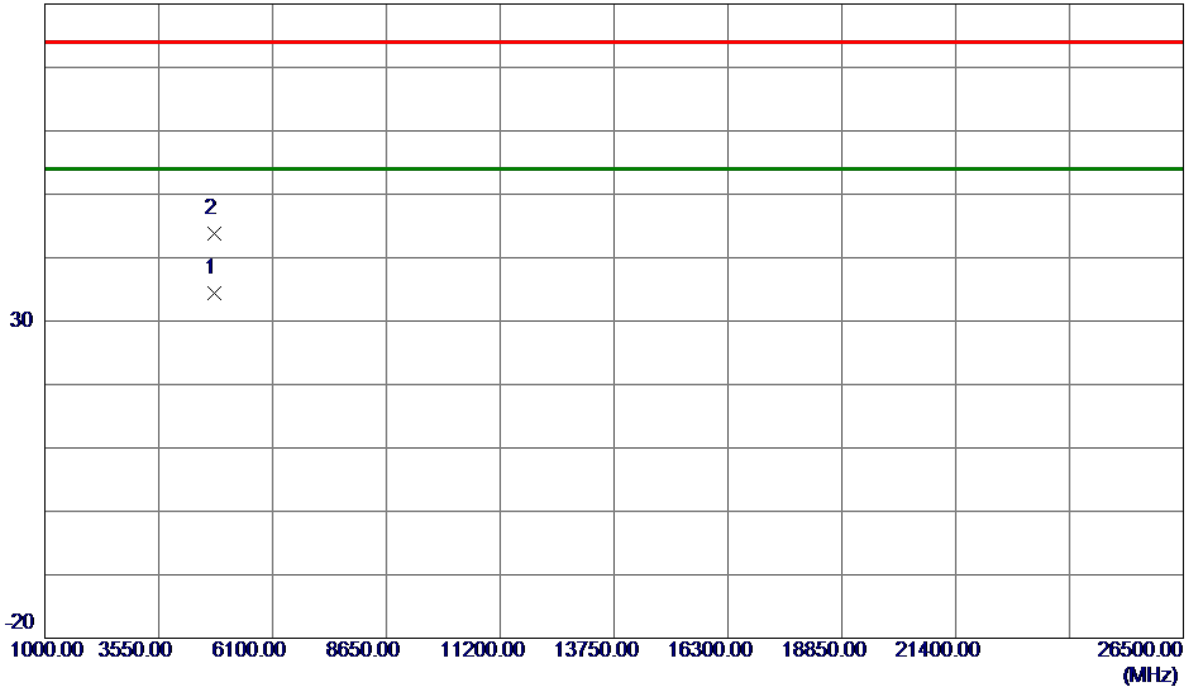
(1) Measurement Value = Reading Level + Correct Factor.

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

Test Mode:	TX 2402 MHz _CH00_3Mbps
------------	-------------------------

Vertical

80 dBuV/m



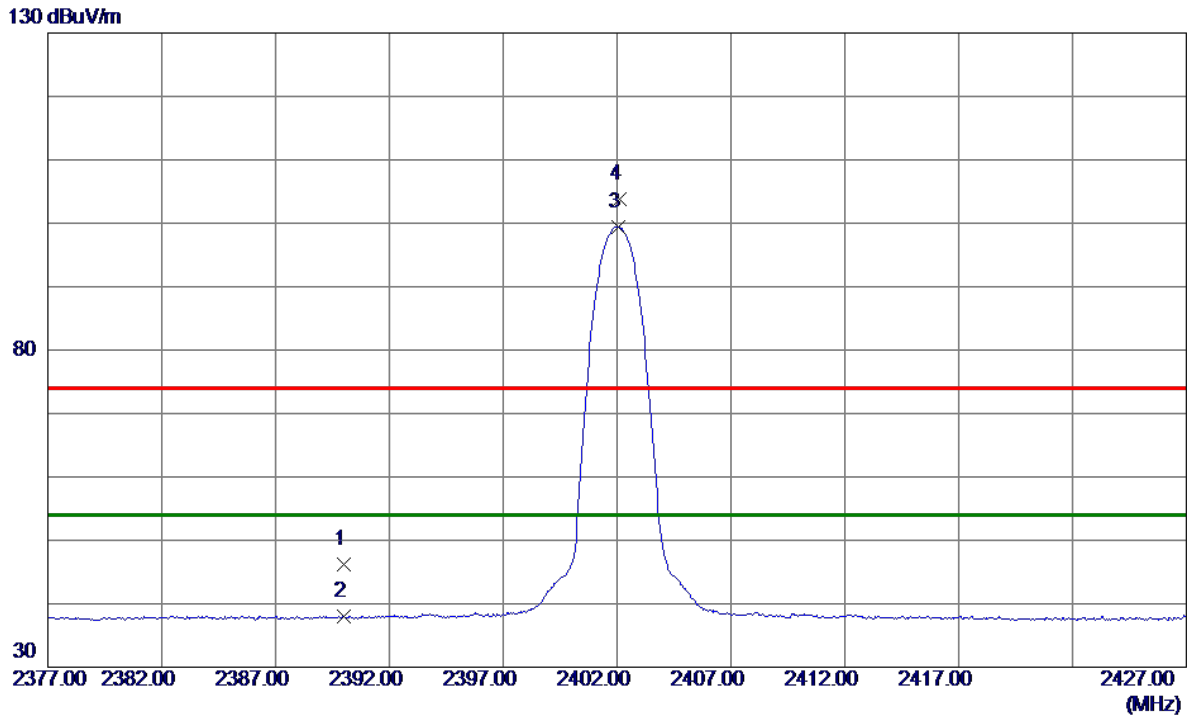
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4804.5500	30.03	4.40	34.43	54.00	-19.57	AVG	
2	4804.8600	39.35	4.40	43.75	74.00	-30.25	Peak	

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. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.0000	38.96	7.26	46.22	74.00	-27.78	Peak	
2	2390.0000	30.71	7.26	37.97	54.00	-16.03	AVG	
3 *	2402.0500	92.14	7.26	99.40	54.00	45.40	AVG	No Limit
4	2402.1000	96.46	7.26	103.72	74.00	29.72	Peak	No Limit

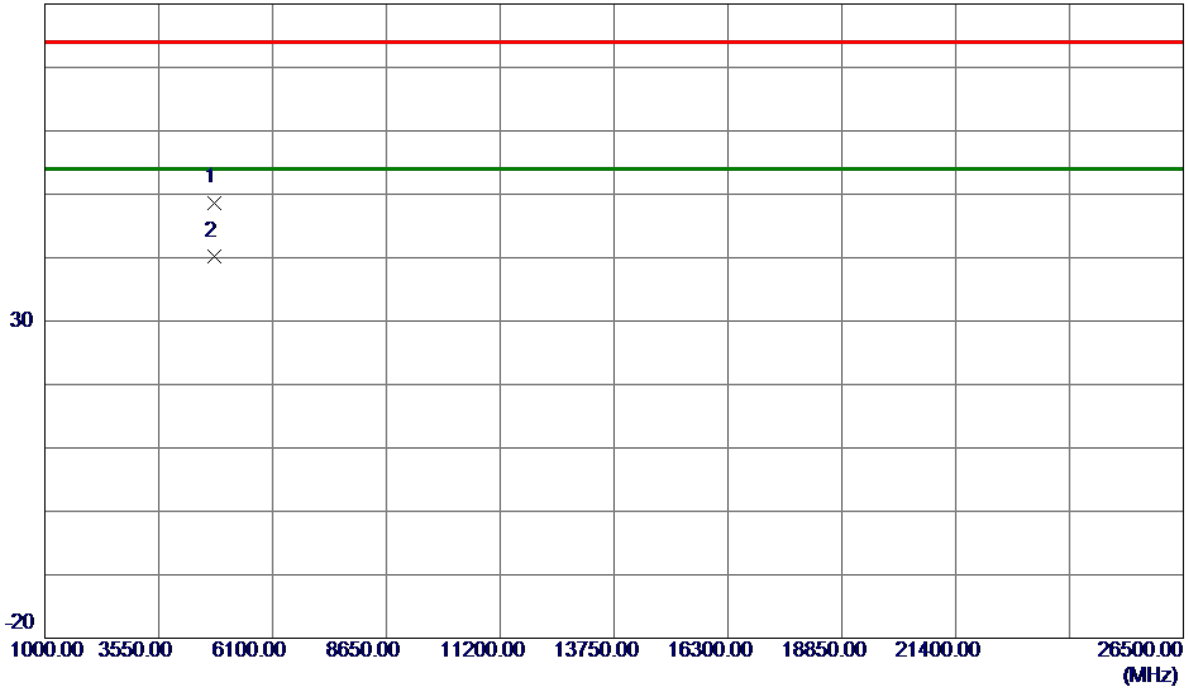
REMARKS:

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

Test Mode:	TX 2402 MHz _CH00_3Mbps
------------	-------------------------

Horizontal

80 dBuV/m



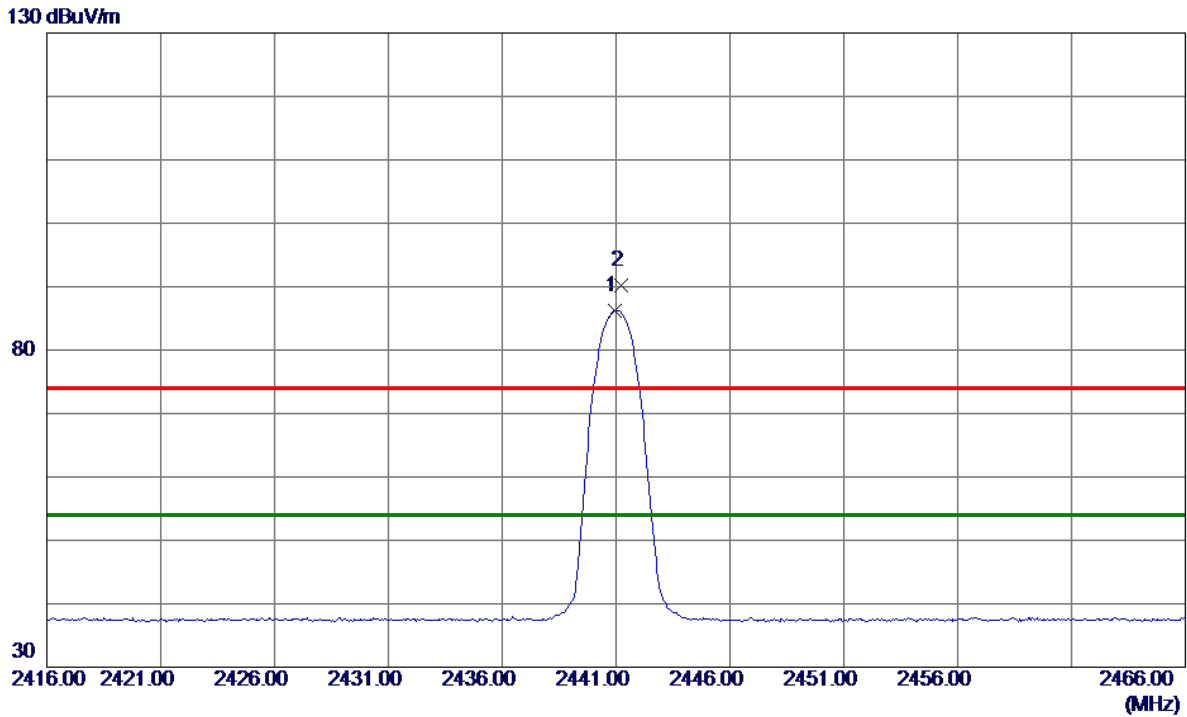
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4803.6560	44.30	4.40	48.70	74.00	-25.30	Peak	
2 *	4803.9129	35.84	4.40	40.24	54.00	-13.76	AVG	

REMARKS:

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

Test Mode:	TX 2441 MHz _CH39_3Mbps
------------	-------------------------

Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2440.9500	79.03	7.25	86.28	54.00	32.28	AVG	No Limit
2	2441.2000	82.94	7.25	90.19	74.00	16.19	Peak	No Limit

REMARKS:

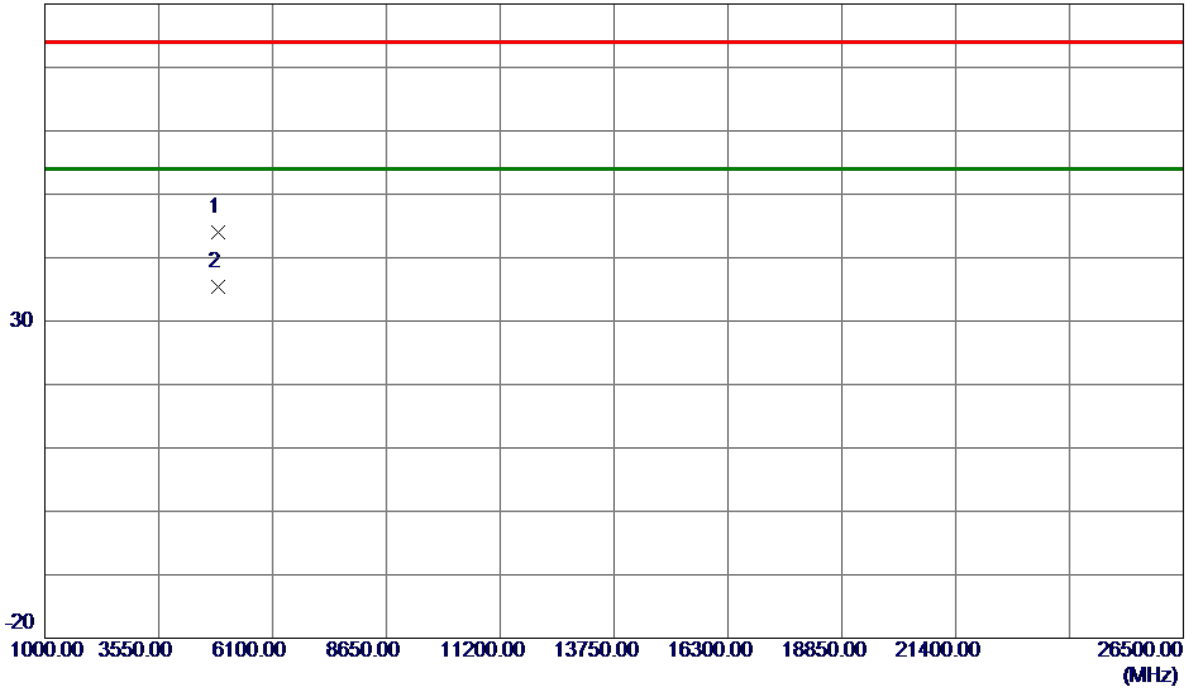
(1) Measurement Value = Reading Level + Correct Factor.

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

Test Mode:	TX 2441 MHz _CH39_3Mbps
------------	-------------------------

Vertical

80 dBuV/m



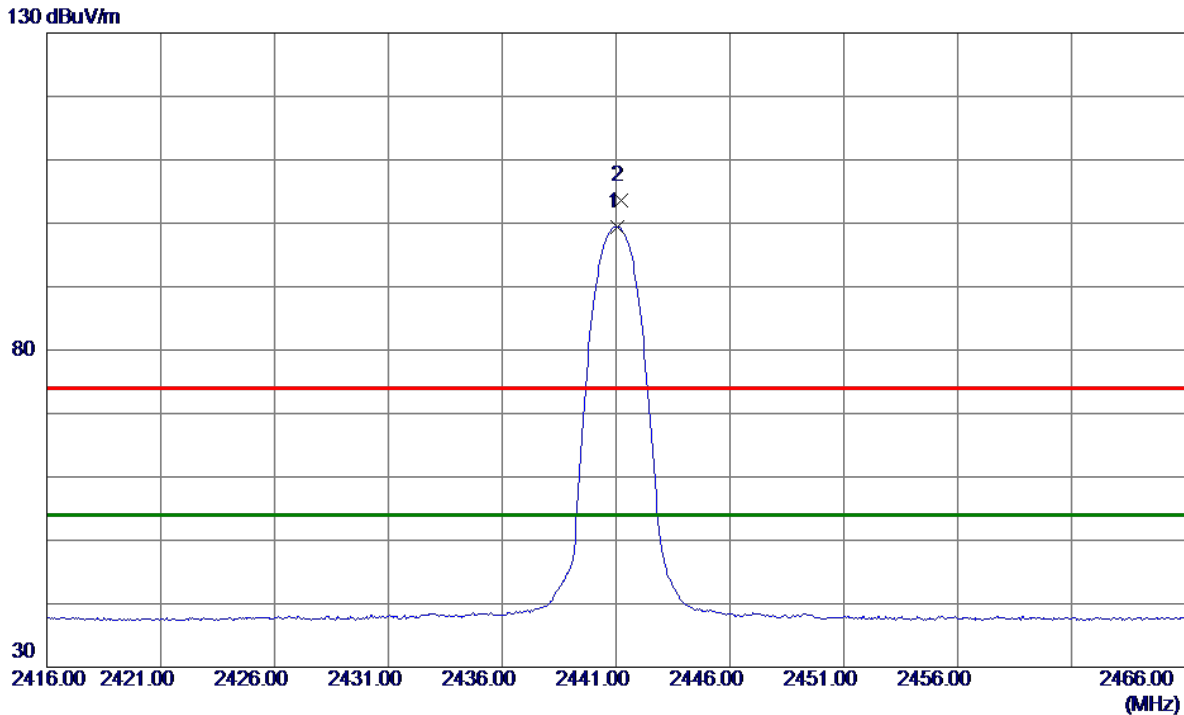
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4881.1349	39.31	4.60	43.91	74.00	-30.09	Peak	
2 *	4882.0040	30.88	4.61	35.49	54.00	-18.51	AVG	

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. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2441.0500	92.18	7.25	99.43	54.00	45.43	AVG	No Limit
2	2441.2000	96.43	7.25	103.68	74.00	29.68	Peak	No Limit

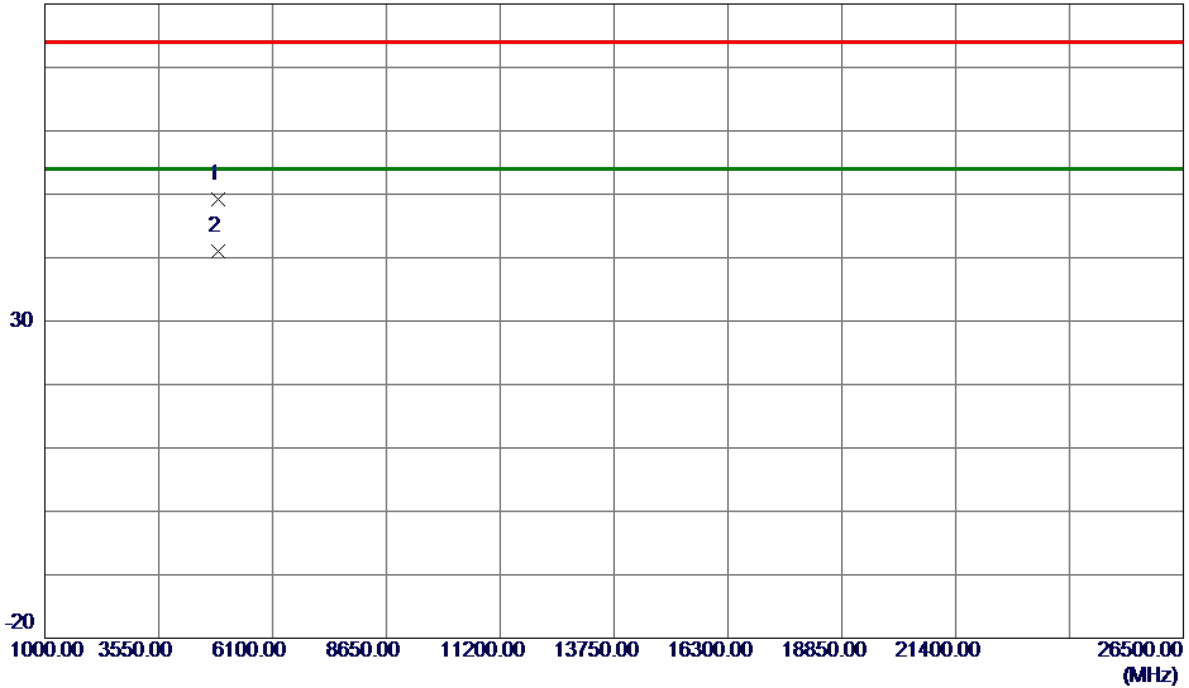
REMARKS:

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

Test Mode:	TX 2441 MHz _CH39_3Mbps
------------	-------------------------

Horizontal

80 dBuV/m



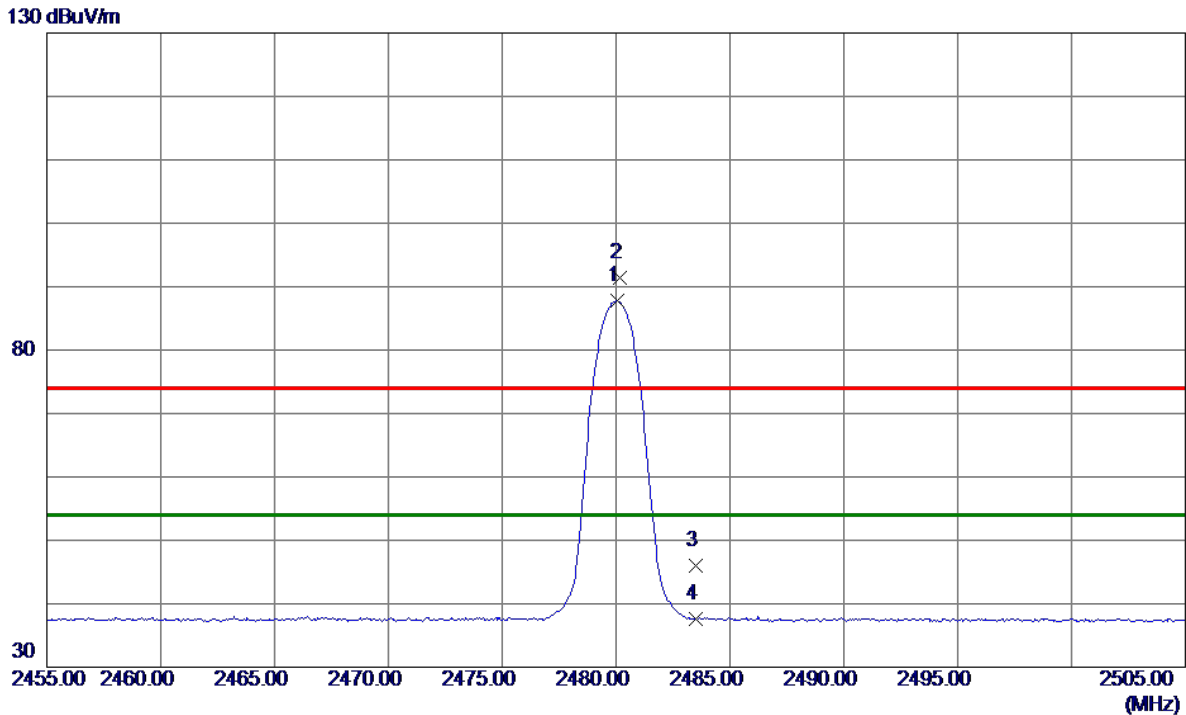
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4881.6050	44.60	4.60	49.20	74.00	-24.80	Peak	
2 *	4881.8180	36.45	4.60	41.05	54.00	-12.95	AVG	

REMARKS:

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

Test Mode:	TX 2480 MHz _CH78_3Mbps
------------	-------------------------

Vertical



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2480.0500	80.47	7.25	87.72	54.00	33.72	AVG	No Limit
2	2480.1500	84.22	7.25	91.47	74.00	17.47	Peak	No Limit
3	2483.5000	38.76	7.25	46.01	74.00	-27.99	Peak	
4	2483.5000	30.36	7.25	37.61	54.00	-16.39	AVG	

REMARKS:

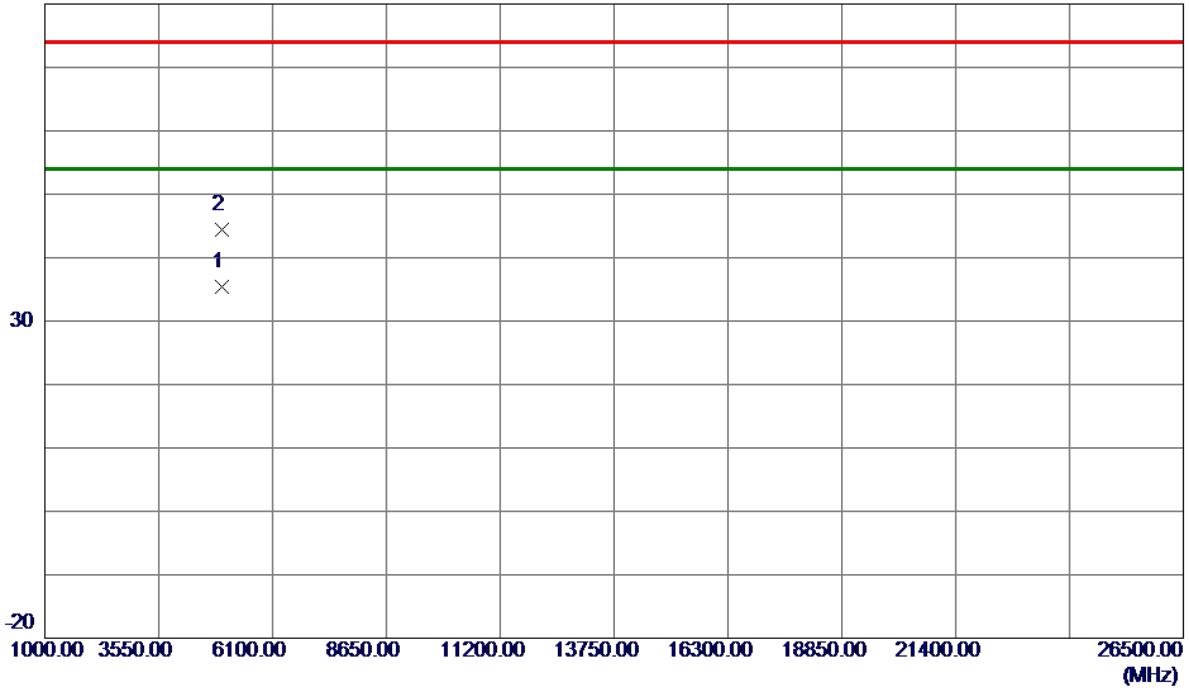
(1) Measurement Value = Reading Level + Correct Factor.

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

Test Mode:	TX 2480 MHz _CH78_3Mbps
------------	-------------------------

Vertical

80 dBuV/m



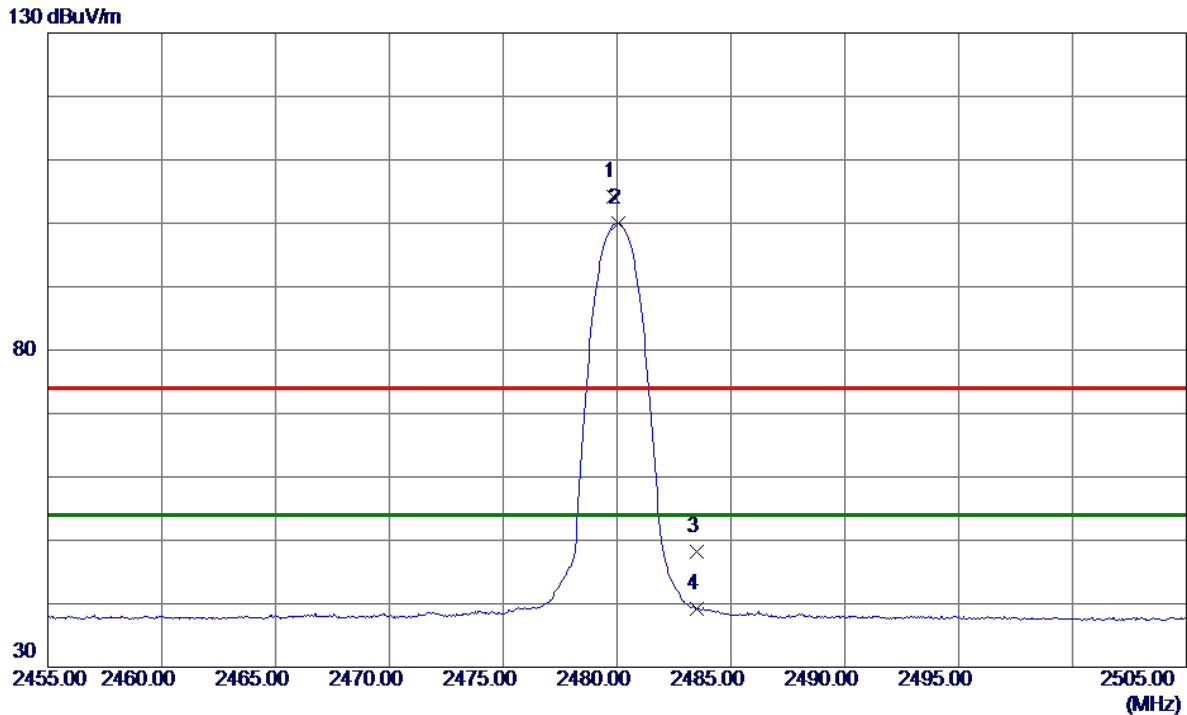
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	4959.9129	30.50	4.81	35.31	54.00	-18.69	AVG	
2	4960.5390	39.67	4.81	44.48	74.00	-29.52	Peak	

REMARKS:

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

Test Mode: TX 2480 MHz _CH78_3Mbps

Horizontal



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.8500	96.93	7.25	104.18	74.00	30.18	Peak	No Limit
2 *	2480.0500	92.73	7.25	99.98	54.00	45.98	AVG	No Limit
3	2483.5000	40.99	7.25	48.24	74.00	-25.76	Peak	
4	2483.5000	31.94	7.25	39.19	54.00	-14.81	AVG	

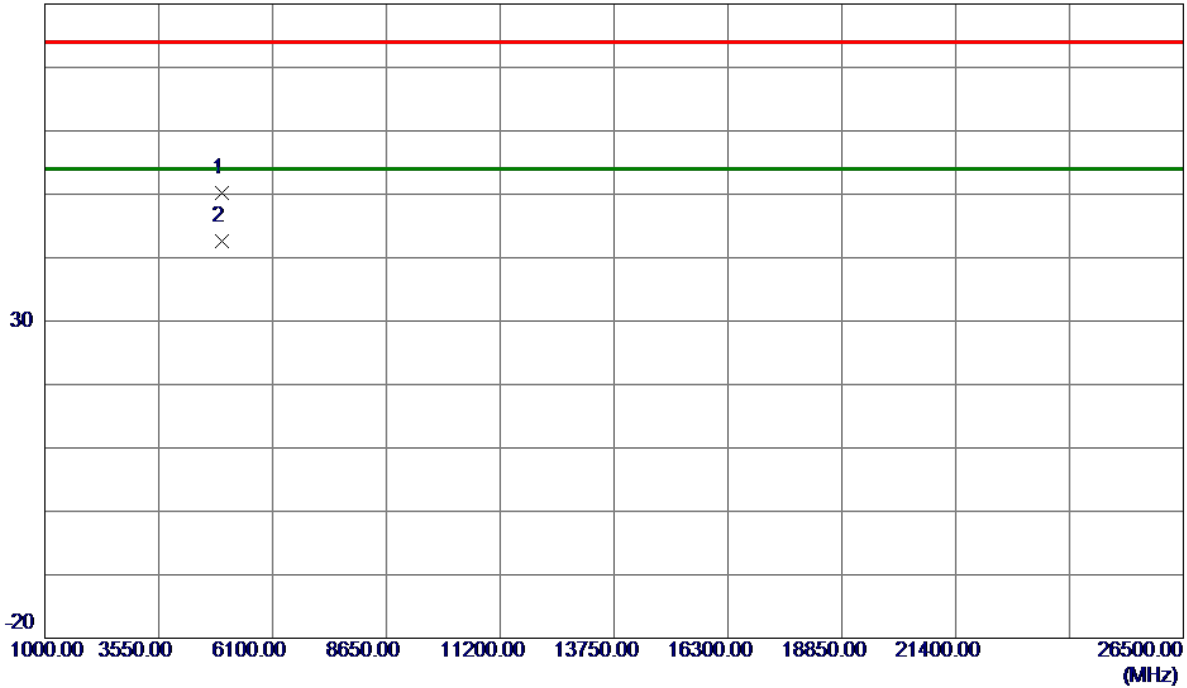
REMARKS:

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

Test Mode:	TX 2480 MHz _CH78_3Mbps
------------	-------------------------

Horizontal

80 dBuV/m



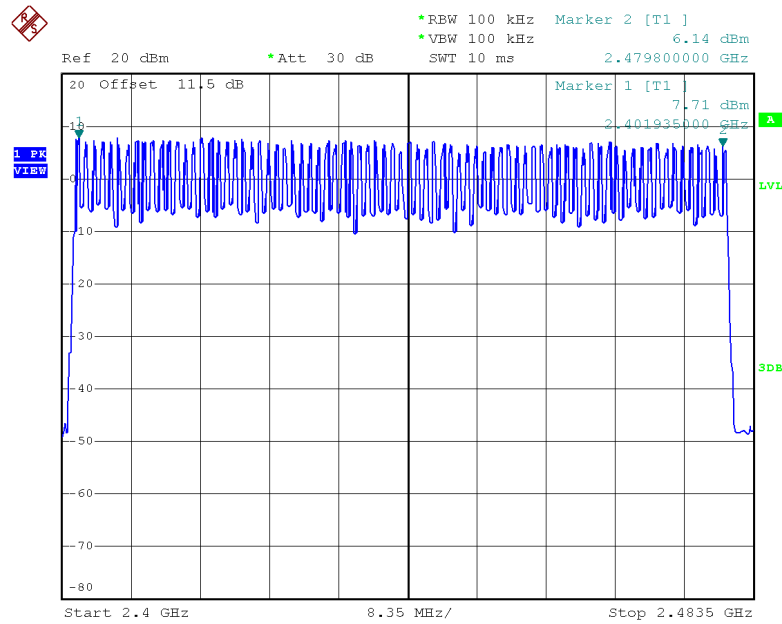
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4959.7610	45.47	4.81	50.28	74.00	-23.72	Peak	
2 *	4959.8610	37.81	4.81	42.62	54.00	-11.38	AVG	

REMARKS:

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

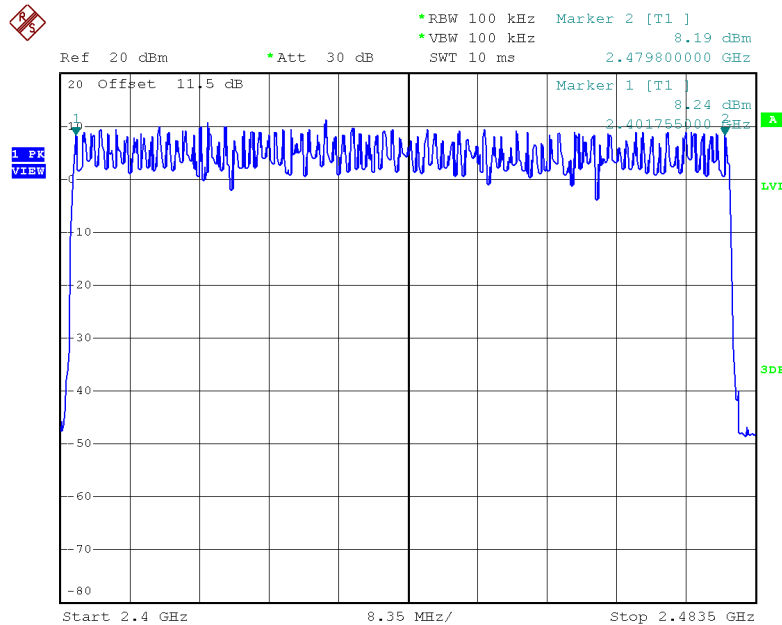
APPENDIX E - NUMBER OF HOPPING FREQUENCY

Test Mode	Hopping Mode_1Mbps
Number of Hopping Frequency	79



Date: 28.JAN.2021 14:33:07

Test Mode	Hopping Mode_3Mbps
Number of Hopping Frequency	79



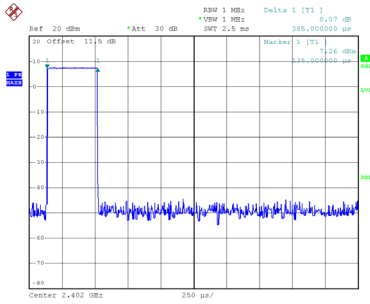
Date: 28.JAN.2021 14:54:59

APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode:	TX Mode_1Mbps
------------	---------------

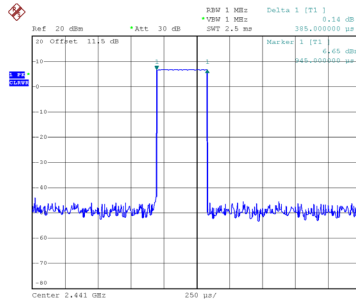
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH1	2402	0.3850	0.1232	0.4000	Pass
DH3	2402	1.6400	0.2624	0.4000	Pass
DH5	2402	2.8800	0.3072	0.4000	Pass
DH1	2441	0.3850	0.1232	0.4000	Pass
DH3	2441	1.6400	0.2624	0.4000	Pass
DH5	2441	2.8800	0.3072	0.4000	Pass
DH1	2480	0.3850	0.1232	0.4000	Pass
DH3	2480	1.6400	0.2624	0.4000	Pass
DH5	2480	2.8800	0.3072	0.4000	Pass

CH00-DH1



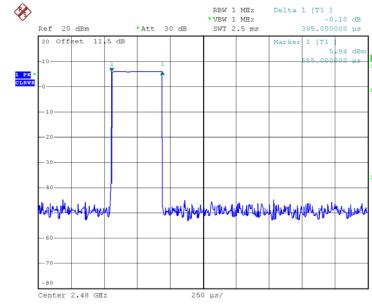
Date: 28.JAN.2021 14:26:29

CH39-DH1



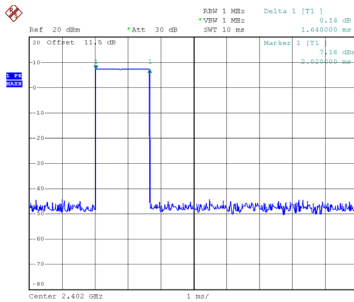
Date: 28.JAN.2021 14:26:36

CH78-DH1



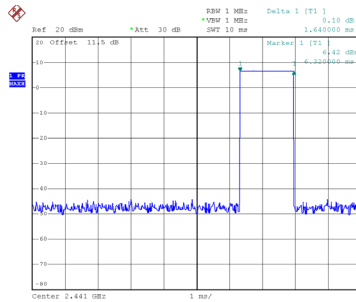
Date: 28.JAN.2021 14:26:14

CH00-DH3



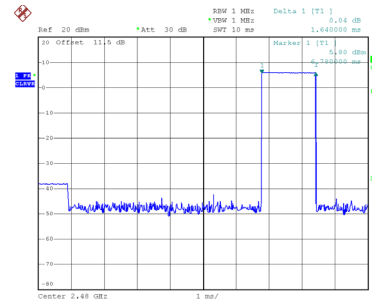
Date: 28.JAN.2021 14:34:51

CH39-DH3



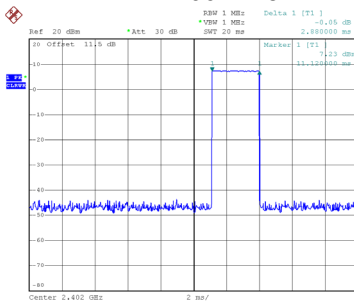
Date: 28.JAN.2021 14:38:20

CH78-DH3



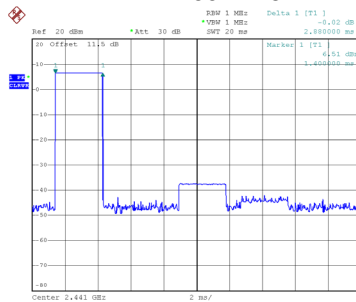
Date: 28.JAN.2021 14:35:06

CH00-DH5



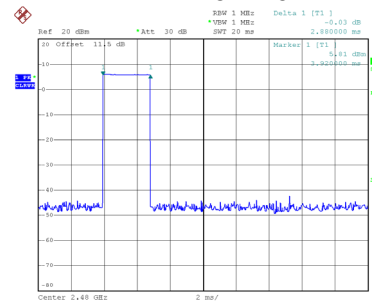
Date: 28.JAN.2021 14:39:10

CH39-DH5



Date: 28.JAN.2021 14:39:18

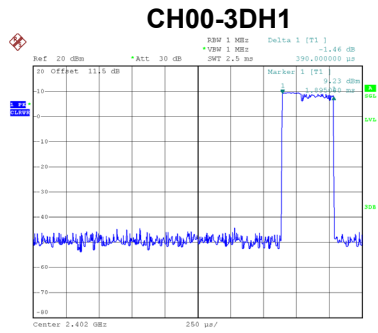
CH78-DH5



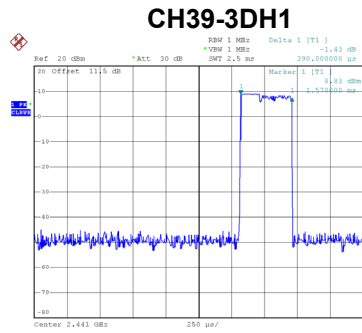
Date: 28.JAN.2021 14:39:26

Test Mode:	TX Mode_3Mbps
------------	---------------

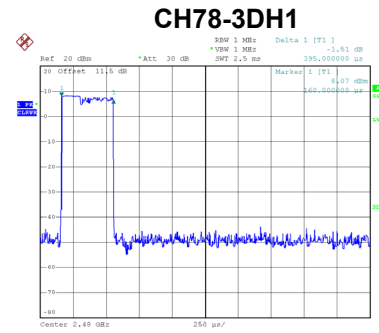
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
3DH1	2402	0.3900	0.1248	0.4000	Pass
3DH3	2402	1.6400	0.2624	0.4000	Pass
3DH5	2402	2.9200	0.3115	0.4000	Pass
3DH1	2441	0.3900	0.1248	0.4000	Pass
3DH3	2441	1.6400	0.2624	0.4000	Pass
3DH5	2441	2.9200	0.3115	0.4000	Pass
3DH1	2480	0.3950	0.1264	0.4000	Pass
3DH3	2480	1.6400	0.2624	0.4000	Pass
3DH5	2480	2.8800	0.3072	0.4000	Pass



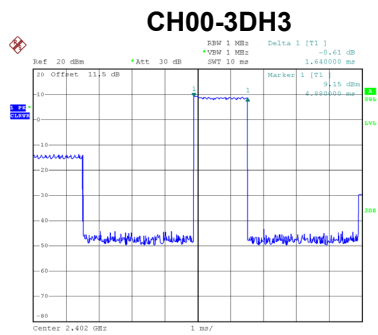
Date: 28.JAN.2021 15:01:52



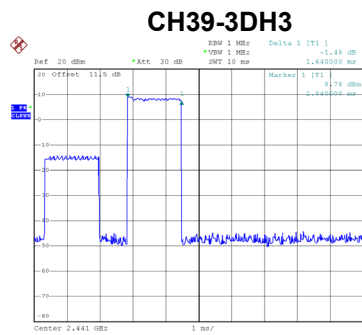
Date: 28.JAN.2021 15:01:30



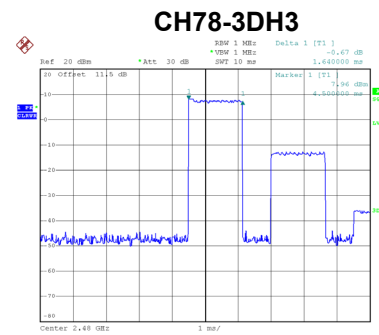
Date: 28.JAN.2021 15:01:35



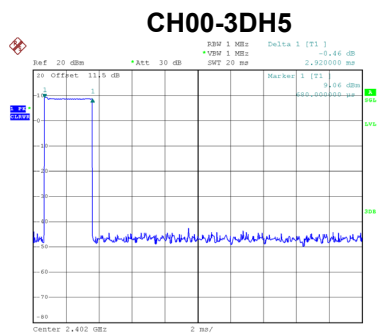
Date: 28.JAN.2021 15:00:03



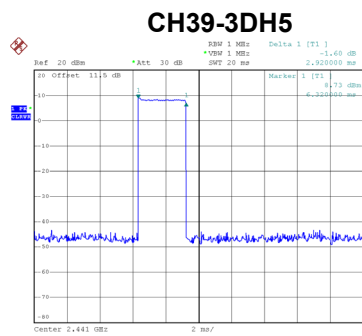
Date: 28.JAN.2021 15:00:45



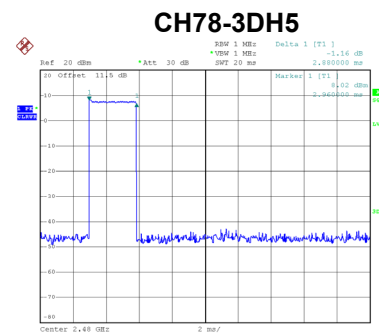
Date: 28.JAN.2021 15:00:12



Date: 28.JAN.2021 14:59:07



Date: 28.JAN.2021 14:59:25

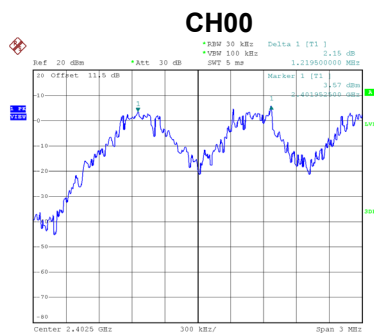


Date: 28.JAN.2021 14:58:50

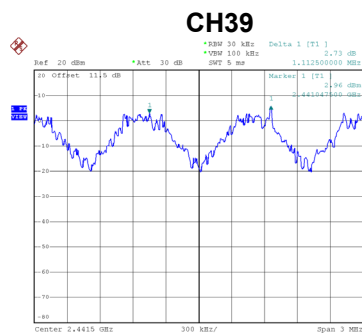
APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT

Test Mode:	Hopping on _1Mbps
------------	-------------------

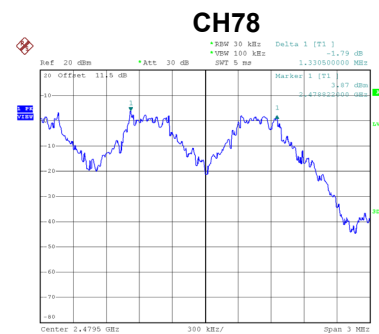
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.220	0.635	Pass
39	2441	1.113	0.629	Pass
78	2480	1.331	0.636	Pass



Date: 28.JAN.2021 14:29:05



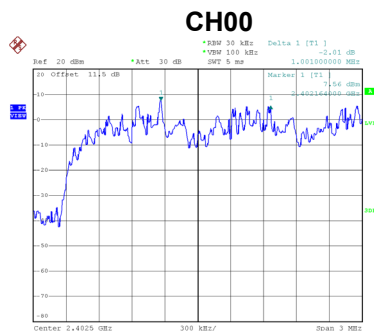
Date: 28.JAN.2021 14:45:32



Date: 28.JAN.2021 14:48:21

Test Mode:	Hopping on _3Mbps
------------	-------------------

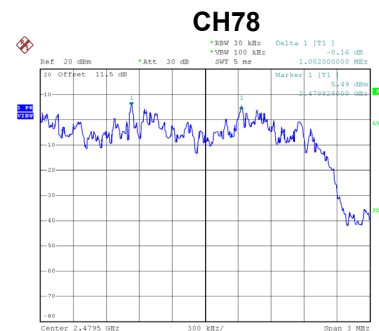
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.001	0.852	Pass
39	2441	1.121	0.856	Pass
78	2480	1.002	0.847	Pass



Date: 28.JAN.2021 14:50:54



Date: 28.JAN.2021 14:52:04

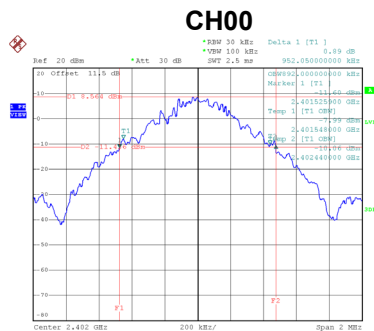


Date: 28.JAN.2021 15:03:50

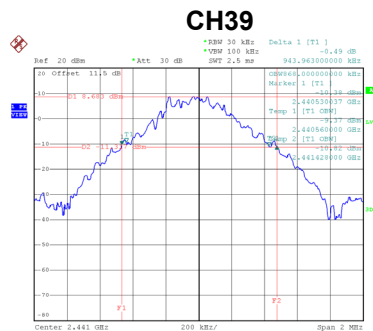
APPENDIX H - BANDWIDTH

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

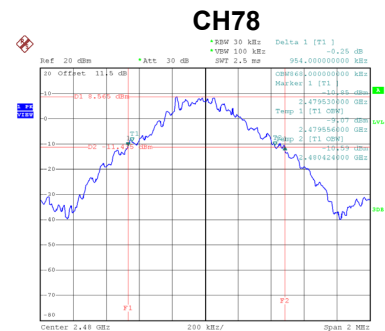
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)
00	2402	0.952	0.892
39	2441	0.944	0.868
78	2480	0.954	0.868



Date: 28.JAN.2021 13:47:32



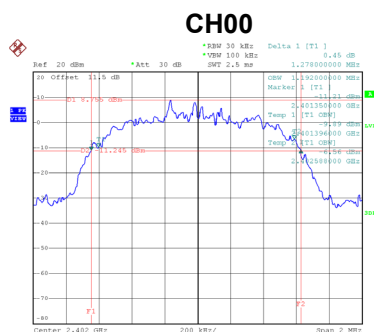
Date: 28.JAN.2021 13:50:59



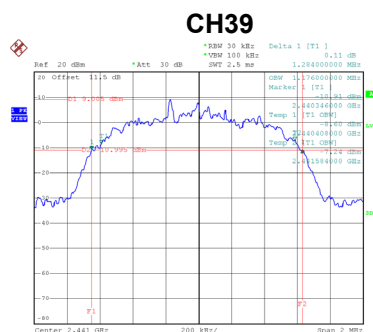
Date: 28.JAN.2021 13:52:10

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

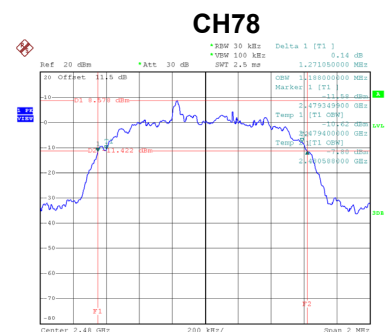
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)
00	2402	1.278	1.192
39	2441	1.284	1.176
78	2480	1.271	1.188



Date: 28.JAN.2021 13:54:13



Date: 28.JAN.2021 13:56:16

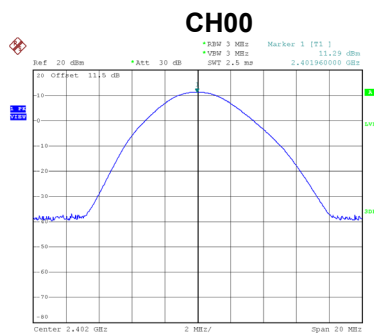


Date: 28.JAN.2021 13:57:11

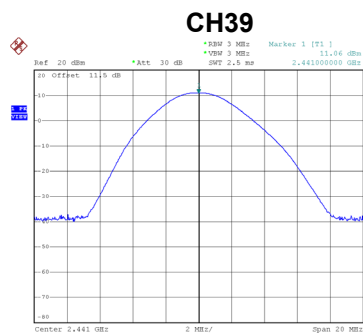
APPENDIX I - MAXIMUM OUTPUT POWER

Test Mode: TX Mode _1Mbps

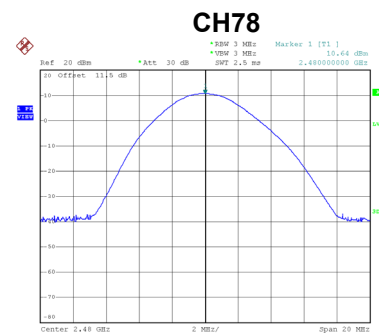
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	11.29	0.0135	21.00	0.125	Pass
39	2441	11.06	0.0128	21.00	0.125	Pass
78	2480	10.64	0.0116	21.00	0.125	Pass



Date: 28.JAN.2021 13:48:08



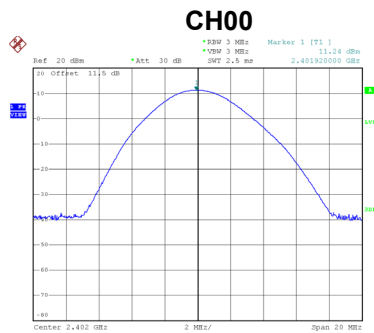
Date: 28.JAN.2021 13:51:07



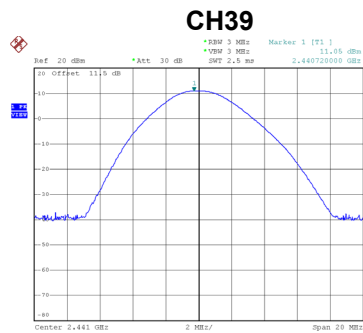
Date: 28.JAN.2021 13:52:46

Test Mode: TX Mode _2Mbps

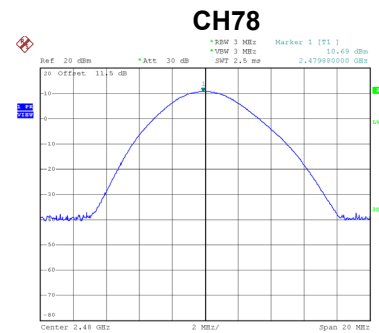
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	11.24	0.0133	21.00	0.125	Pass
39	2441	11.05	0.0127	21.00	0.125	Pass
78	2480	10.69	0.0117	21.00	0.125	Pass



Date: 28.JAN.2021 14:19:29



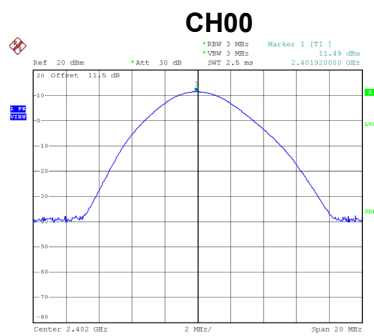
Date: 28.JAN.2021 14:20:10



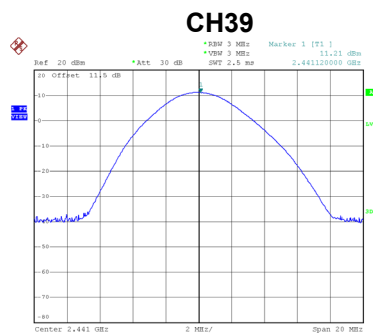
Date: 28.JAN.2021 14:20:37

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

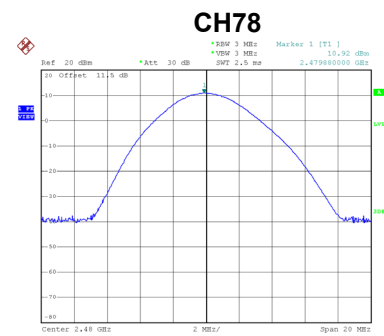
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	11.49	0.0141	21.00	0.125	Pass
39	2441	11.21	0.0132	21.00	0.125	Pass
78	2480	10.92	0.0124	21.00	0.125	Pass



Date: 28.JAN.2021 13:54:49



Date: 28.JAN.2021 13:56:22

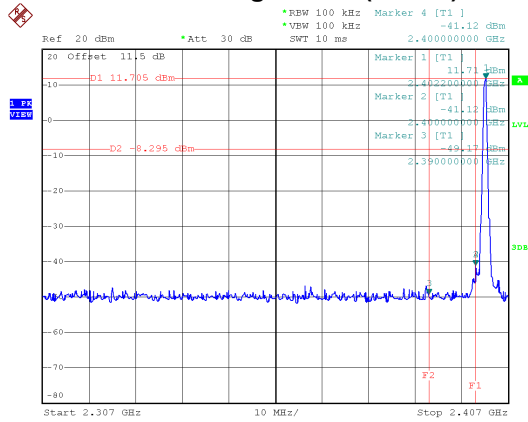


Date: 28.JAN.2021 13:57:47

APPENDIX J - CONDUCTED SPURIOUS EMISSION

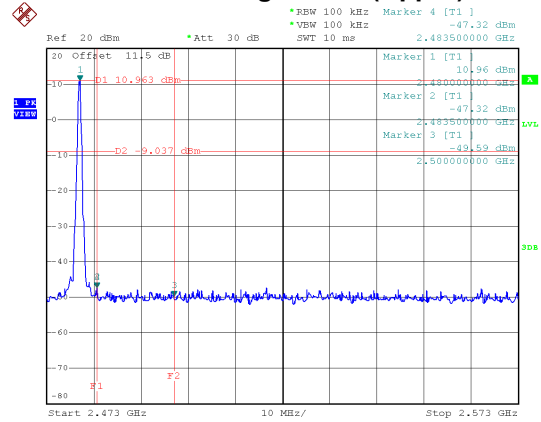
Test Mode : TX Mode _1Mbps

Bandedge CH00 (Lower)



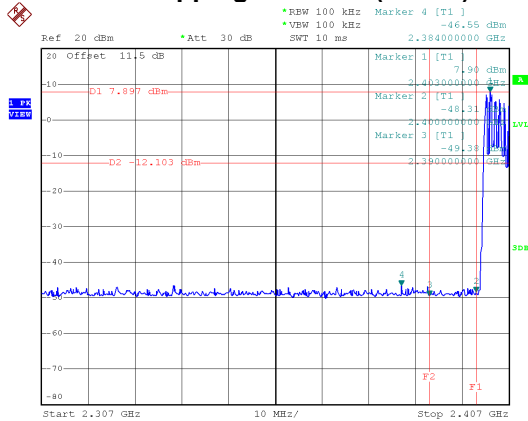
Date: 28.JAN.2021 13:47:03

Bandedge CH78 (Upper)



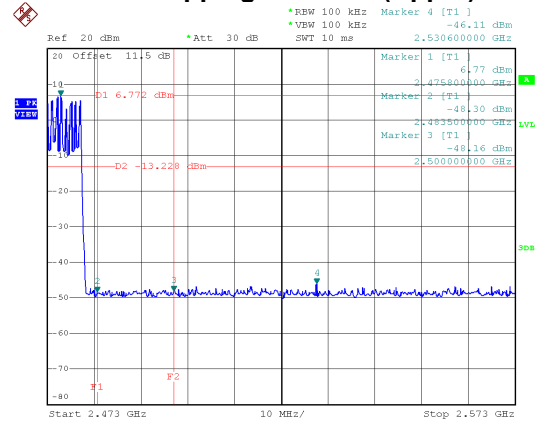
Date: 28.JAN.2021 13:51:43

Hopping on mode (Lower)



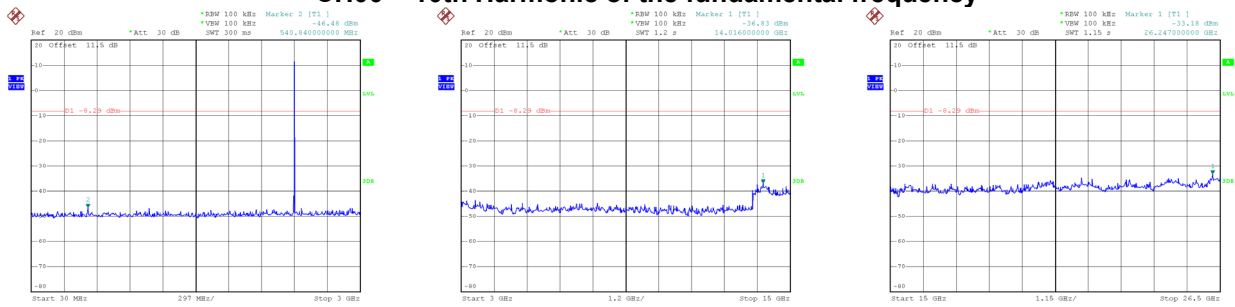
Date: 28.JAN.2021 14:33:42

Hopping on mode (Upper)



Date: 28.JAN.2021 14:42:49

CH00 – 10th Harmonic of the fundamental frequency

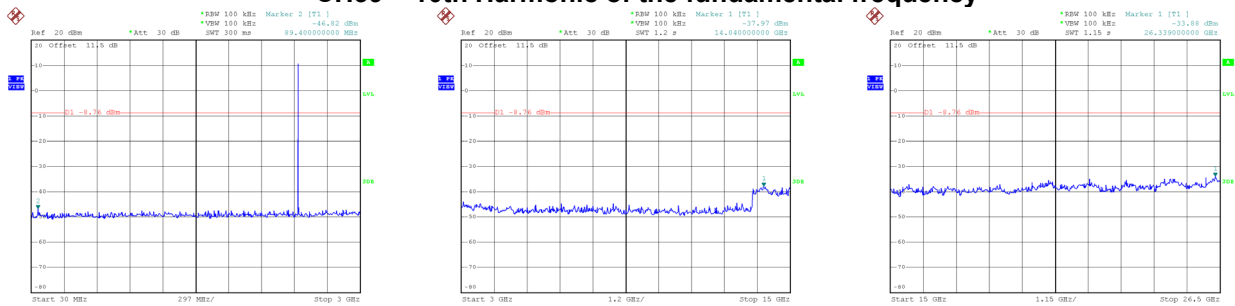


Date: 28.JAN.2021 13:47:46

Date: 28.JAN.2021 13:47:54

Date: 28.JAN.2021 13:48:02

CH39 – 10th Harmonic of the fundamental frequency

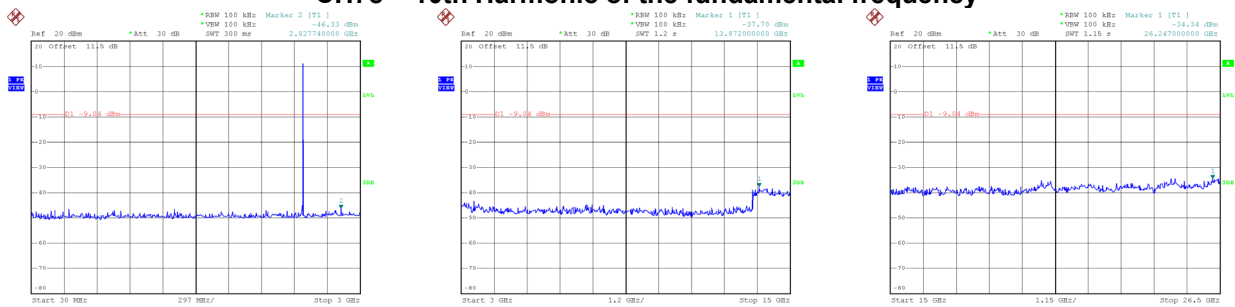


Date: 28.JAN.2021 13:50:16

Date: 28.JAN.2021 13:50:24

Date: 28.JAN.2021 13:50:32

CH78 – 10th Harmonic of the fundamental frequency



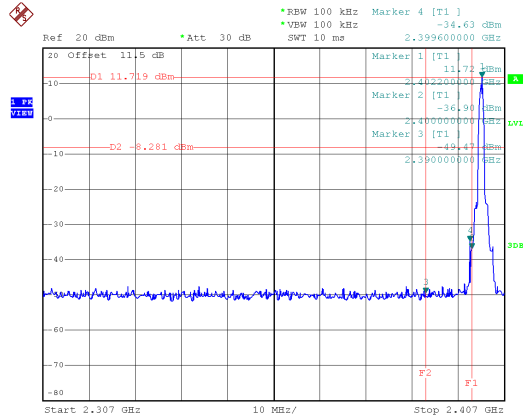
Date: 28.JAN.2021 13:52:23

Date: 28.JAN.2021 13:52:31

Date: 28.JAN.2021 13:52:40

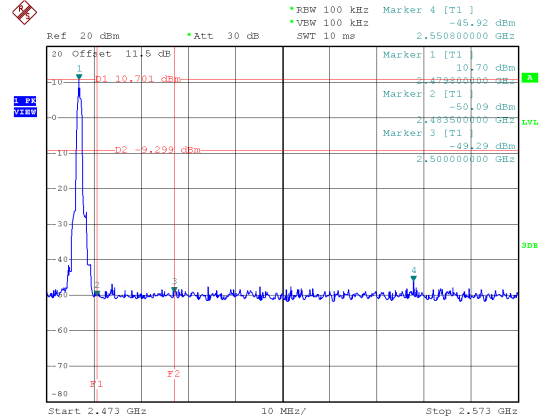
Test Mode : TX Mode _3Mbps

Bandedge CH00 (Lower)



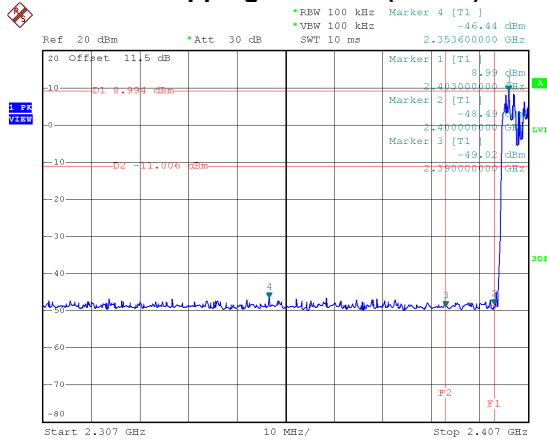
Date: 28.JAN.2021 13:53:50

Bandedge CH78 (Upper)



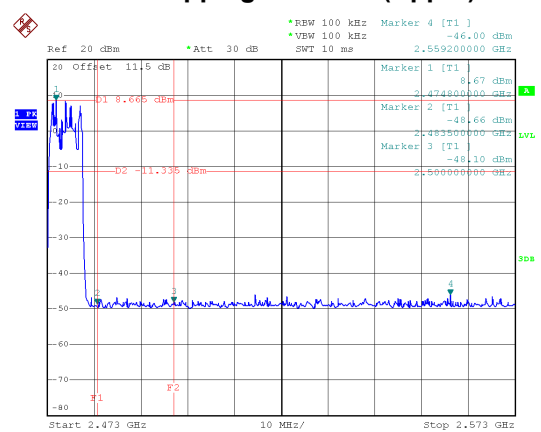
Date: 28.JAN.2021 13:56:50

Hopping on mode (Lower)



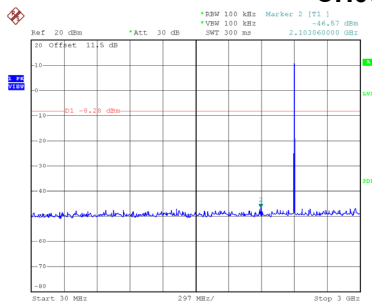
Date: 28.JAN.2021 14:55:34

Hopping on mode (Upper)

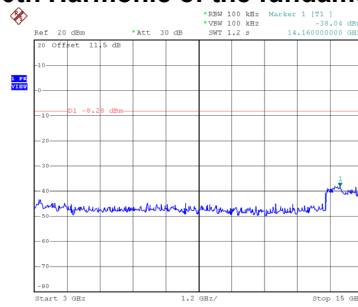


Date: 28.JAN.2021 14:56:09

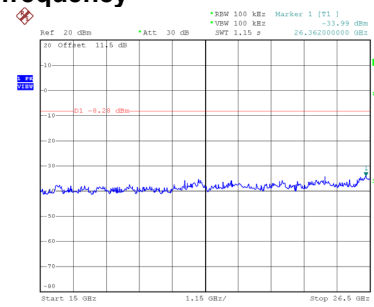
CH00 – 10th Harmonic of the fundamental frequency



Date: 28.JAN.2021 13:54:26

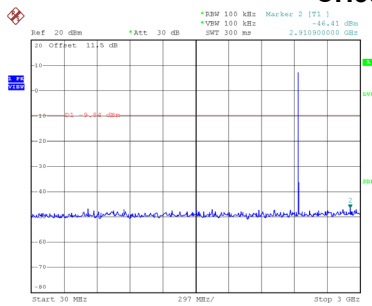


Date: 28.JAN.2021 13:54:35

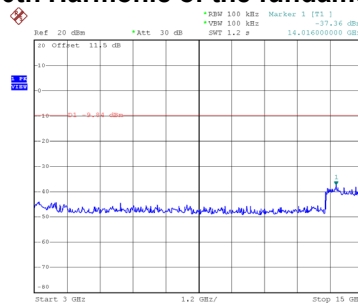


Date: 28.JAN.2021 13:54:43

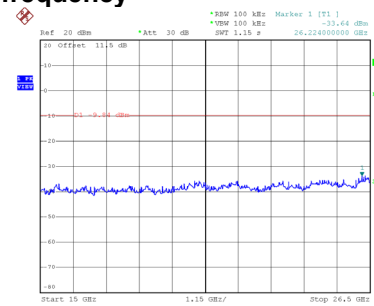
CH39 – 10th Harmonic of the fundamental frequency



Date: 28.JAN.2021 13:55:39

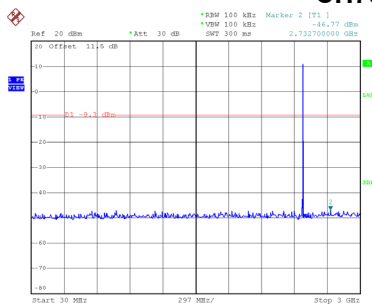


Date: 28.JAN.2021 13:55:47

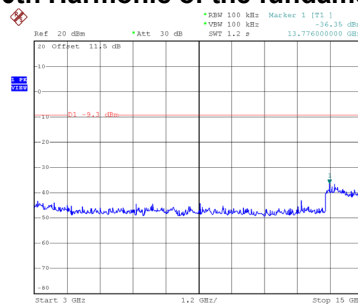


Date: 28.JAN.2021 13:55:55

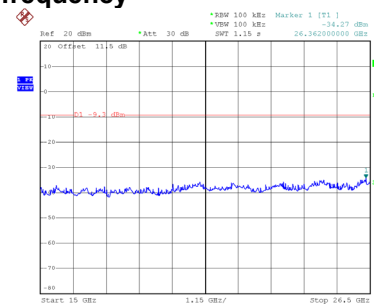
CH78 – 10th Harmonic of the fundamental frequency



Date: 28.JAN.2021 13:57:24



Date: 28.JAN.2021 13:57:32



Date: 28.JAN.2021 13:57:41

End of Test Report