FCC Radio Test Report

FCC ID: QWHCPAXX02

This report concerns: Original Grant

Project No.	:	1906C091
Equipment	:	Power Amplifiers
Test Model	:	CPA2402
Series Model	:	CPA1202
Applicant	:	MUSIC Tribe Manufacturing PH Ltd.
Address	:	17A Brunswick Street Hamilton HM 10 Bermuda

Date of Receipt	:	Jun. 20, 2019
Date of Test	:	Jun. 27, 2019 ~ Jul. 15, 2019
Issued Date	:	Sep. 12, 2019
Tested by	:	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.
Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jul. 19, 2019
R01	Add the AC Power Line Conducted Emissions and Radiated Emission below 1G test data to the model CPA1202.	Sep. 12, 2019

1. GENERAL SUMMARY

Equipment	:	Power Amplifiers
Brand Name	:	LAB GRUPPEN
Test Model	:	CPA2402
Series Model	:	CPA1202
Applicant	:	MUSIC Tribe Manufacturing PH Ltd.
Manufacturer	:	MUSIC Tribe Manufacturing PH Ltd.
Address	:	17A Brunswick Street Hamilton HM 10 Bermuda
Factory	:	Zhongshan Eurotec Electronics Ltd
Address	:	No.10 Wanmei Road, South China Modern Chinese Medicine Park, Nanlang Town, Zhongshan City, Guangdong Province, P.R. China
Date of Test	:	Jun. 27, 2019 ~ Jul. 15, 2019
Test Sample	:	Engineering Sample No.: DG190626157
Standard(s)	:	FCC Part15, Subpart C (15.247) ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance V05r02

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1906C091) 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):

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.

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

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	150 kHz ~ 30 MHz	2.32

B. Radiated emissions test:

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

C. Other Measurement:

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

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Power Amplifiers
Brand Name	LAB GRUPPEN
Test Model	CPA2402
Series Model	CPA1202
Model Difference(s)	Share the same hardware design, just different amplifier. CPA2402 | 240Wat*2ch CPA1202 | 120Wat*2ch
Power Source	AC Mains.
Power Rating	100-240V ~ 50/60Hz
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Technology	GFSK, π/4-DQPSK, 8-DPSK
Bit Rate of Transmitter	1/2/3Mbps
Max. Output Power	7.87 dBm (0.0061 W) For 1Mbps 7.83 dBm (0.0061 W) For 3Mbps

Note:

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

2. Channel List:

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

3 Table for Filed Antenna:

.

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Dipole	N/A	2.09

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)**
Mode 2	TX Mode Channel 39 _1Mbps

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 1	TX Mode

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 2	TX Mode Channel 39 _1Mbps

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:

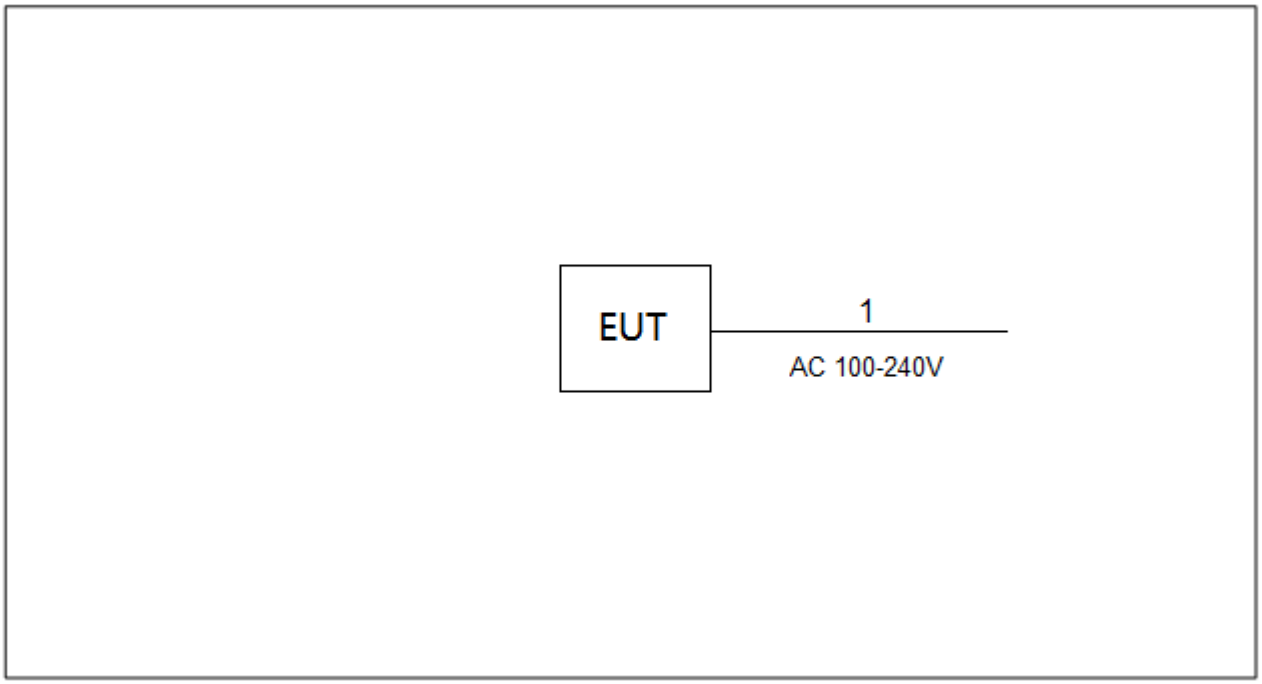
(1) The measurements are performed at the high, middle, low available channels.
(2) The measurements for Hopping Channel Separation, Bandwidth and Maximum Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.
(3) For radiated emission above 1 GHz test, 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.
(4) For radiated emission above 1 GHz test, the CPA2402 and CPA1202 have been pre-tested and found the CPA2402 is the worst case.

3.3 PARAMETERS OF TEST SOFTWARE

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

Test Software	BlueTest3 2.6.2		
Frequency (MHz)	2402	2441	2480
Parameters(1Mbps)	255,63	255,55	255,50
Parameters(3Mbps)	255,63	255,63	255,60

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 SUPPORT UNITS

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

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	AC Cable	NO	NO	1.5m

4. AC POWER LINE CONDUCTED EMISSIONS TEST

4.1 LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

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

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.

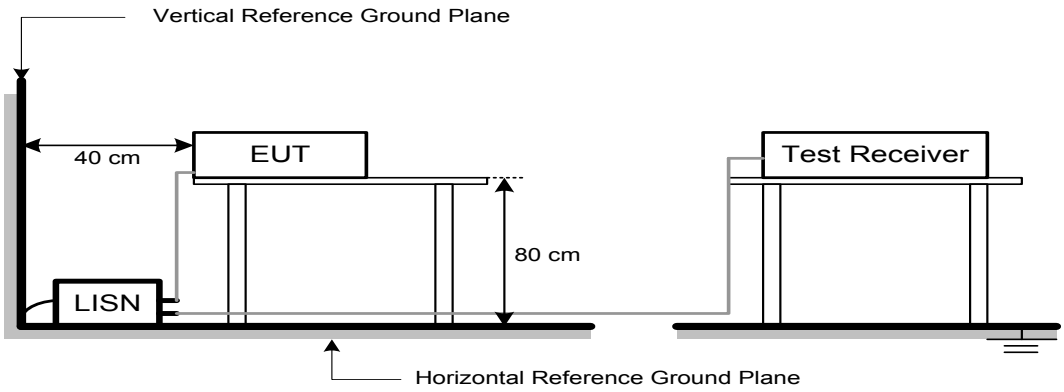
d. LISN at least 80 cm from nearest part of EUT chassis.

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 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.

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.

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.

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

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

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

5.2 TEST PROCEDURE

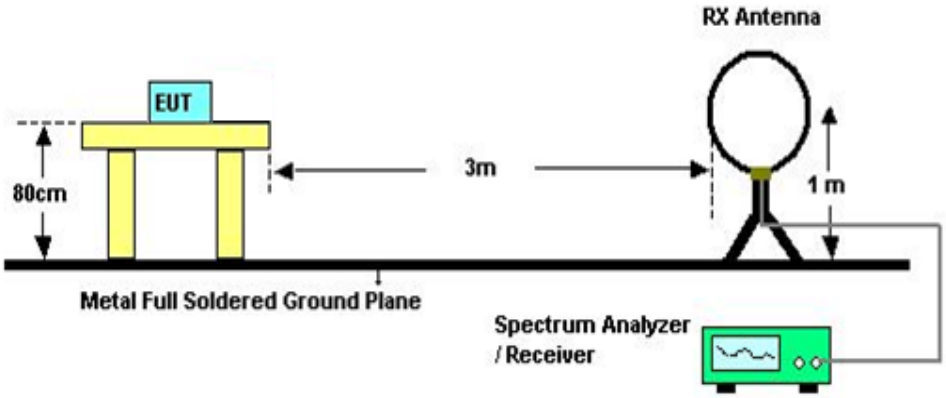
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance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

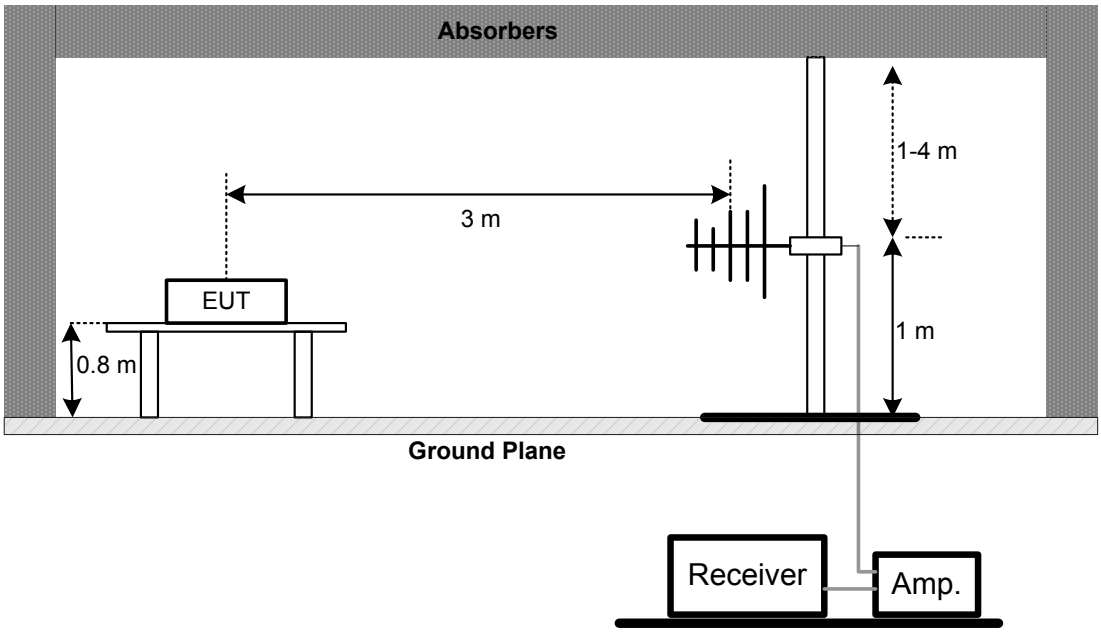
No deviation

5.4 TEST SETUP

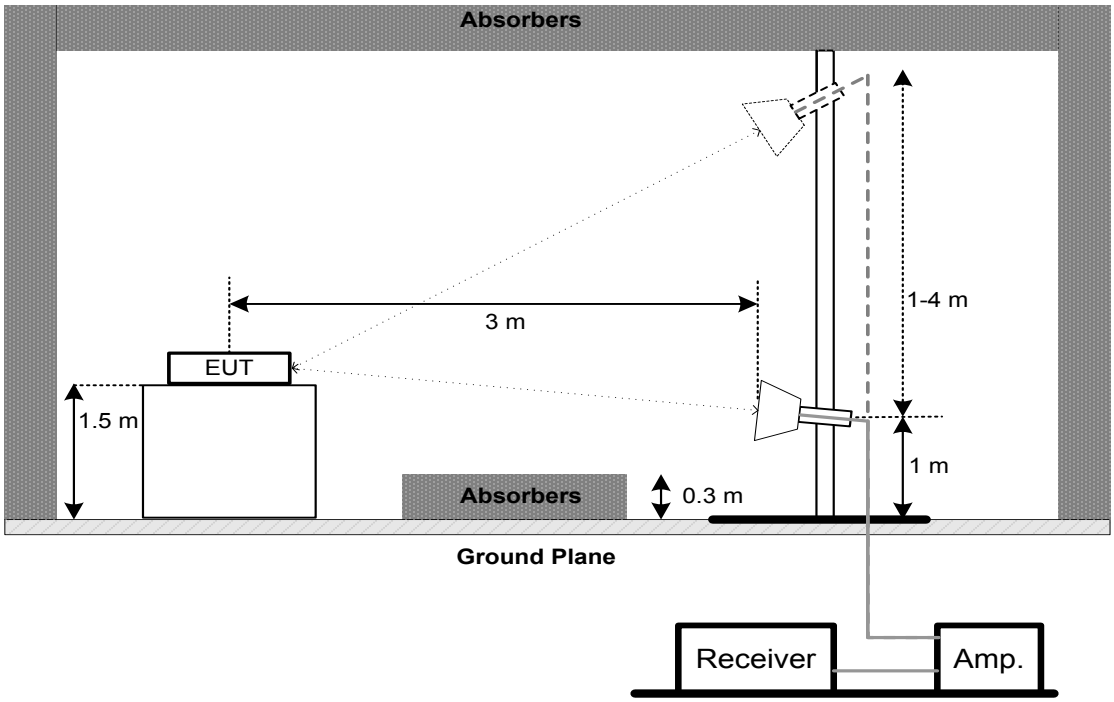
9 kHz-30 MHz



30 MHz to 1 GHz



Above 1 GHz


Absorbers
3 m
1-4 m
EUT
1.5 m
1 m
Absorbers
0.3 m
Ground Plane
Receiver
Amp.

5.5 EUT OPERATING 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) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) 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 FREQUENCY

6.1 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

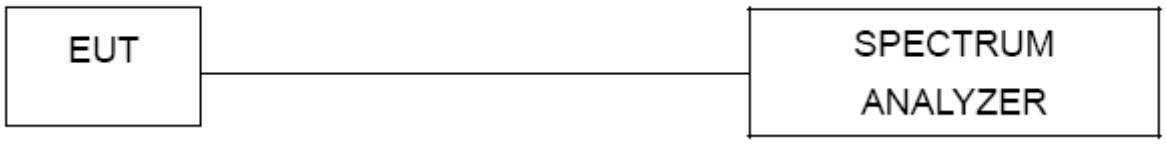
6.2 TEST PROCEDURE

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: 24°C Relative Humidity: 56% Test Voltage: AC 120V/60Hz

6.7 TEST RESULTS

Please refer to the APPENDIX E

7. AVERAGE TIME OF OCCUPANCY

7.1 LIMIT

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

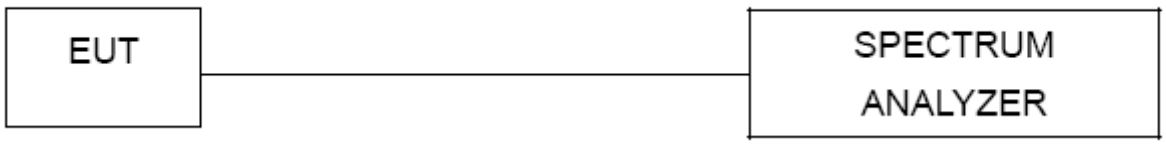
7.2 TEST PROCEDURE

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 DH1, DH3 and DH5 packet transmitting
h. Measure the maximum time duration of one single pulse
i. 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
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. 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

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: 24°C Relative Humidity: 56% Test Voltage: AC 120V/60Hz

7.7 TEST RESULTS

Please refer to the APPENDIX F

8. HOPPING CHANNEL SEPARATION MEASUREMENT

8.1 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

8.2 TEST PROCEDURE

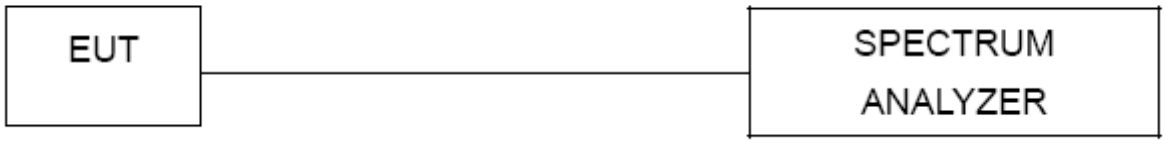
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 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: 24°C Relative Humidity: 56% Test Voltage: AC 120V/60Hz

8.7 TEST RESULTS

Please refer to the APPENDIX G

9. BANDWIDTH TEST

9.1 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

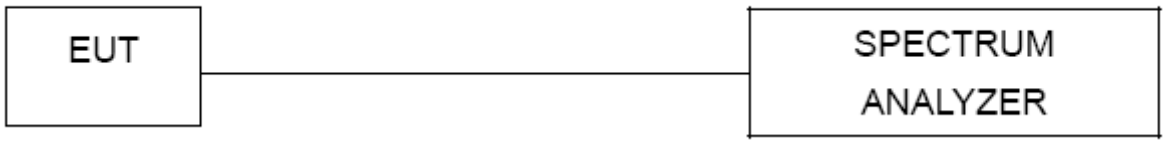
9.2 TEST PROCEDURE

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: 24°C Relative Humidity: 56% Test Voltage: AC 120V/60Hz

9.7 TEST RESULTS

Please refer to the APPENDIX H

10. MAXIMUM OUTPUT POWER

10.1 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 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: 24°C Relative Humidity: 56% Test Voltage: AC 120V/60Hz

10.7 TEST RESULTS

Please refer to the APPENDIX I

11. CONDUCTED SPURIOUS EMISSION

11.1 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.

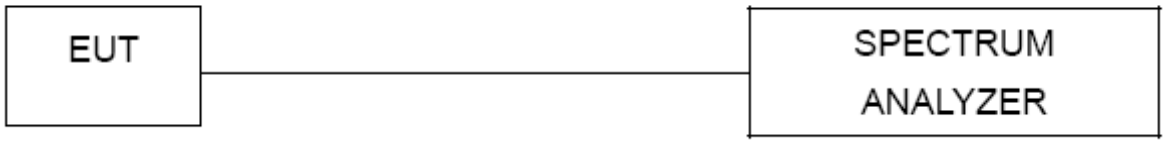
11.2 TEST PROCEDURE

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: 24°C Relative Humidity: 56% 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. 10, 2020
2	LISN	EMCO	3816/2	52765	Mar. 10, 2020
3	50ohm Terminator	SHX	TF5-3	15041305	Mar. 10, 2020
4	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Mar. 10, 2020
5	TRANSIENT LIMITER	EM	EM-7600	772	Mar. 10, 2020
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Cable	N/A	RG223	12m	Mar. 12, 2020

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	Jan. 15, 2020
2	Cable	N/A	RG 213/U	C-102	May 31, 2020
3	EMI Test Receiver	R&S	ESCI	100895	Mar. 10, 2020
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	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2020
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 24, 2020
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. 09, 2020
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 23, 2020
3	Amplifier	Agilent	8449B	3008A02333	Mar. 10, 2020
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 10, 2020
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 Frequency					
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

Maximum 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.

13. EUT TEST PHOTO

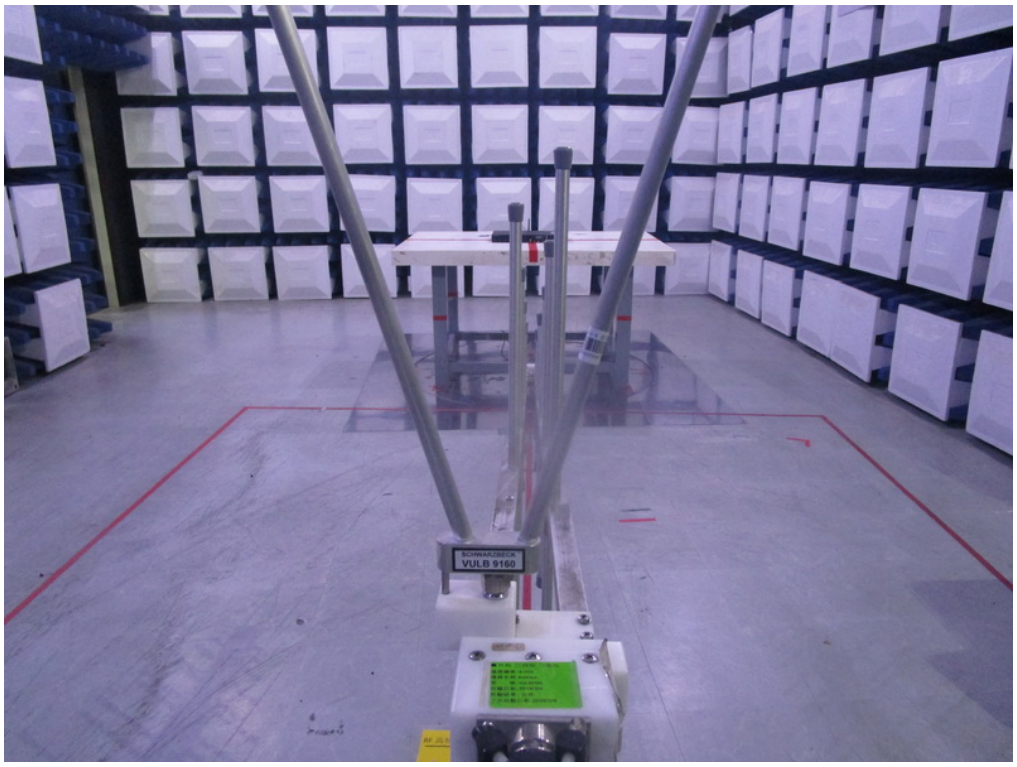
AC Power Line Conducted Emissions Test Photos

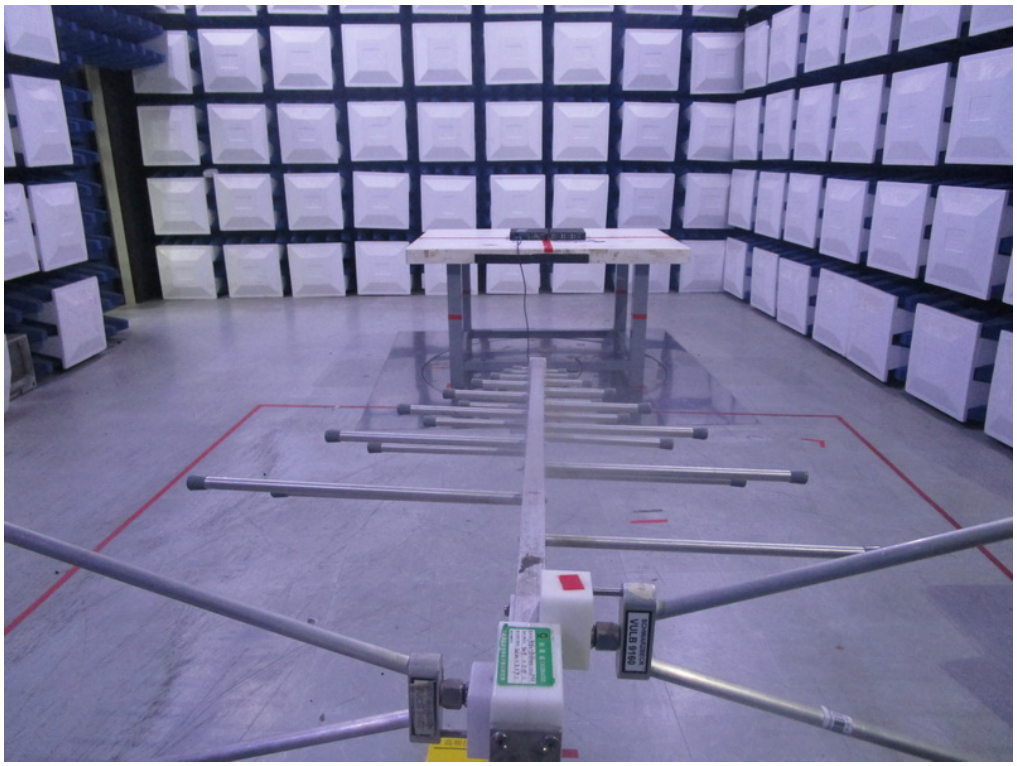
Radiated Emissions Test Photos

9 kHz to 30 MHz

Radiated Emissions Test Photos

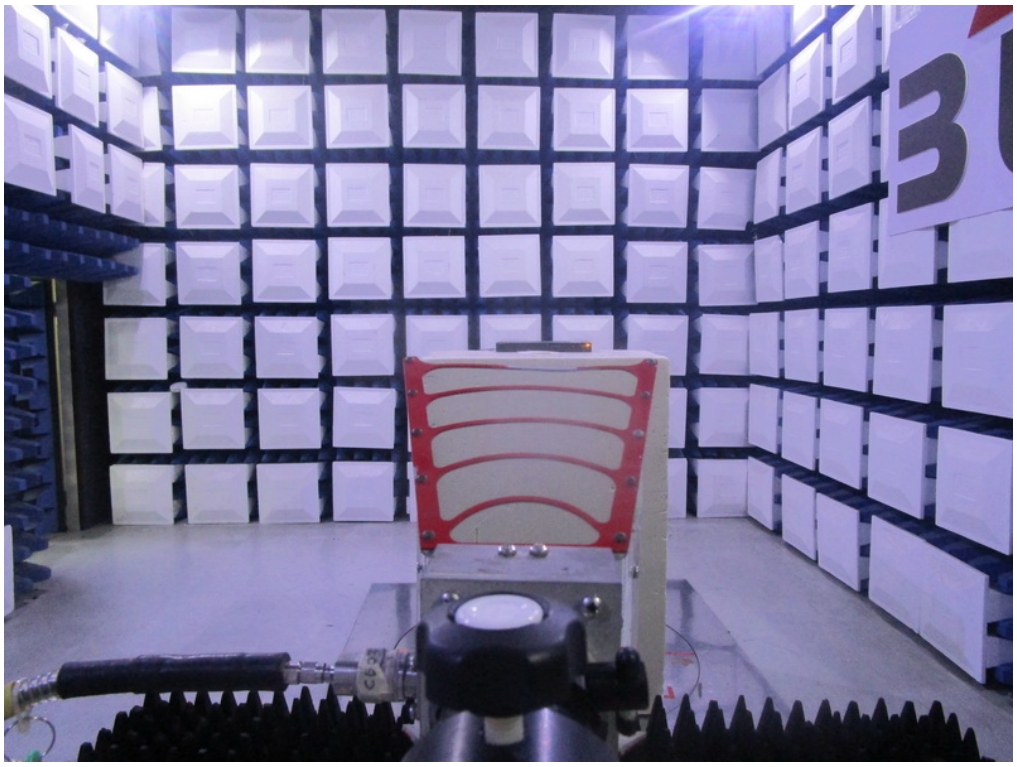
30 MHz to 1000 MHz





Radiated Emissions Test Photos

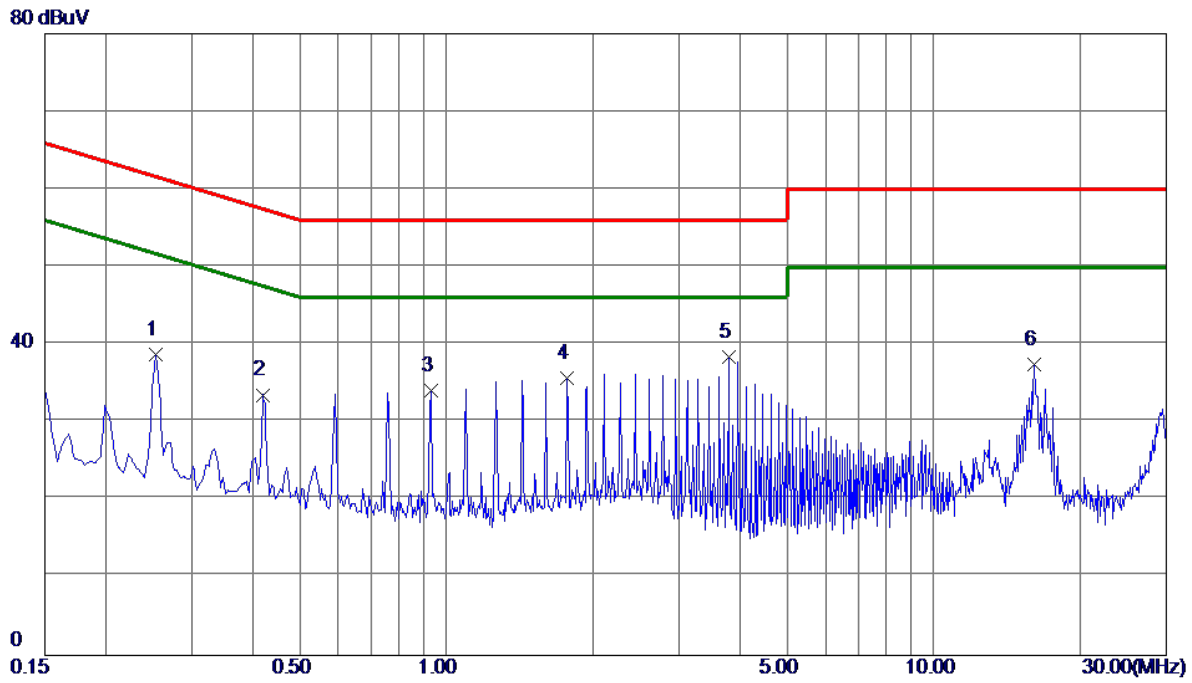
Above 1 GHz



APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA2402

Line

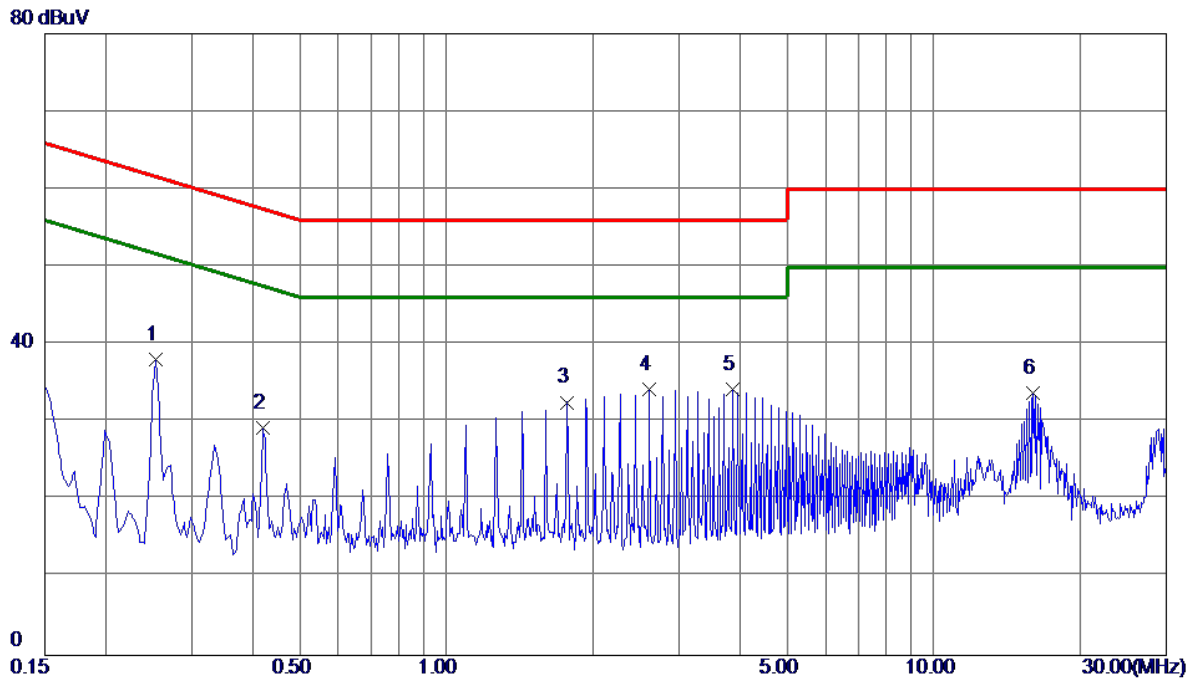


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.2535	28.93	9.83	38.76	61.64	-22.88	Peak	
2	0.4200	23.65	9.87	33.52	57.45	-23.93	Peak	
3	0.9284	24.23	9.92	34.15	56.00	-21.85	Peak	
4	1.7700	25.65	9.98	35.63	56.00	-20.37	Peak	
5 *	3.7950	28.21	10.12	38.33	56.00	-17.67	Peak	
6	16.0889	26.67	10.84	37.51	60.00	-22.49	Peak	

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA2402

Neutral

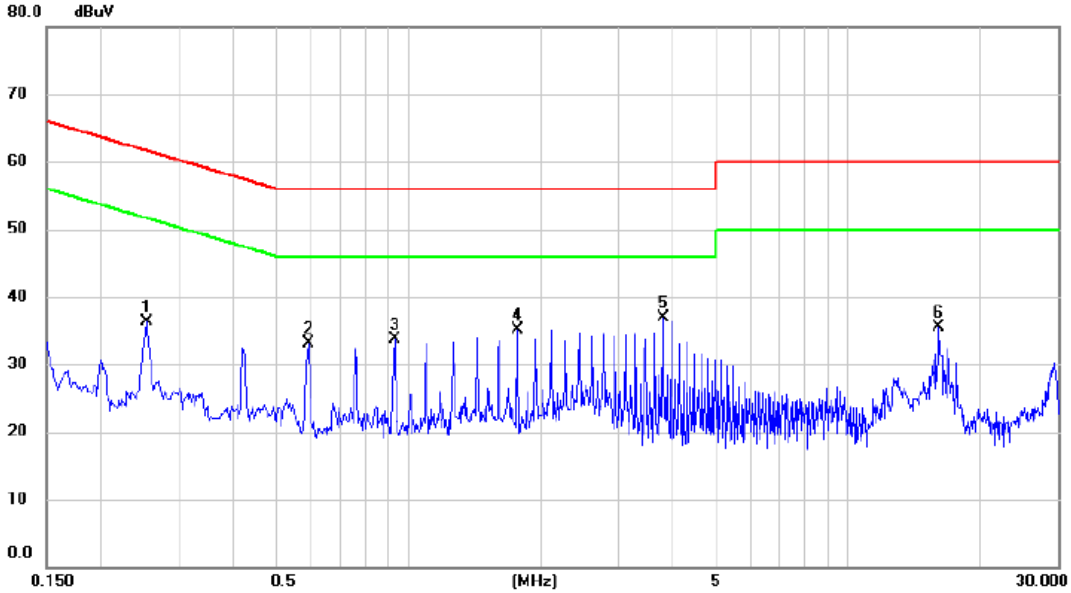


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.2535	28.21	9.93	38.14	61.64	-23.50	Peak	
2	0.4200	19.22	10.01	29.23	57.45	-28.22	Peak	
3	1.7700	22.39	10.17	32.56	56.00	-23.44	Peak	
4 *	2.6114	24.06	10.22	34.28	56.00	-21.72	Peak	
5	3.8760	23.95	10.31	34.26	56.00	-21.74	Peak	
6	16.0080	22.61	11.16	33.77	60.00	-26.23	Peak	

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Line

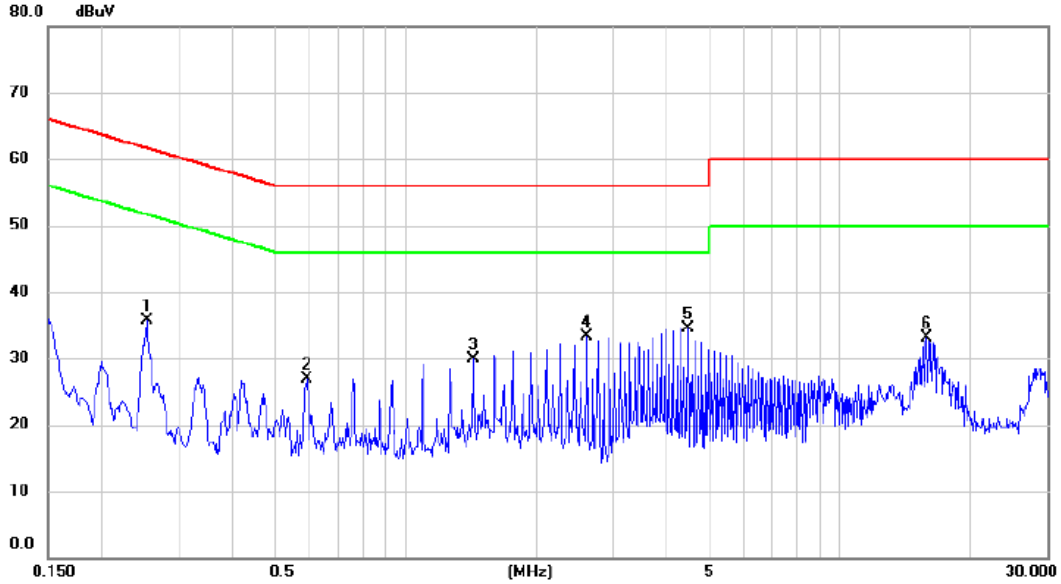


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2535	26.43	9.83	36.26	61.64	-25.38	peak	
2		0.5910	23.19	9.89	33.08	56.00	-22.92	peak	
3		0.9284	23.73	9.92	33.65	56.00	-22.35	peak	
4		1.7700	25.15	9.98	35.13	56.00	-20.87	peak	
5	*	3.7950	26.72	10.11	36.83	56.00	-19.17	peak	
6		16.0890	24.68	10.83	35.51	60.00	-24.49	peak	

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Neutral



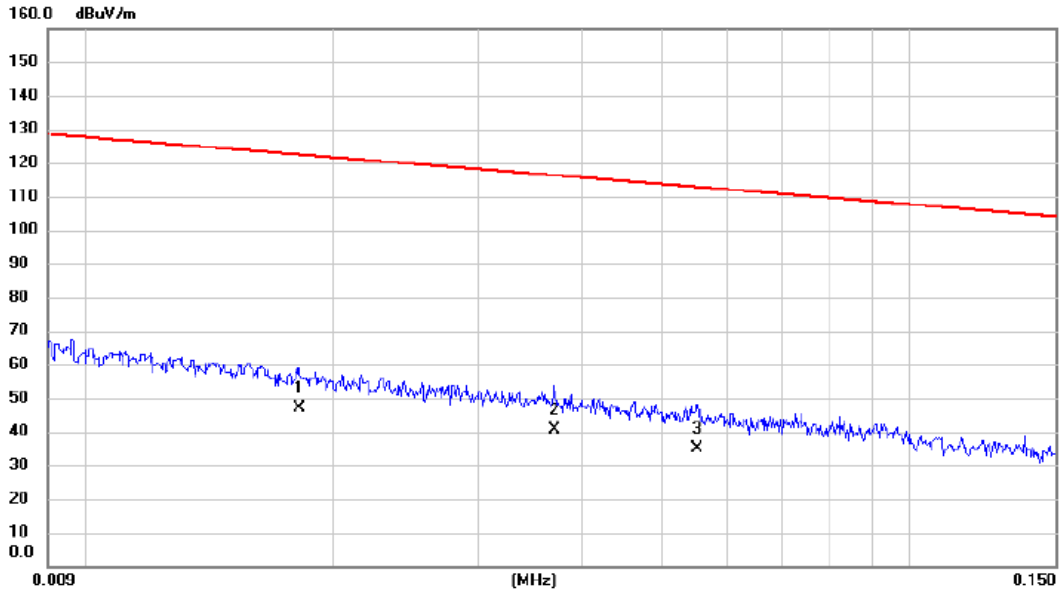
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2535	25.71	9.93	35.64	61.64	-26.00	peak	
2		0.5910	16.92	10.04	26.96	56.00	-29.04	peak	
3		1.4320	19.70	10.15	29.85	56.00	-26.15	peak	
4		2.6114	23.06	10.22	33.28	56.00	-22.72	peak	
5	*	4.4653	24.23	10.36	34.59	56.00	-21.41	peak	
6		15.8414	21.95	11.15	33.10	60.00	-26.90	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 39 _1Mbps_Model: CPA2402

Ant 0°

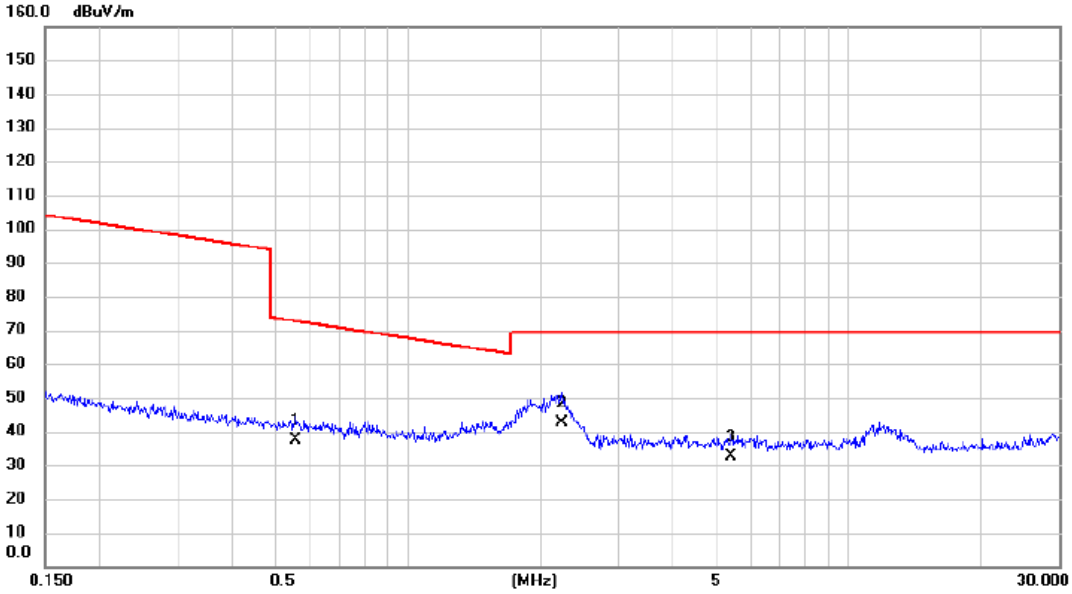


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	0.018	32.80	14.36	47.16	122.40	-75.24	AVG			
2		0.037	26.80	13.89	40.69	116.22	-75.53	AVG			
3		0.055	21.30	13.85	35.15	112.78	-77.63	AVG			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA2402

Ant 0°

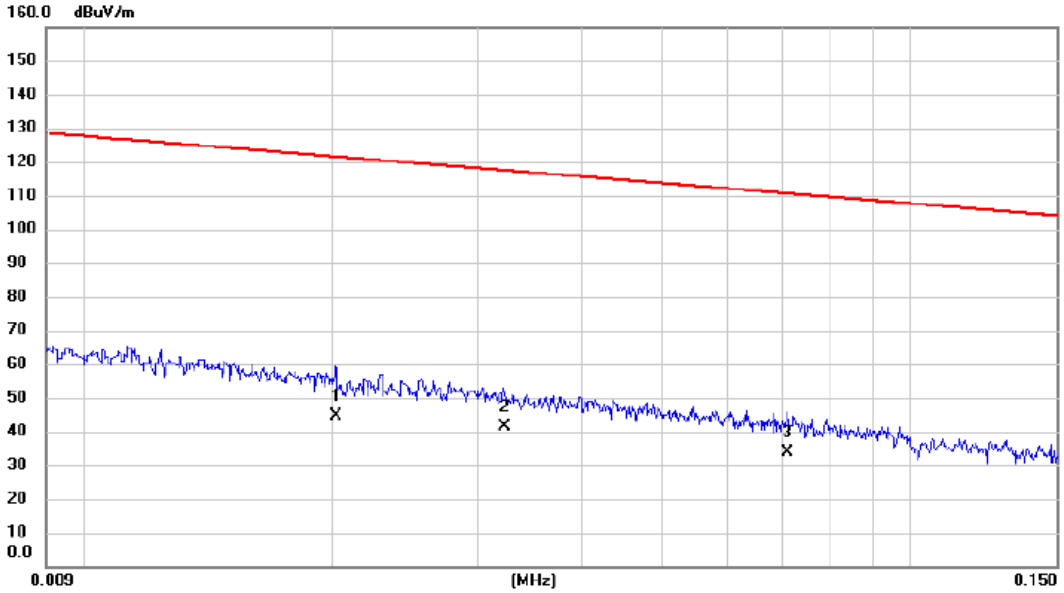


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.558	24.30	12.94	37.24	72.67	-35.43	QP			
2 *		2.237	30.80	11.68	42.48	69.54	-27.06	QP			
3		5.390	21.50	10.92	32.42	69.54	-37.12	QP			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA2402

Ant 90°

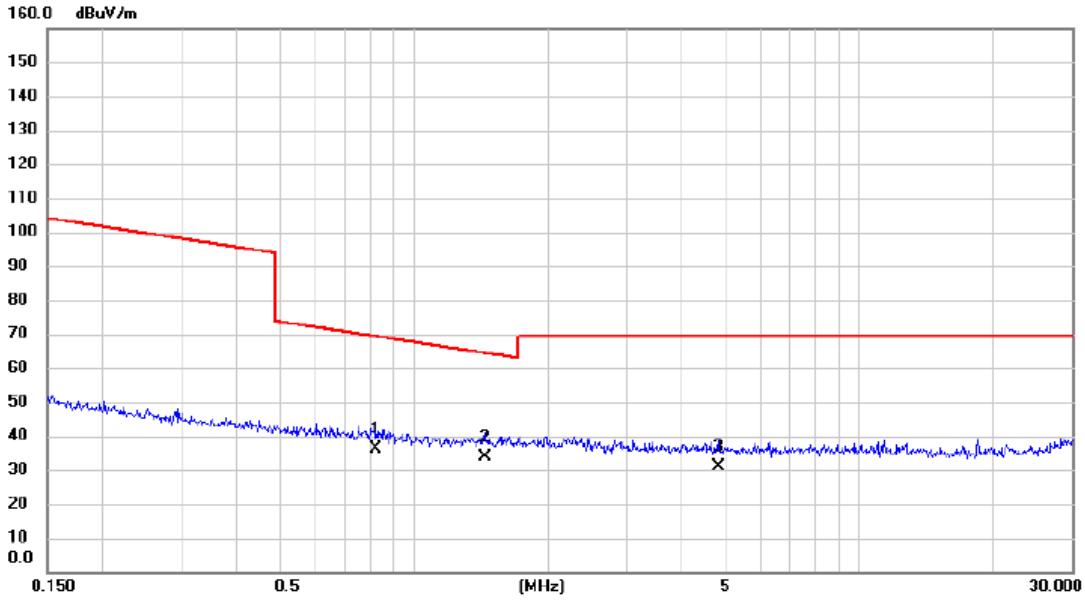


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.020	30.80	13.82	44.62	121.50	-76.88	AVG			
2 *		0.032	27.60	13.87	41.47	117.42	-75.95	AVG			
3		0.071	20.30	13.59	33.89	110.57	-76.68	AVG			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA2402

Ant 90°

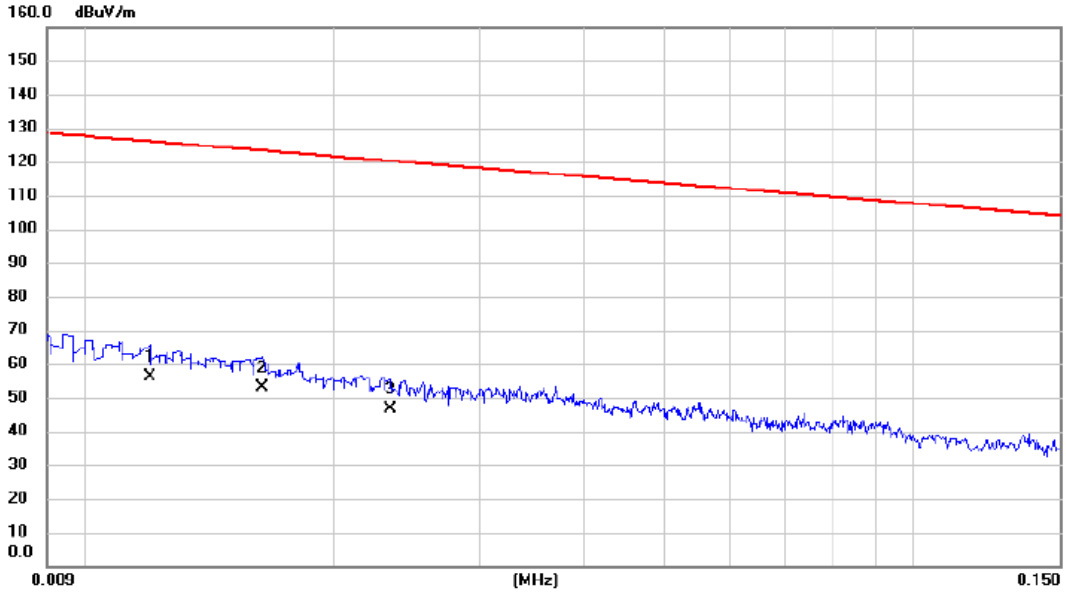


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.817	23.60	12.56	36.16	69.36	-33.20	QP			
2 *		1.441	21.80	12.20	34.00	64.43	-30.43	QP			
3		4.822	20.10	10.88	30.98	69.54	-38.56	QP			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Ant 0°

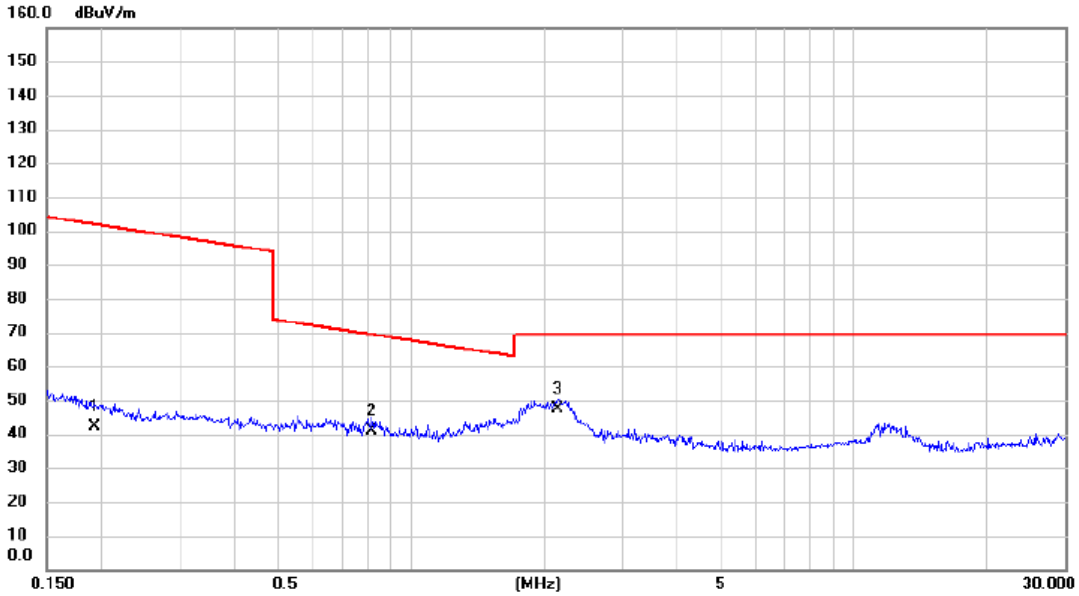


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	0.0120	40.10	16.22	56.32	126.02	-69.70	AVG			
2		0.0164	38.20	14.90	53.10	123.31	-70.21	AVG			
3		0.0234	32.69	13.83	46.52	120.22	-73.70	AVG			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Ant 0°

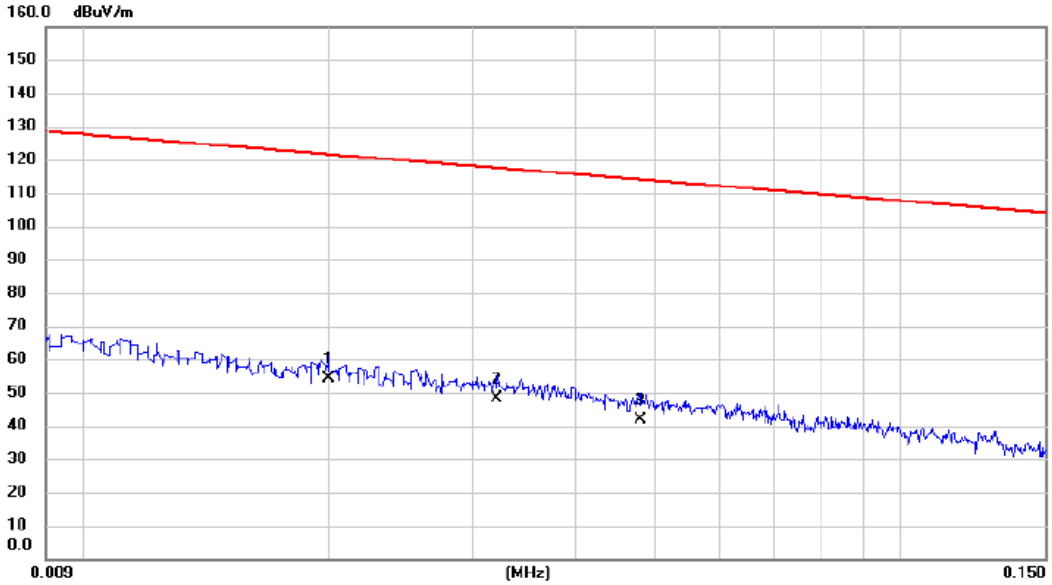


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.1932	28.61	13.60	42.21	101.89	-59.68	AVG			
2		0.8173	28.51	12.56	41.07	69.36	-28.29	QP			
3	*	2.1440	35.49	11.73	47.22	69.54	-22.32	QP			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Ant 90°

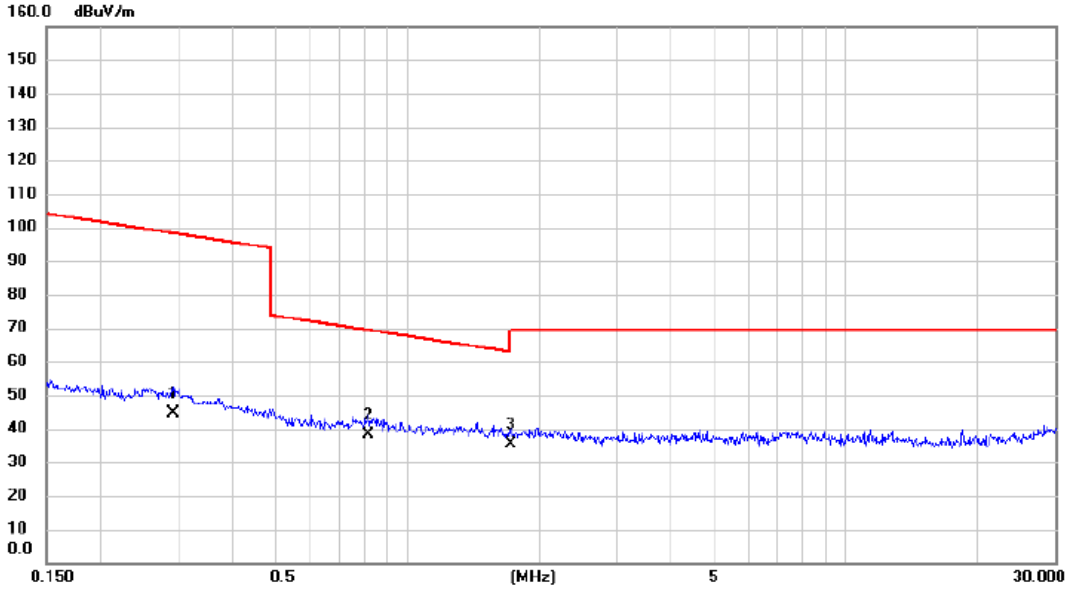


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	0.0200	40.38	13.82	54.20	121.58	-67.38	AVG			
2		0.0321	34.15	13.87	48.02	117.47	-69.45	AVG			
3		0.0480	27.75	13.92	41.67	113.98	-72.31	AVG			

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Ant 90°



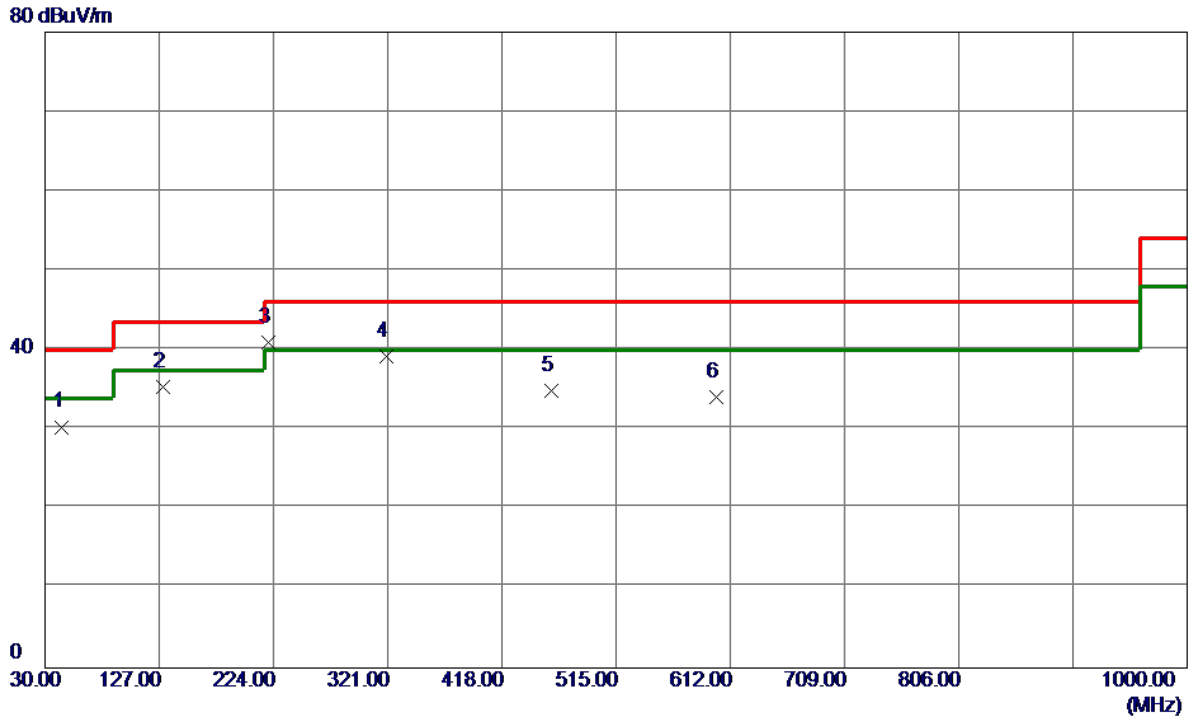
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.2923	30.87	13.56	44.43	98.29	-53.86	AVG			
2	*	0.8173	25.47	12.56	38.03	69.36	-31.33	QP			
3		1.7253	23.28	12.00	35.28	69.54	-34.26	QP			

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 39 _1Mbps_Model: CPA2402

Vertical

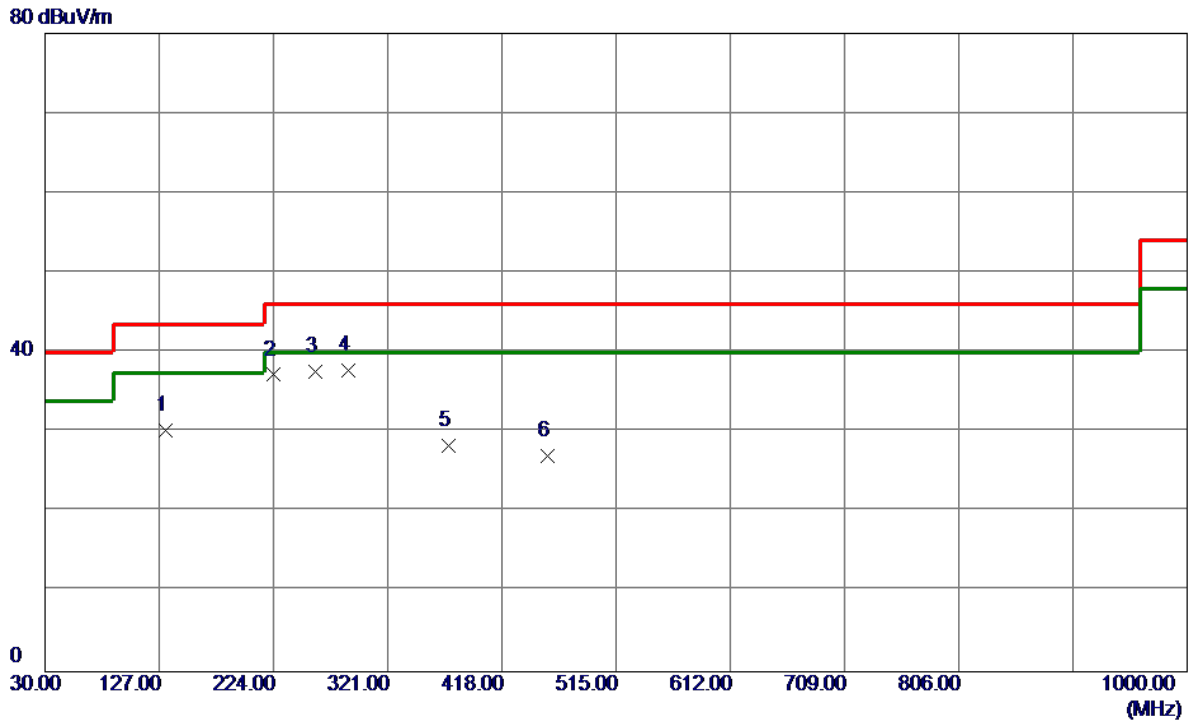


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	44.5500	44.84	-14.52	30.32	40.00	-9.68	Peak	
2	129.9100	48.41	-13.05	35.36	43.50	-8.14	Peak	
3 *	220.1200	55.59	-14.64	40.95	46.00	-5.05	Peak	
4	320.0300	50.38	-11.16	39.22	46.00	-6.78	Peak	
5	460.1950	42.82	-8.00	34.82	46.00	-11.18	Peak	
6	599.8750	39.89	-5.74	34.15	46.00	-11.85	Peak	

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA2402

Horizontal

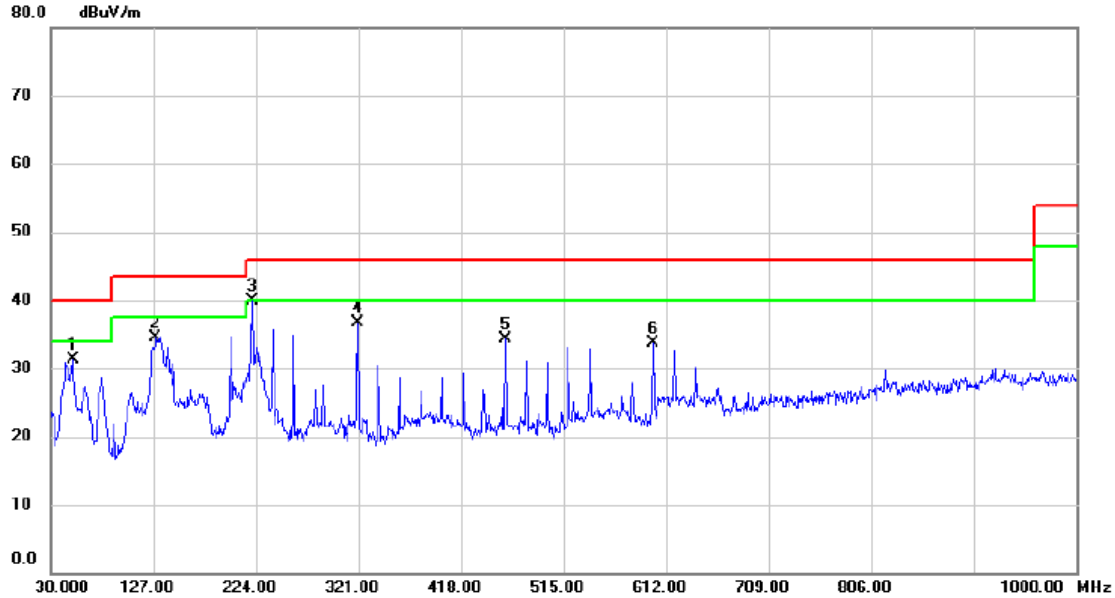


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	132.3350	43.24	-13.01	30.23	43.50	-13.27	Peak	
2	223.5150	51.71	-14.51	37.20	46.00	-8.80	Peak	
3	259.8900	50.33	-12.66	37.67	46.00	-8.33	Peak	
4 *	288.0200	49.79	-12.08	37.71	46.00	-8.29	Peak	
5	372.4100	38.43	-10.12	28.31	46.00	-17.69	Peak	
6	457.2850	35.04	-8.02	27.02	46.00	-18.98	Peak	

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Vertical

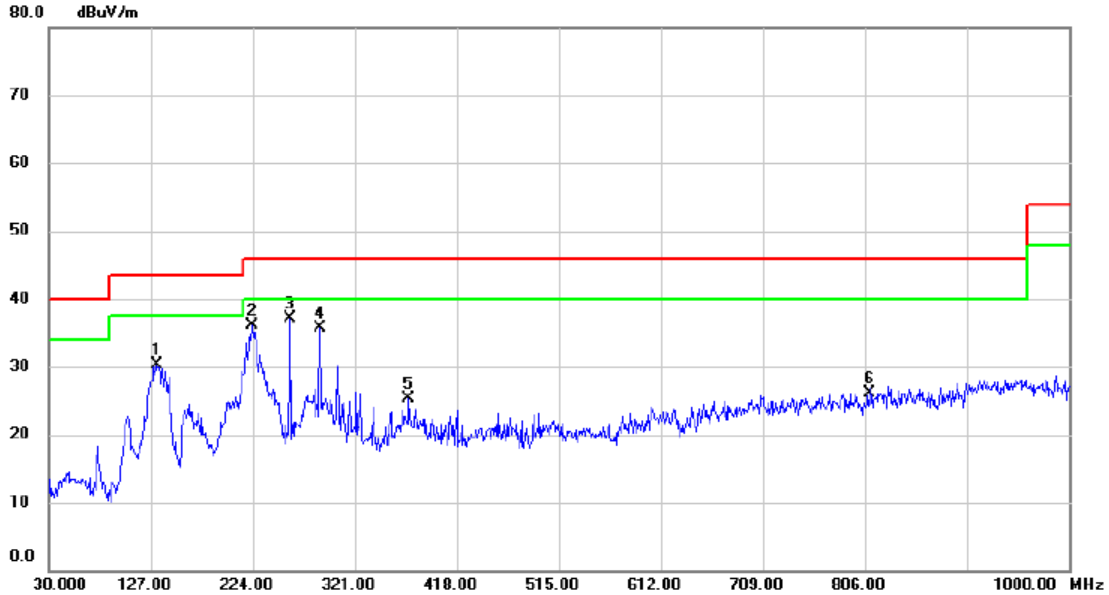


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		50.8550	45.19	-13.92	31.27	40.00	-8.73	peak	
2		129.4250	47.61	-13.05	34.56	43.50	-8.94	peak	
3	*	220.1200	54.59	-14.64	39.95	46.00	-6.05	peak	
4		320.0300	47.88	-11.16	36.72	46.00	-9.28	peak	
5		460.1950	42.32	-8.00	34.32	46.00	-11.68	peak	
6		599.8750	39.39	-5.74	33.65	46.00	-12.35	peak	

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

Test Mode:	TX Mode Channel 39 _1Mbps_Model: CPA1202

Horizontal



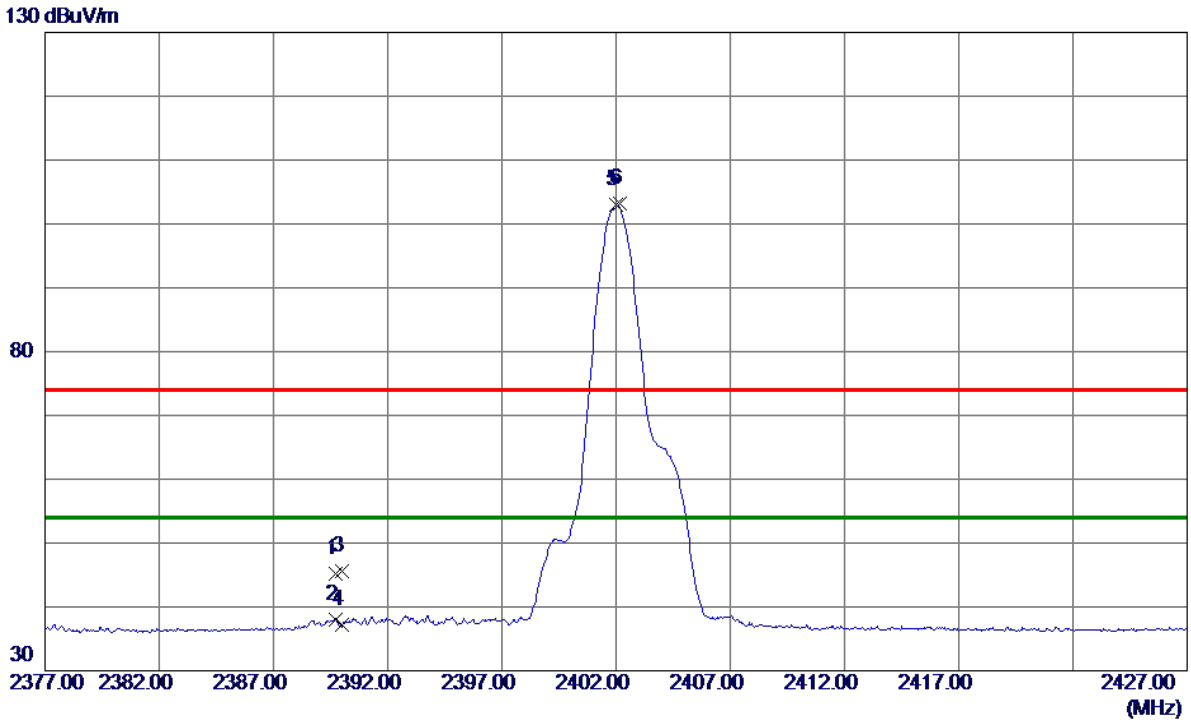
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		132.3350	43.24	-13.01	30.23	43.50	-13.27	peak	
2		223.5150	50.70	-14.50	36.20	46.00	-9.80	peak	
3	*	259.8900	49.83	-12.66	37.17	46.00	-8.83	peak	
4		288.0200	47.79	-12.08	35.71	46.00	-10.29	peak	
5		372.4100	35.43	-10.12	25.31	46.00	-20.69	peak	
6		810.3650	29.05	-2.87	26.18	46.00	-19.82	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_Model: CPA2402

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2389.7000	38.62	6.53	45.15	74.00	-28.85	Peak	
2	2389.7000	31.53	6.53	38.06	54.00	-15.94	AVG	
3	2390.0000	39.06	6.53	45.59	74.00	-28.41	Peak	
4	2390.0000	30.66	6.53	37.19	54.00	-16.81	AVG	
5 *	2402.0000	96.40	6.52	102.92	54.00	48.92	AVG	No Limit
6	2402.1750	96.61	6.52	103.13	74.00	29.13	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_Model: CPA2402

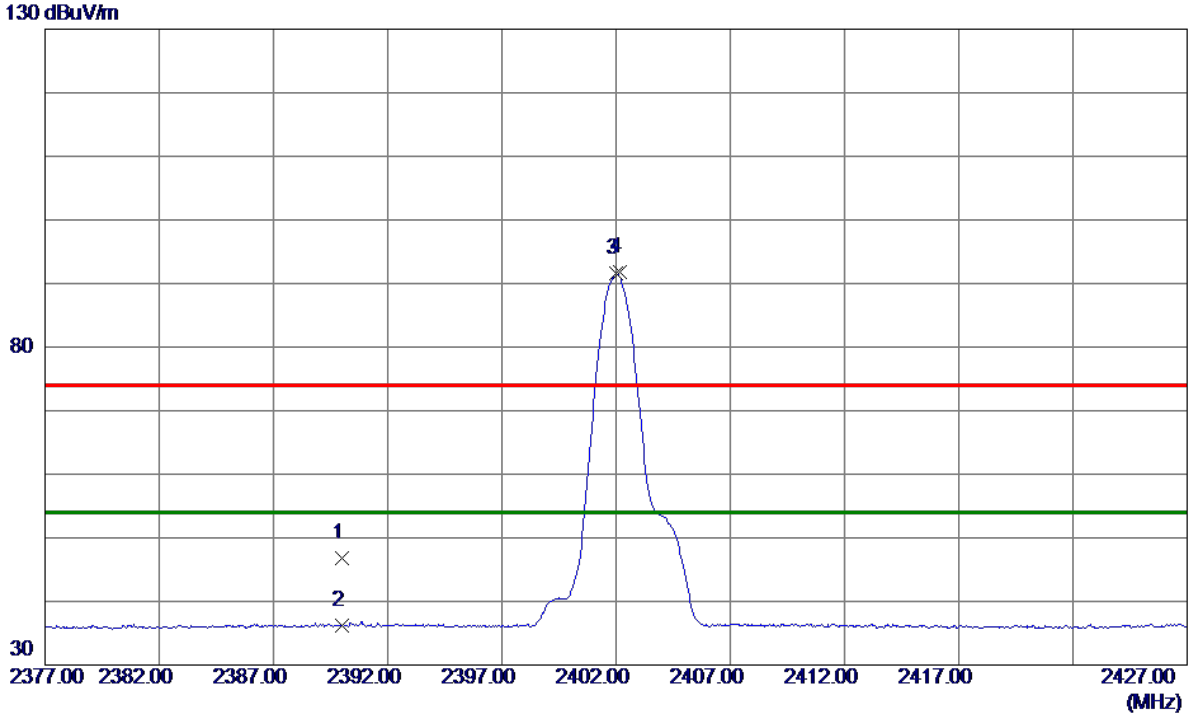
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4803.8980	42.52	3.37	45.89	74.00	-28.11	Peak	
2 *	4804.0170	36.64	3.37	40.01	54.00	-13.99	AVG	

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

Test Mode:	TX 2402 MHz _CH00_1Mbps_Model: CPA2402

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	40.25	6.53	46.78	74.00	-27.22	Peak	
2	2390.0000	29.70	6.53	36.23	54.00	-17.77	AVG	
3 *	2402.0000	85.01	6.52	91.53	54.00	37.53	AVG	No Limit
4	2402.1750	85.36	6.52	91.88	74.00	17.88	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_Model: CPA2402

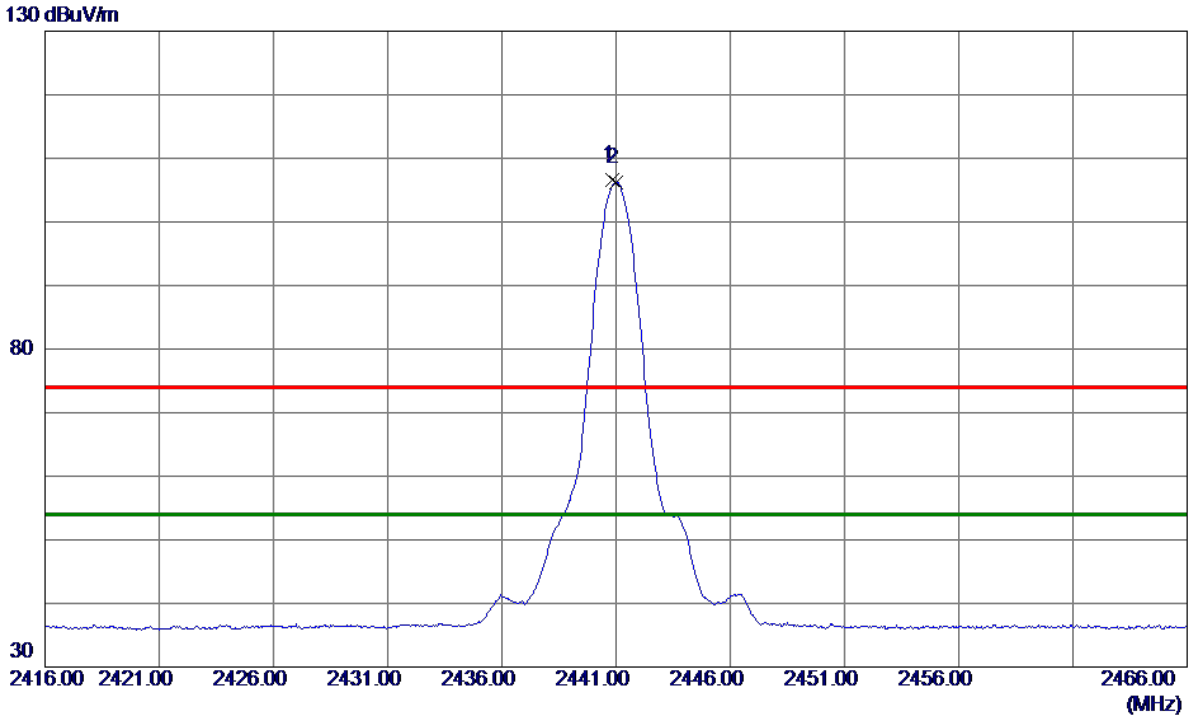
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4803.9650	30.10	3.37	33.47	54.00	-20.53	AVG	
2	4804.3230	39.13	3.37	42.50	74.00	-31.50	Peak	

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

Test Mode:	TX 2441 MHz _CH39_1Mbps_Model: CPA2402

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	100.06	6.47	106.53	74.00	32.53	Peak	No Limit
2 *	2441.0250	99.80	6.47	106.27	54.00	52.27	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_Model: CPA2402

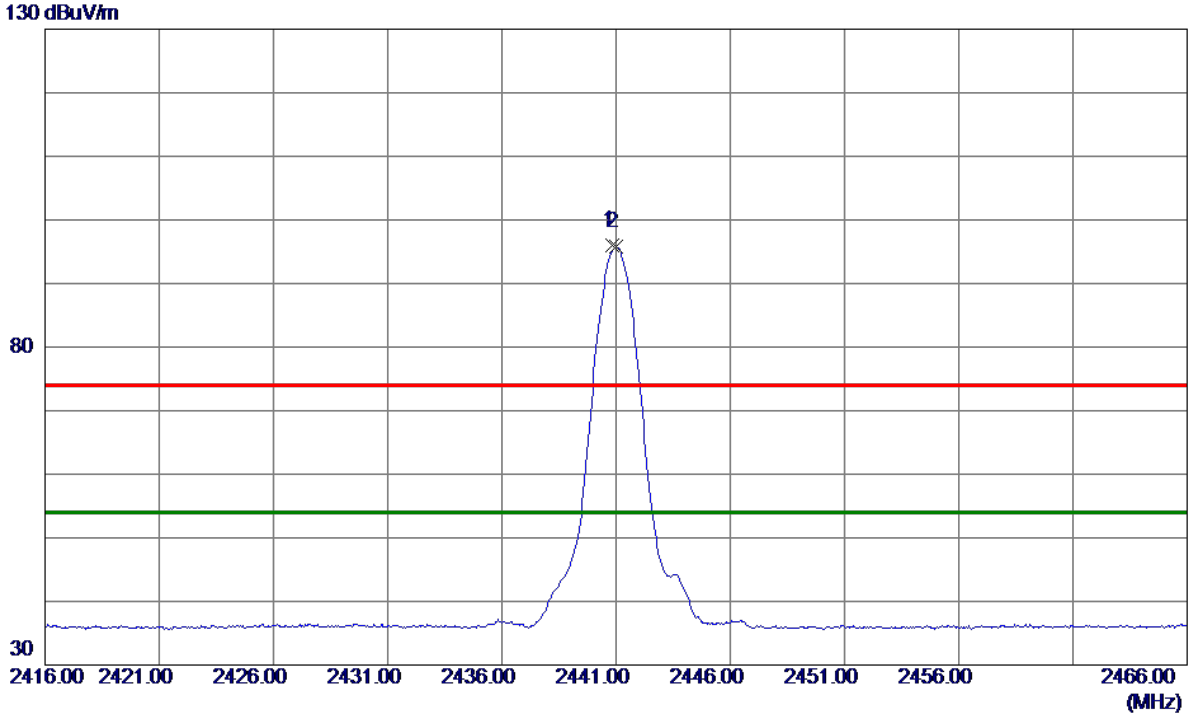
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4881.9890	33.46	3.60	37.06	54.00	-16.94	AVG	
2	4882.0660	40.73	3.60	44.33	74.00	-29.67	Peak	

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

Test Mode:	TX 2441 MHz _CH39_1Mbps_Model: CPA2402

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8250	89.53	6.47	96.00	74.00	22.00	Peak	No Limit
2 *	2441.0000	89.27	6.47	95.74	54.00	41.74	AVG	No Limit

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

Test Mode:	TX 2441 MHz _CH39_1Mbps_Model: CPA2402

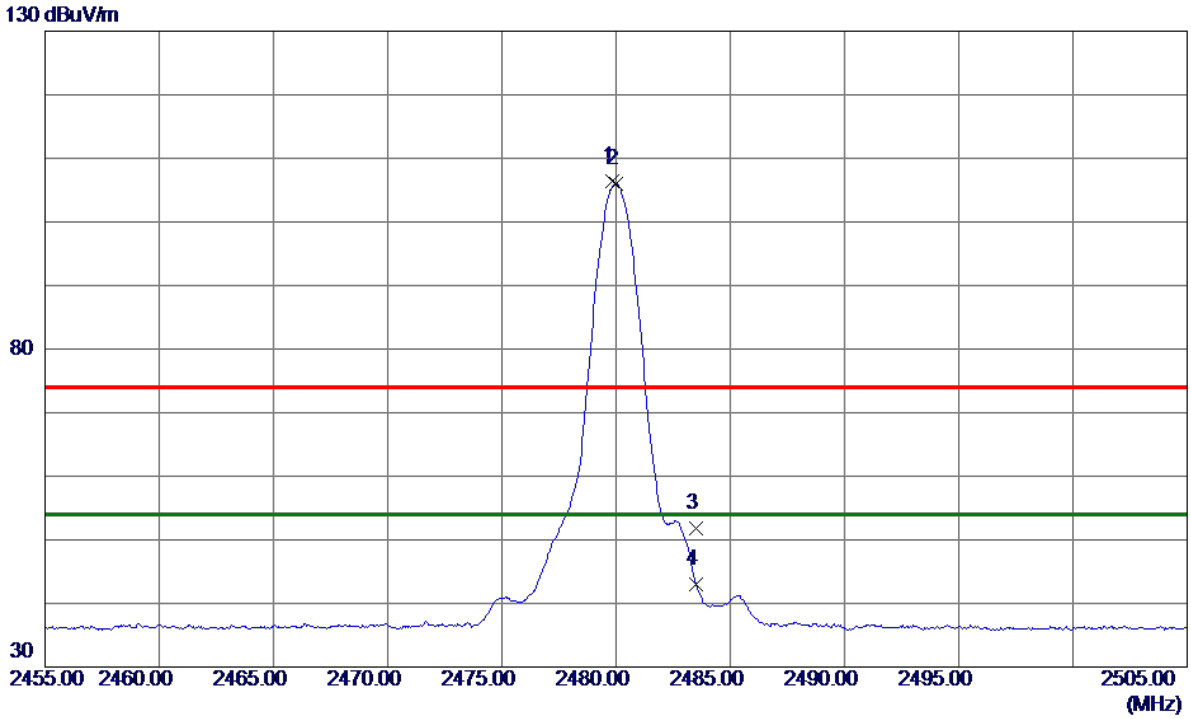
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4881.3800	38.04	3.60	41.64	74.00	-32.36	Peak	
2 *	4882.2500	27.84	3.61	31.45	54.00	-22.55	AVG	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps_Model: CPA2402

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.8250	99.93	6.43	106.36	74.00	32.36	Peak	No Limit
2 *	2480.0250	99.61	6.43	106.04	54.00	52.04	AVG	No Limit
3	2483.5000	45.31	6.42	51.73	74.00	-22.27	Peak	
4	2483.5000	36.56	6.42	42.98	54.00	-11.02	AVG	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps_Model: CPA2402

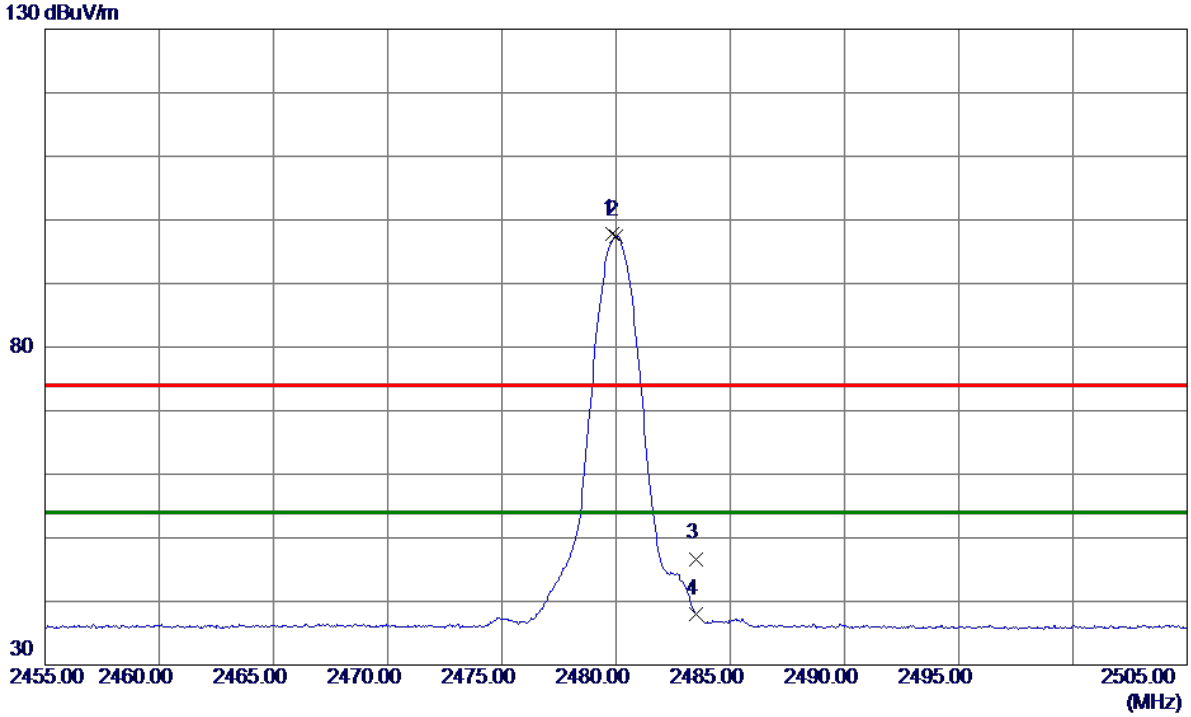
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4960.0050	32.99	3.84	36.83	54.00	-17.17	AVG	
2	4960.2679	40.55	3.84	44.39	74.00	-29.61	Peak	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps_Model: CPA2402

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.8250	91.33	6.43	97.76	74.00	23.76	Peak	No Limit
2 *	2480.0000	91.07	6.43	97.50	54.00	43.50	AVG	No Limit
3	2483.5000	40.28	6.42	46.70	74.00	-27.30	Peak	
4	2483.5000	31.61	6.42	38.03	54.00	-15.97	AVG	

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

Test Mode:	TX 2480 MHz _CH78_1Mbps_Model: CPA2402

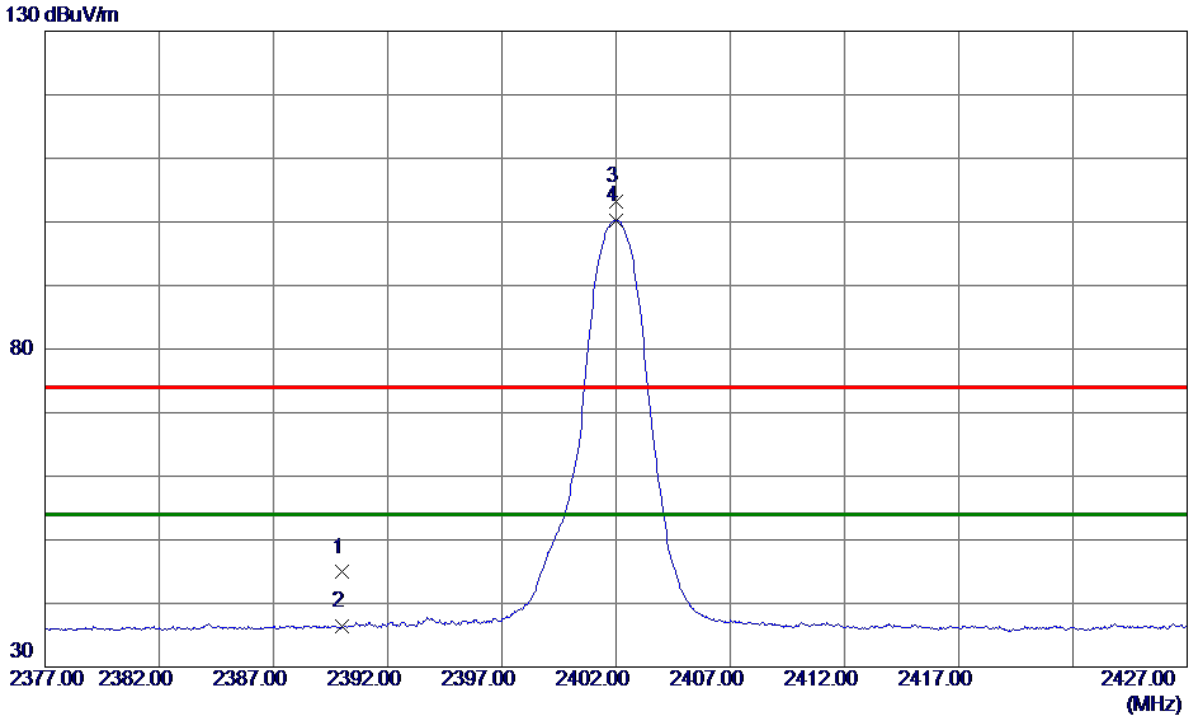
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4959.8690	38.67	3.84	42.51	74.00	-31.49	Peak	
2 *	4959.9190	29.11	3.84	32.95	54.00	-21.05	AVG	

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

Test Mode:	TX 2402 MHz _CH00_3Mbps_Model: CPA2402

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	38.37	6.53	44.90	74.00	-29.10	Peak	
2	2390.0000	29.78	6.53	36.31	54.00	-17.69	AVG	
3	2401.9750	96.74	6.52	103.26	74.00	29.26	Peak	No Limit
4 *	2402.0250	93.75	6.52	100.27	54.00	46.27	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_Model: CPA2402

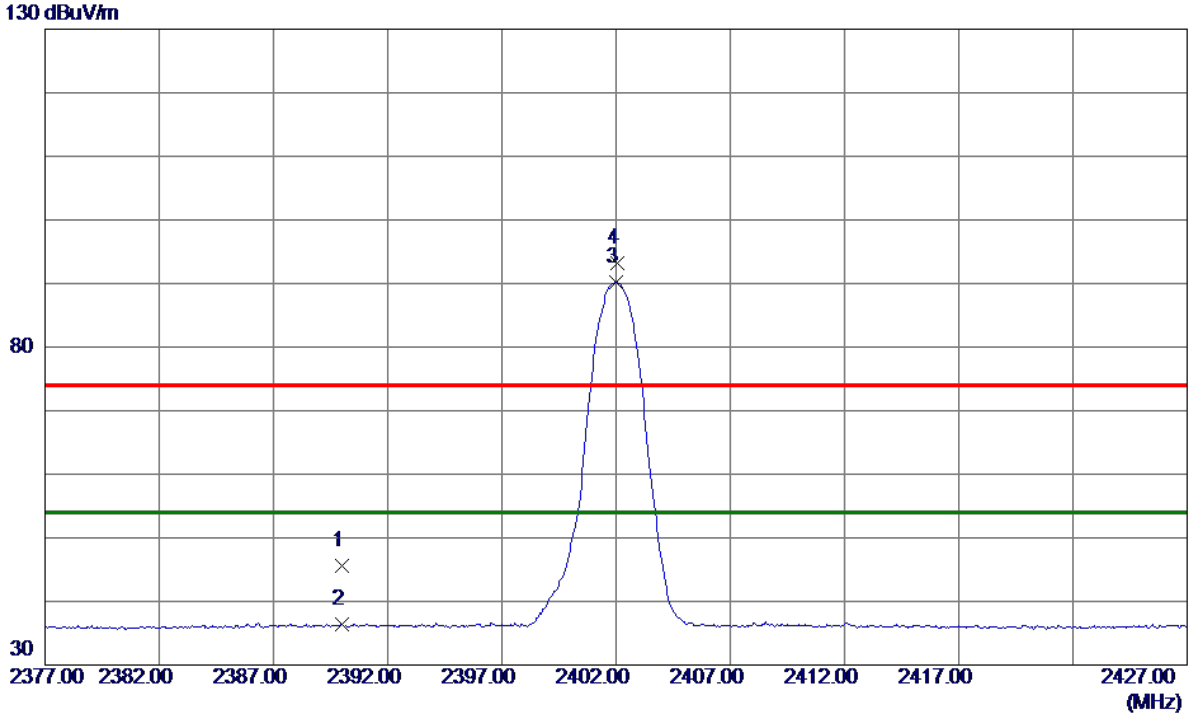
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4803.9129	40.10	3.37	43.47	74.00	-30.53	Peak	
2 *	4803.9960	30.63	3.37	34.00	54.00	-20.00	AVG	

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

Test Mode:	TX 2402 MHz _CH00_3Mbps_Model: CPA2402

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	39.12	6.53	45.65	74.00	-28.35	Peak	
2	2390.0000	29.81	6.53	36.34	54.00	-17.66	AVG	
3 *	2402.0250	83.68	6.52	90.20	54.00	36.20	AVG	No Limit
4	2402.0500	86.67	6.52	93.19	74.00	19.19	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_Model: CPA2402

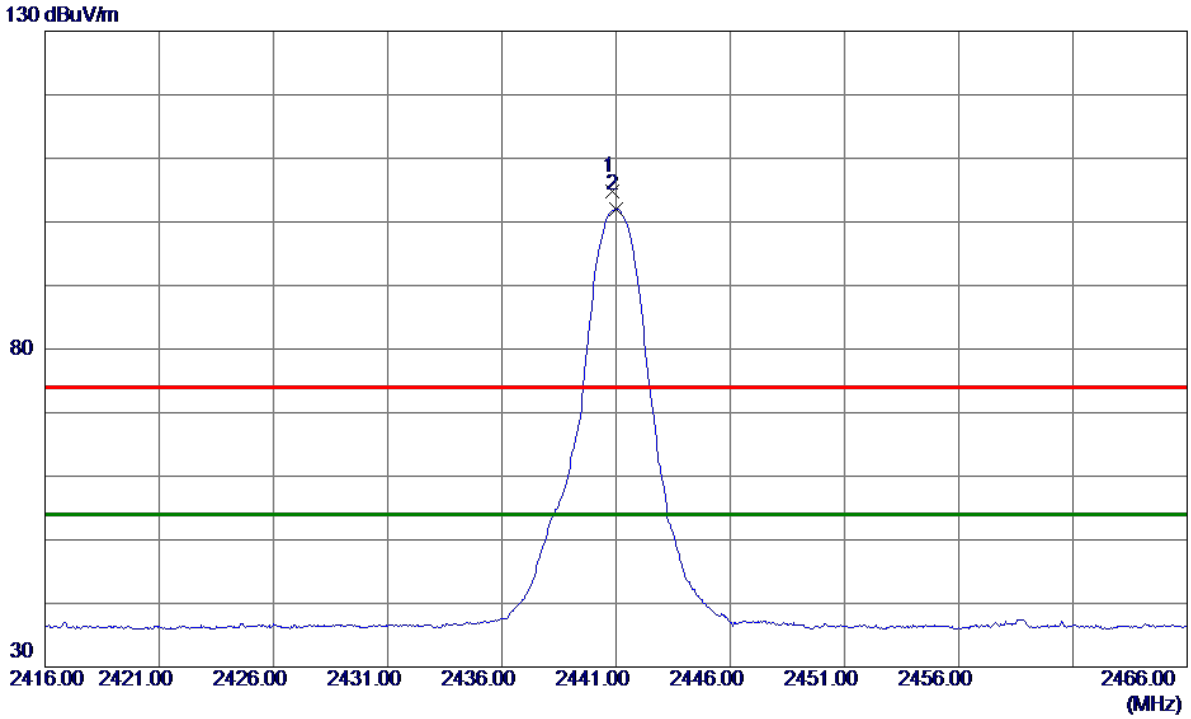
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4804.1480	26.24	3.37	29.61	54.00	-24.39	AVG	
2	4804.6540	37.30	3.37	40.67	74.00	-33.33	Peak	

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

Test Mode:	TX 2441 MHz _CH39_3Mbps_Model: CPA2402

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8250	98.30	6.47	104.77	74.00	30.77	Peak	No Limit
2 *	2441.0000	95.53	6.47	102.00	54.00	48.00	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_Model: CPA2402

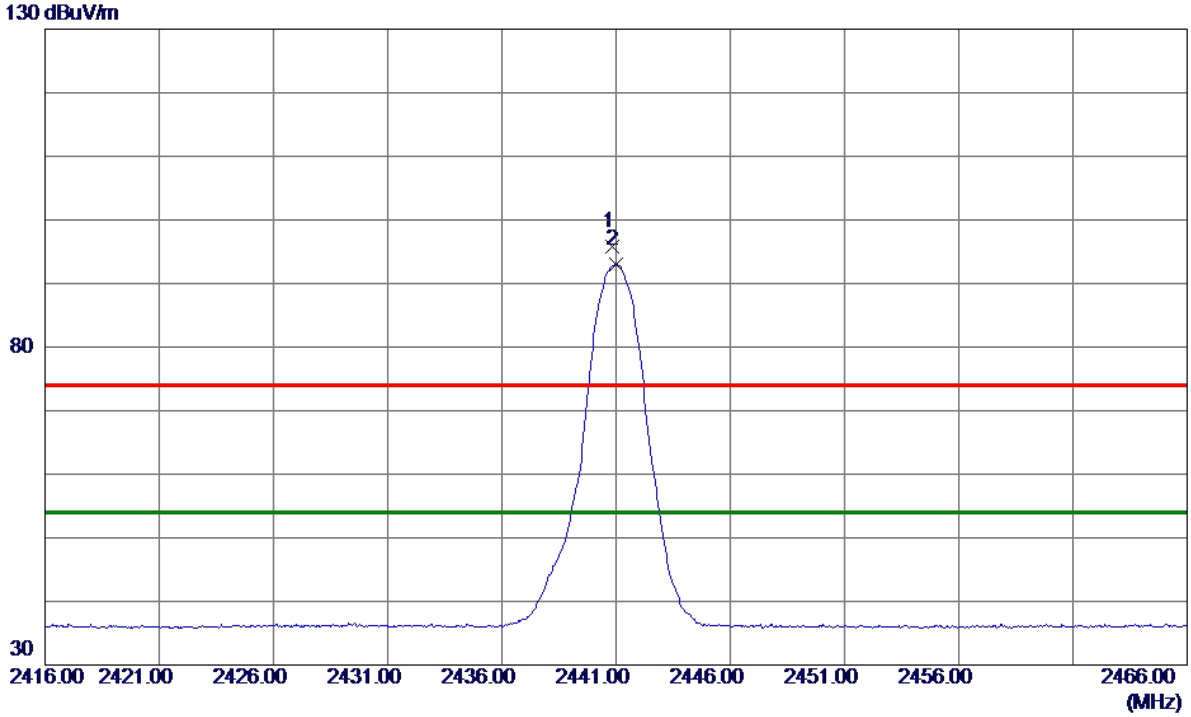
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4881.6920	39.15	3.60	42.75	74.00	-31.25	Peak	
2 *	4881.9330	29.61	3.60	33.21	54.00	-20.79	AVG	

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

Test Mode:	TX 2441 MHz _CH39_3Mbps_Model: CPA2402

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2440.8500	89.26	6.47	95.73	74.00	21.73	Peak	No Limit
2 *	2441.0000	86.52	6.47	92.99	54.00	38.99	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_Model: CPA2402

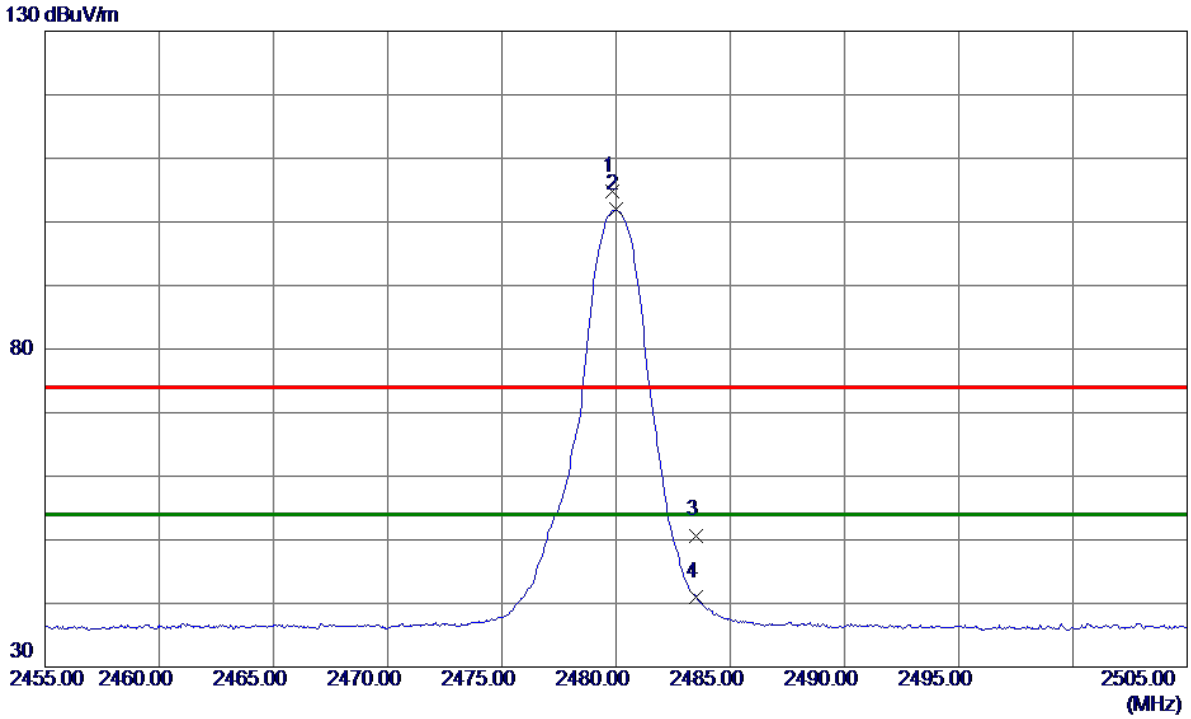
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4882.0730	37.73	3.60	41.33	74.00	-32.67	Peak	
2 *	4882.2470	27.10	3.61	30.71	54.00	-23.29	AVG	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps_Model: CPA2402

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.8250	98.30	6.43	104.73	74.00	30.73	Peak	No Limit
2 *	2479.9750	95.48	6.43	101.91	54.00	47.91	AVG	No Limit
3	2483.5000	44.28	6.42	50.70	74.00	-23.30	Peak	
4	2483.5000	34.52	6.42	40.94	54.00	-13.06	AVG	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps_Model: CPA2402

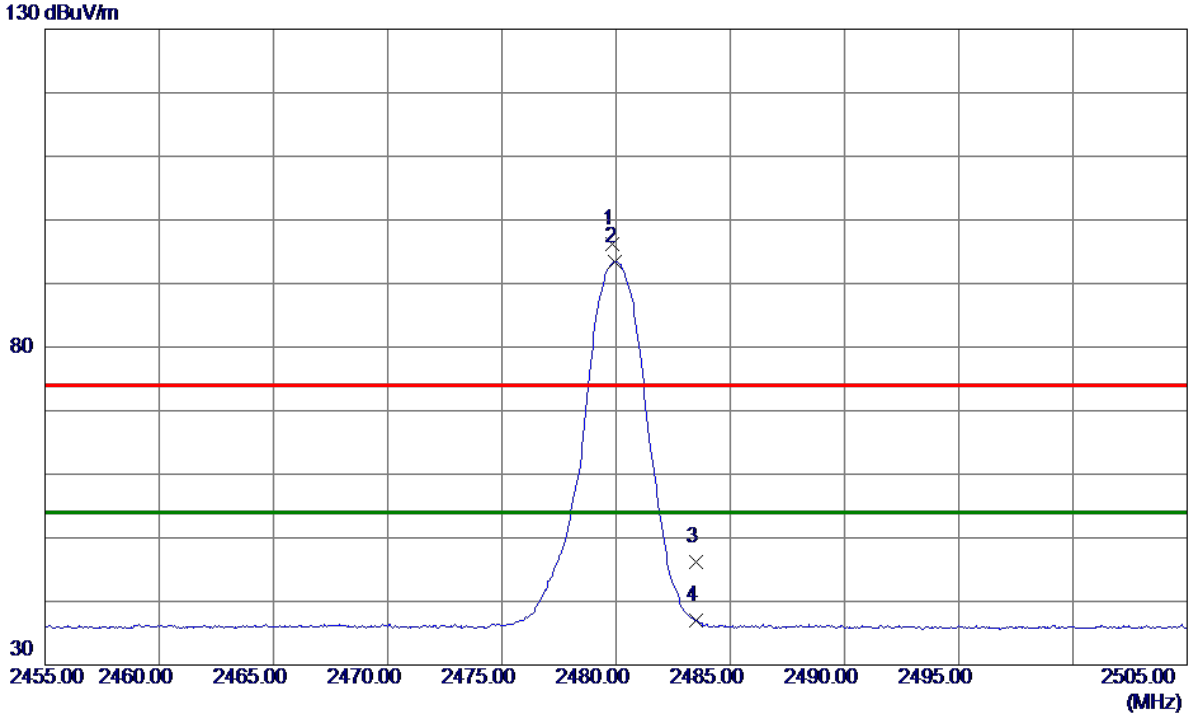
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4959.7350	29.54	3.84	33.38	54.00	-20.62	AVG	
2	4959.7400	39.01	3.84	42.85	74.00	-31.15	Peak	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps_Model: CPA2402

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.8250	89.74	6.43	96.17	74.00	22.17	Peak	No Limit
2 *	2479.9500	87.01	6.43	93.44	54.00	39.44	AVG	No Limit
3	2483.5000	39.81	6.42	46.23	74.00	-27.77	Peak	
4	2483.5000	30.49	6.42	36.91	54.00	-17.09	AVG	

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

Test Mode:	TX 2480 MHz _CH78_3Mbps_Model: CPA2402

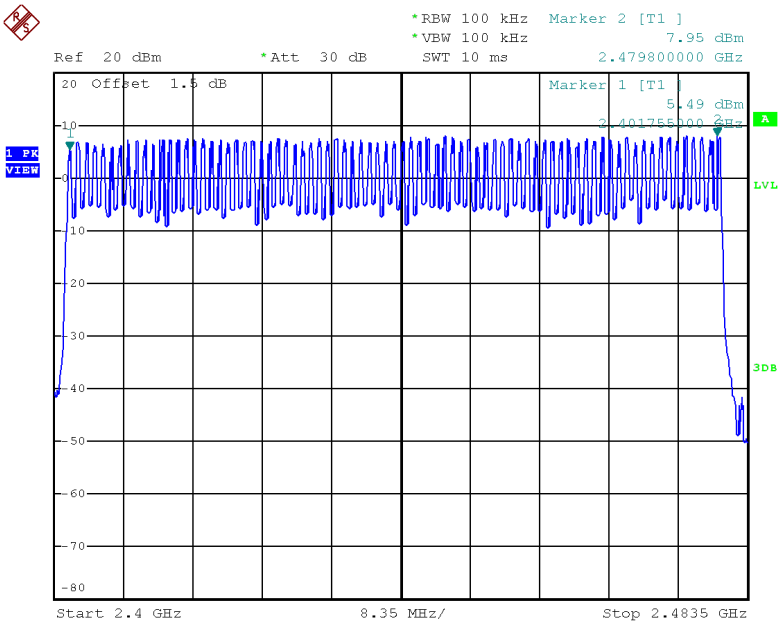
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4959.1570	37.55	3.84	41.39	74.00	-32.61	Peak	
2 *	4959.6629	26.54	3.84	30.38	54.00	-23.62	AVG	

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

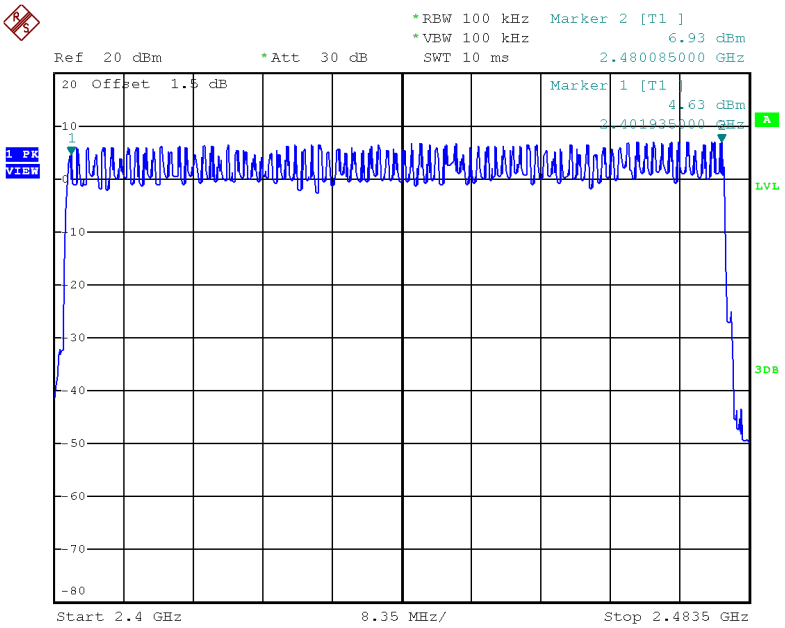
APPENDIX E - NUMBER OF HOPPING FREQUENCY

Test Mode	Hopping Mode_1Mbps
Number of Hopping Frequency	79



Date: 6.JUL.2019 10:18:08

Test Mode	Hopping Mode_3Mbps
Number of Hopping Frequency	79



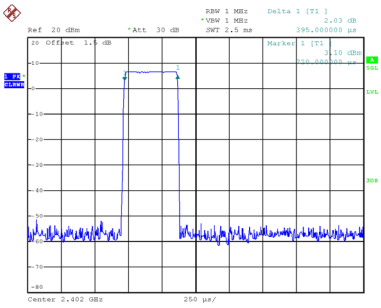
Date: 6.JUL.2019 11:14:07

APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode:	TX Mode_1Mbps

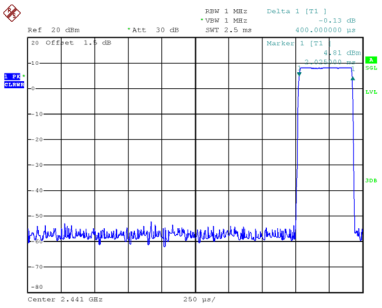
Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH1	2402	0.3950	0.1264	0.4000	Pass
DH3	2402	1.6600	0.2656	0.4000	Pass
DH5	2402	2.9200	0.3115	0.4000	Pass
DH1	2441	0.4000	0.1280	0.4000	Pass
DH3	2441	1.6600	0.2656	0.4000	Pass
DH5	2441	2.9200	0.3115	0.4000	Pass
DH1	2480	0.4000	0.1280	0.4000	Pass
DH3	2480	1.6600	0.2656	0.4000	Pass
DH5	2480	2.9200	0.3115	0.4000	Pass

CH00-DH1



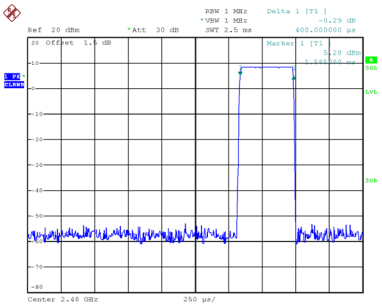
Date: 6.JUL.2019 10:56:04

CH39-DH1



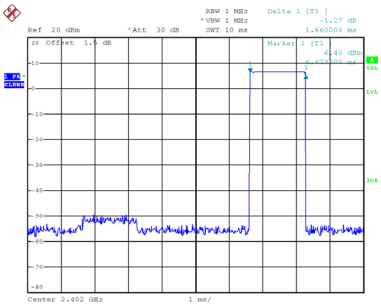
Date: 6.JUL.2019 10:48:03

CH78-DH1



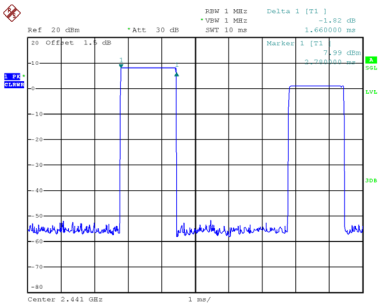
Date: 6.JUL.2019 10:48:07

CH00-DH3



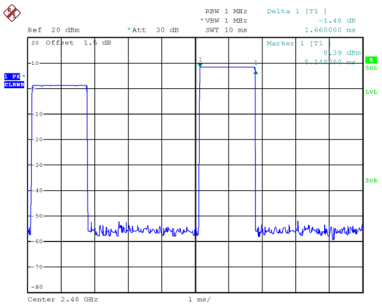
Date: 6.JUL.2019 10:57:12

CH39-DH3



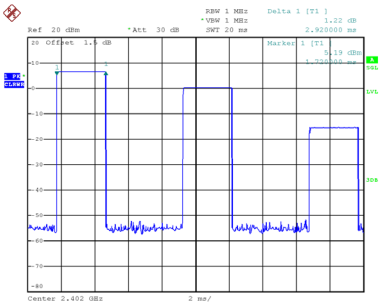
Date: 6.JUL.2019 10:52:44

CH78-DH3



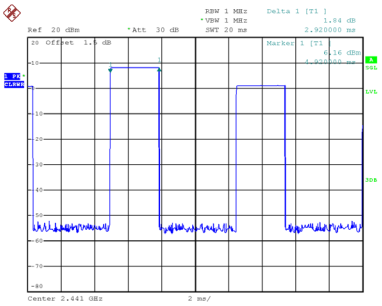
Date: 6.JUL.2019 10:52:48

CH00-DH5



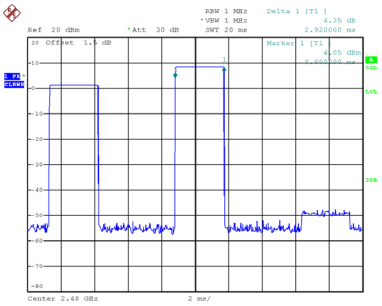
Date: 6.JUL.2019 11:02:17

CH39-DH5



Date: 6.JUL.2019 10:53:35

CH78-DH5

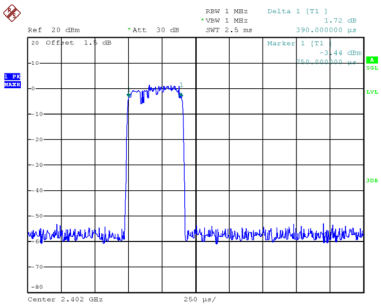


Date: 6.JUL.2019 10:53:39

Test Mode:	TX Mode_3Mbps

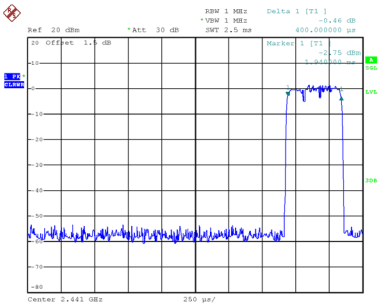
Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)	Test Result
3DH1	2402	0.3900	0.1248	0.4000	Pass
3DH3	2402	1.6400	0.2624	0.4000	Pass
3DH5	2402	2.9200	0.3115	0.4000	Pass
3DH1	2441	0.4000	0.1280	0.4000	Pass
3DH3	2441	1.6600	0.2656	0.4000	Pass
3DH5	2441	2.8800	0.3072	0.4000	Pass
3DH1	2480	0.4050	0.1296	0.4000	Pass
3DH3	2480	1.6600	0.2656	0.4000	Pass
3DH5	2480	2.9200	0.3115	0.4000	Pass

CH00-3DH1



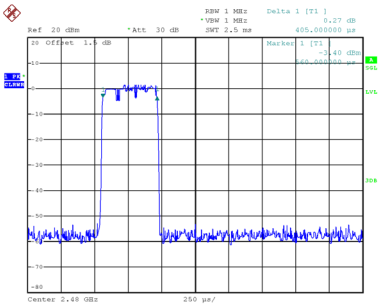
Date: 6.JUL.2019 11:15:50

CH39-3DH1



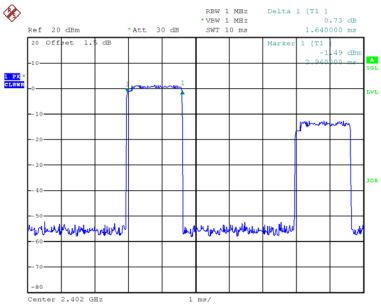
Date: 6.JUL.2019 11:15:54

CH78-3DH1



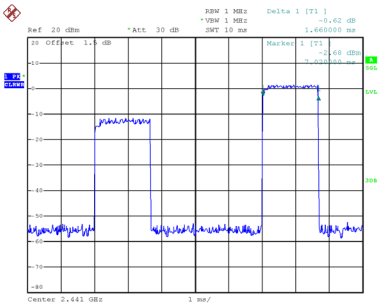
Date: 6.JUL.2019 11:20:41

CH00-3DH3



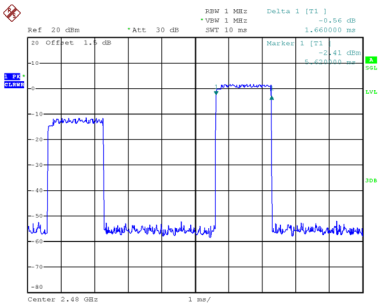
Date: 6.JUL.2019 11:16:40

CH39-3DH3



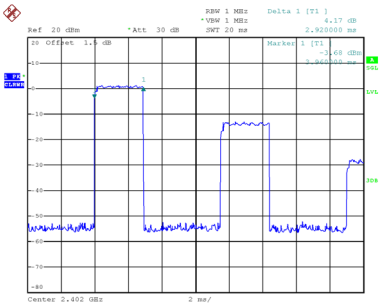
Date: 6.JUL.2019 11:16:43

CH78-3DH3



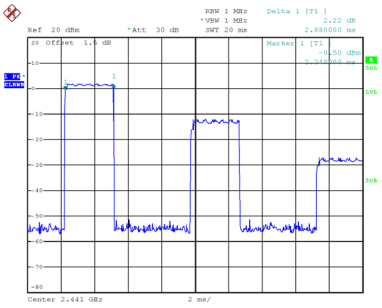
Date: 6.JUL.2019 11:19:47

CH00-3DH5



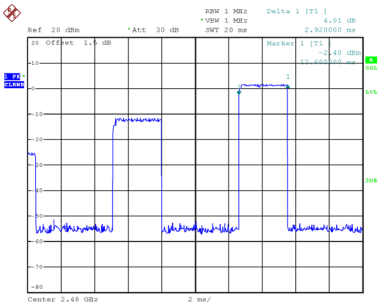
Date: 6.JUL.2019 11:18:55

CH39-3DH5



Date: 6.JUL.2019 11:18:31

CH78-3DH5



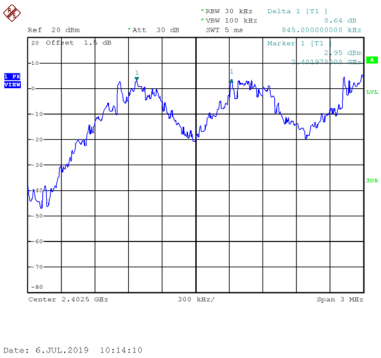
Date: 6.JUL.2019 11:18:35

APPENDIX G - HOPPING CHANNEL SEPARATION MEASUREMENT

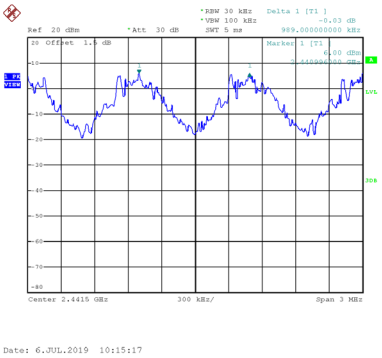
Test Mode:	Hopping on _1Mbps

Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	0.845	0.631	Pass
39	2441	0.989	0.629	Pass
78	2480	0.996	0.632	Pass

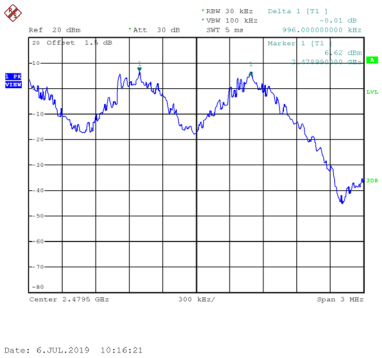
CH00



CH39



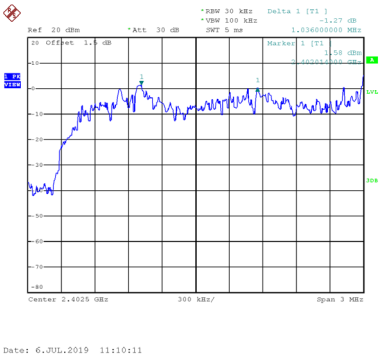
CH78



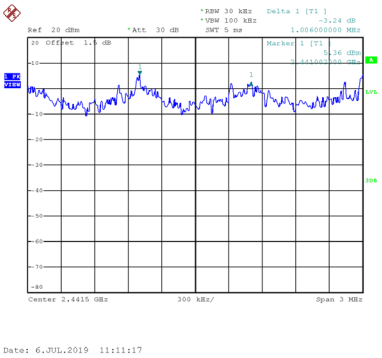
Test Mode:	Hopping on _3Mbps

Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.036	0.840	Pass
39	2441	1.006	0.841	Pass
78	2480	0.996	0.843	Pass

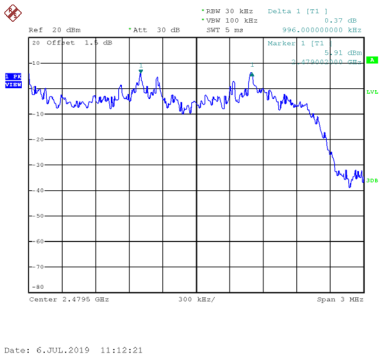
CH00



CH39



CH78

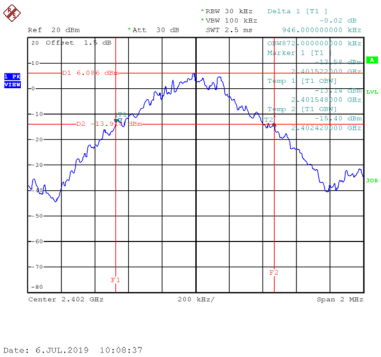


APPENDIX H - BANDWIDTH

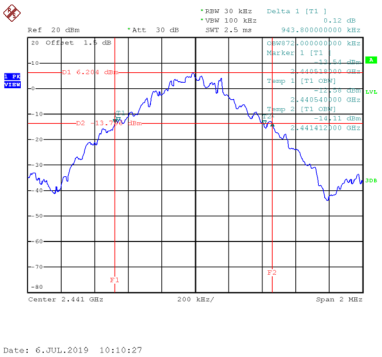
Test Mode:	TX Mode _1Mbps

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)
00	2402	0.946	0.872
39	2441	0.944	0.872
78	2480	0.948	0.868

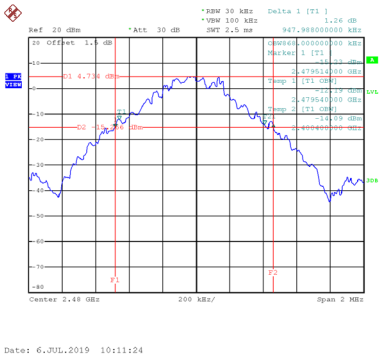
CH00



CH39



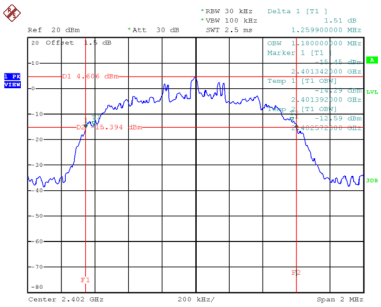
CH78



Test Mode:	TX Mode _3Mbps

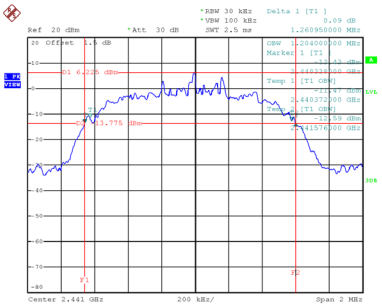
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)
00	2402	1.260	1.180
39	2441	1.261	1.204
78	2480	1.264	1.184

CH00



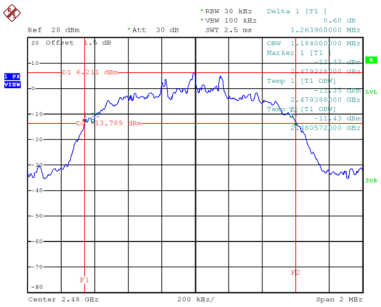
Date: 6.JUL.2019 11:05:06

CH39



Date: 6.JUL.2019 11:06:35

CH78



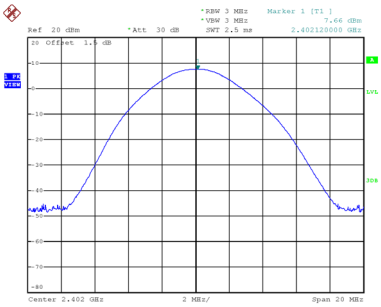
Date: 6.JUL.2019 11:07:16

APPENDIX I - MAXIMUM OUTPUT POWER

Test Mode:	TX Mode _1Mbps

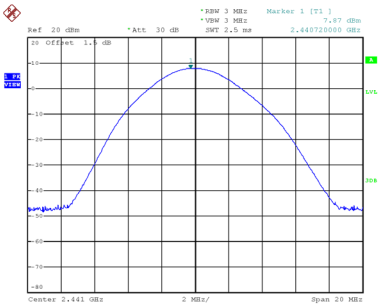
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	7.66	0.0058	21.00	0.125	Pass
39	2441	7.87	0.0061	21.00	0.125	Pass
78	2480	7.78	0.0060	21.00	0.125	Pass

CH00



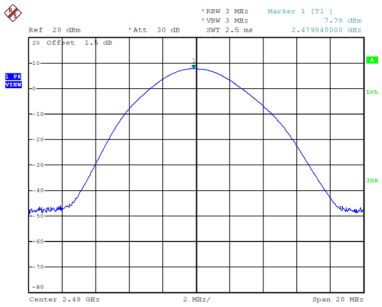
Date: 6.JUL.2019 09:54:02

CH39



Date: 6.JUL.2019 09:54:46

CH78

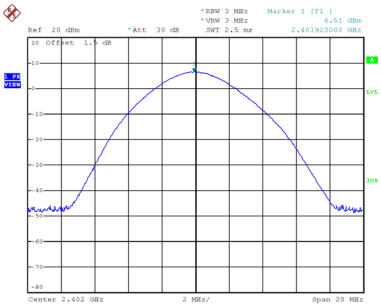


Date: 6.JUL.2019 09:55:39

Test Mode:	TX Mode _3Mbps

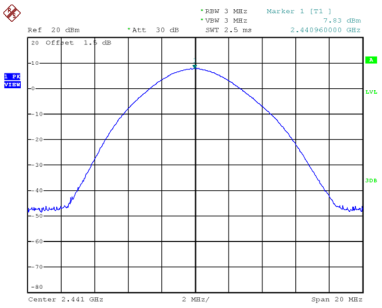
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	6.51	0.0045	21.00	0.125	Pass
39	2441	7.83	0.0061	21.00	0.125	Pass
78	2480	7.72	0.0059	21.00	0.125	Pass

CH00



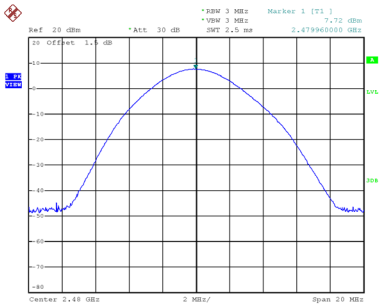
Date: 6.JUL.2019 10:00:44

CH39



Date: 6.JUL.2019 10:01:03

CH78

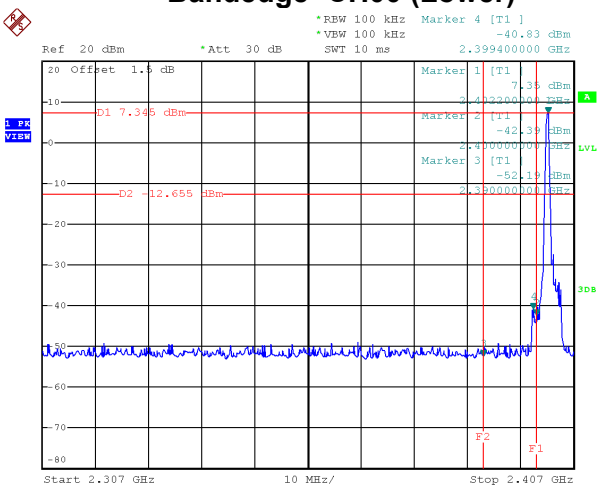


Date: 6.JUL.2019 10:04:00

APPENDIX J - CONDUCTED SPURIOUS EMISSION

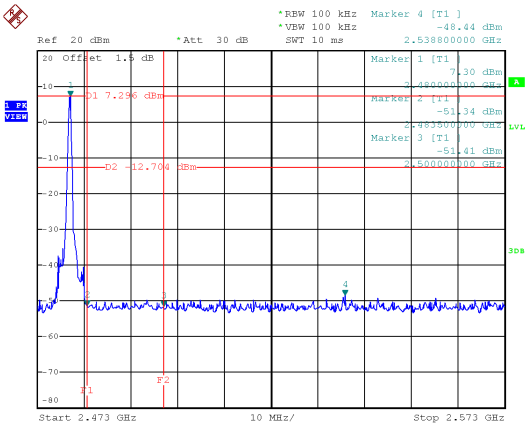
Test Mode : TX Mode _1Mbps

Bandedge- CH00 (Lower)



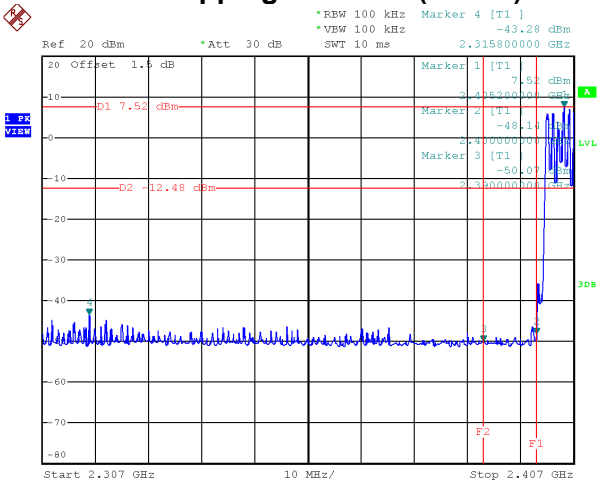
Date: 6.JUL.2019 10:08:14

Bandedge CH78 (Upper)



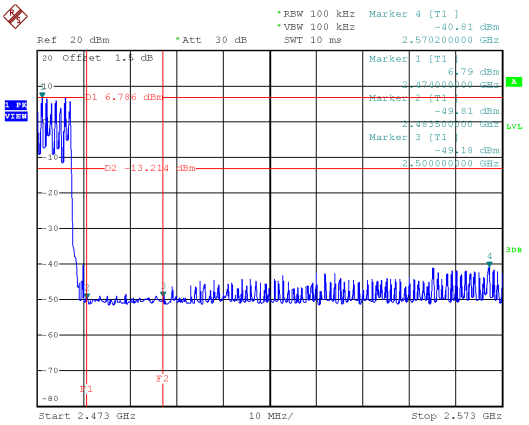
Date: 6.JUL.2019 10:11:02

Hopping on mode (Lower)



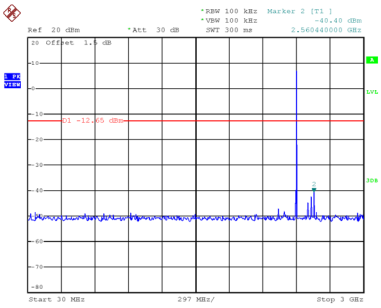
Date: 6.JUL.2019 10:18:42

Hopping on mode (Upper)

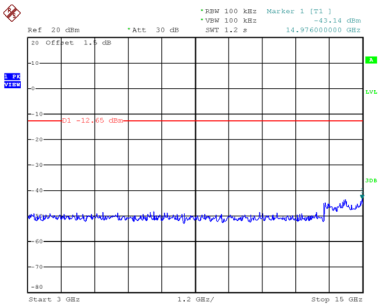


Date: 6.JUL.2019 10:19:17

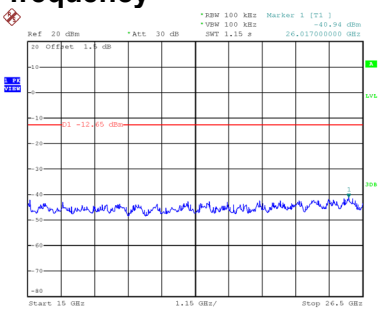
CH00 – 10th Harmonic of the fundamental frequency



Date: 6.JUL.2019 10:08:52

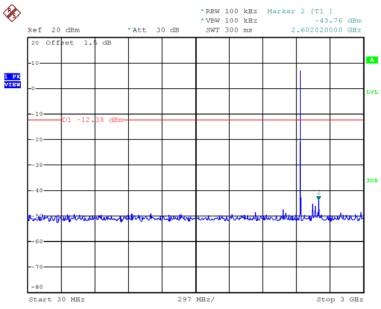


Date: 6.JUL.2019 10:08:59

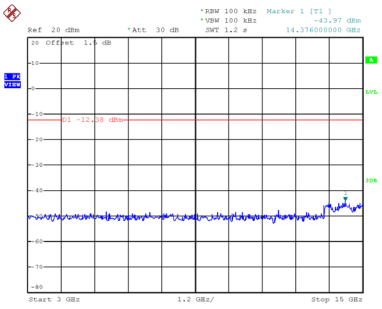


Date: 6.JUL.2019 10:09:05

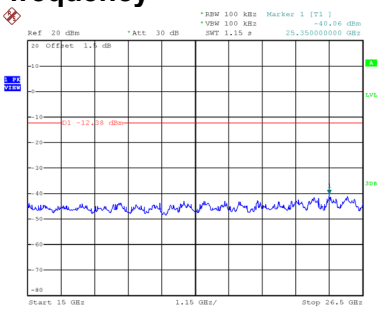
CH39 – 10th Harmonic of the fundamental frequency



Date: 6.JUL.2019 10:09:51

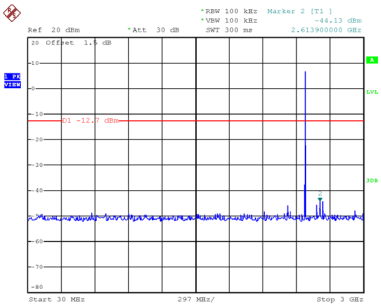


Date: 6.JUL.2019 10:09:58

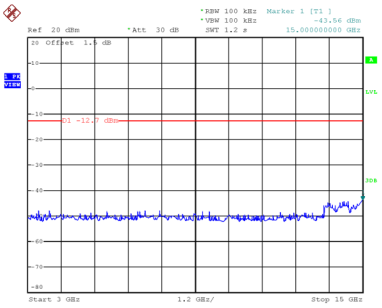


Date: 6.JUL.2019 10:10:05

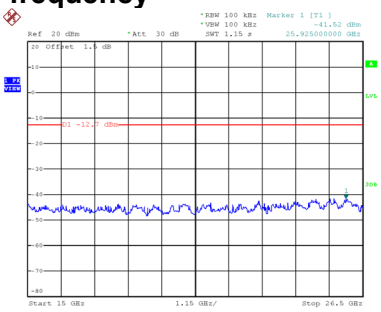
CH78 – 10th Harmonic of the fundamental frequency



Date: 6.JUL.2019 10:11:37



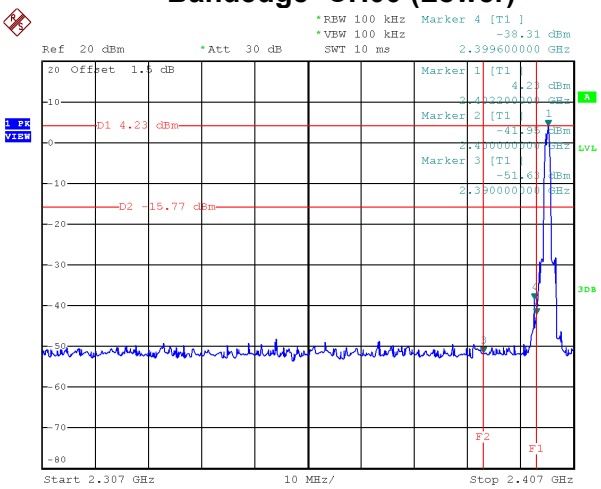
Date: 6.JUL.2019 10:11:44



Date: 6.JUL.2019 10:11:51

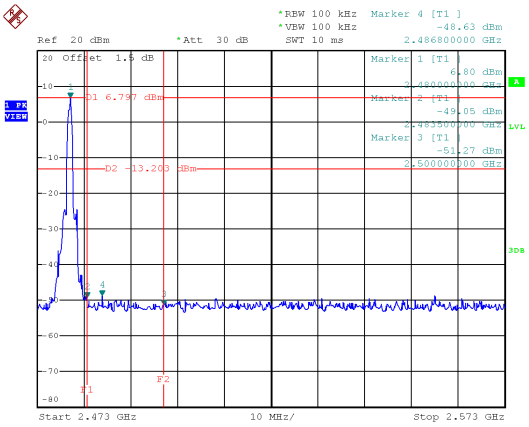
Test Mode : TX Mode _3Mbps

Bandedge- CH00 (Lower)



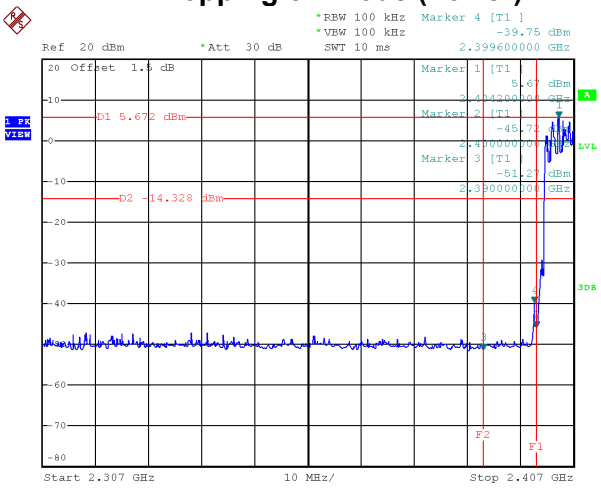
Date: 6.JUL.2019 11:04:49

Bandedge CH78 (Upper)



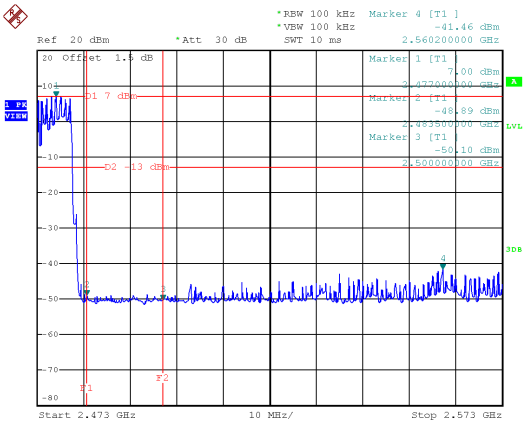
Date: 6.JUL.2019 11:06:59

Hopping on mode (Lower)



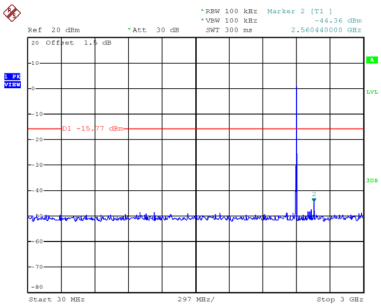
Date: 6.JUL.2019 11:14:42

Hopping on mode (Upper)

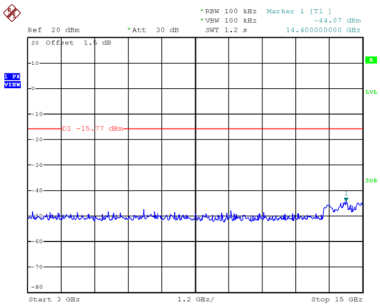


Date: 6.JUL.2019 11:15:16

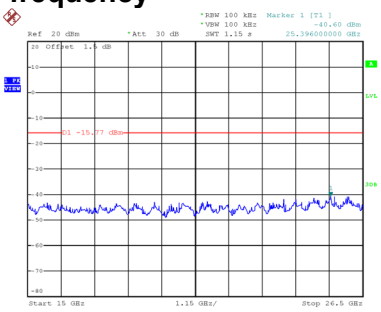
CH00 – 10th Harmonic of the fundamental frequency



Date: 6.JUL.2019 11:05:19

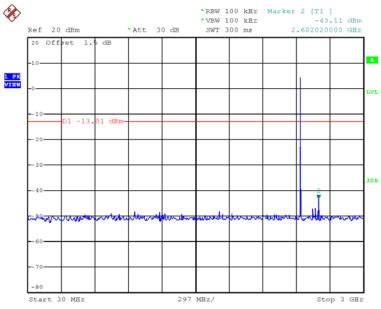


Date: 6.JUL.2019 11:05:25

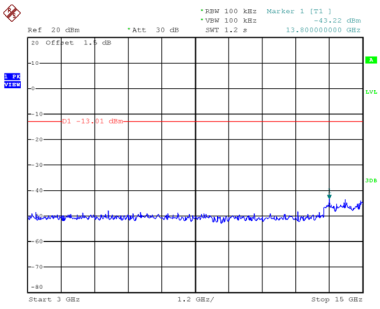


Date: 6.JUL.2019 11:05:32

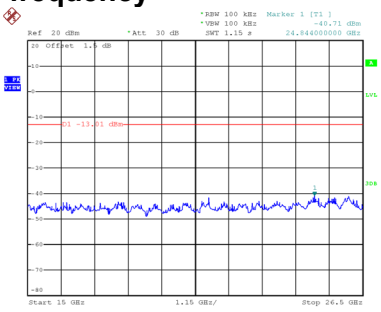
CH39 – 10th Harmonic of the fundamental frequency



Date: 6.JUL.2019 11:06:04

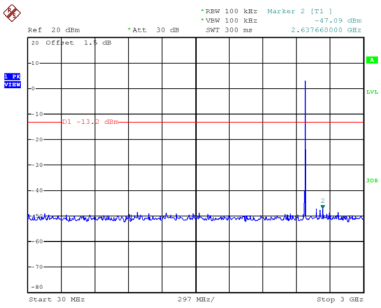


Date: 6.JUL.2019 11:06:11

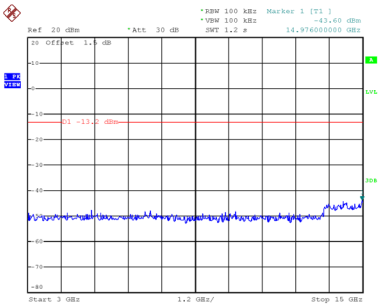


Date: 6.JUL.2019 11:06:17

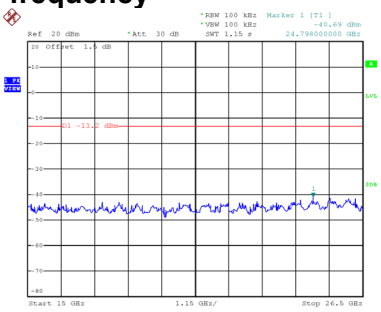
CH78 – 10th Harmonic of the fundamental frequency



Date: 6.JUL.2019 11:07:29



Date: 6.JUL.2019 11:07:36



Date: 6.JUL.2019 11:07:42

End of Test Report