FCC Radio Test Report

FCC ID:2BDERCELSYSCES50037

Test Report No……..:	RF231025014-01-001
Product(s) Name……...:	CLIP STUDIO TABMATE 2
Model(s)……..:	CES-50037
Trade Mark……....:	CLIP STUDIO
Applicant……..…:	CELSYS, Inc.
Address……..…...:	2F, Pacificmarks-Sinjuku-Parkside 4-15-7, Nishishinjuku Shinjuku-ku, Tokyo 160-0023 Japan
Receipt Date……..:	2023.10.30
Test Date……....:	2023.10.31~2023.11.06
Issued Date……..…:	2023.11.29
Standards……..:	47 CFR FCC Part 15, Subpart C(Section 15.247) ANSI C63.10:2013
Testing Laboratory……:	Shenzhen Haiyun Standard Technical Co., Ltd.

Prepared By:	Checked By:	Approved By:	
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REPORT ISSUED HISTORY

Original Report Issue Date: 2023.11.29

● No additional attachment

○ Additional attachments were issued following record

Attachment No.	Issue Date	Description

1.. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart C				
Standard(s) Section	**Test Item**	**Test Result**	**Judgment**	**Remark**
15.207	AC Power Line Conducted Emissions	------	N/A	------
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX A APPENDIX B APPENDIX C	PASS	------
15.247(a)(2)	Bandwidth	APPENDIX D	PASS	------
15.247(b)(3)	Maximum Output Power	APPENDIX E	PASS	------
15.247(d)	Conducted Spurious Emission	APPENDIX F	PASS	------
15.247(e)	Power Spectral Density	APPENDIX G	PASS	------
15.203	Antenna Requirement	------	PASS	Note(2)

Note:

(1) “N/A” denotes test is not applicable to this device.

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

1.1. TEST FACILITY

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110-113, 115, 116, Block B, Jinyuan Business Building, Bao'an District, Shenzhen, China
CNAS Registration Number:	CNAS L18252
CAB identifier	CN0145
A2LA Certificate Number	6823.01
Telephone:	0755-26024411

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))

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±143.88 kHz
Power Spectral Density	±0.743dB
Conducted Spurious Emission	±1.328dB
RF power conducted	±0.384 dB
Conducted emission(9kHz~30MHz) AC main	±2.72dB
Radiated emission(9kHz~30MHz)	±2.66dB
Radiated emission (30MHz～1GHz)	±4.62dB
Radiated emission (1GHz～18GHz)	±4.86dB
Radiated emission (18GHz～40GHz)	±3.80dB

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
Radiated Emissions-9 kHz to 30 MHz	24.0°C	54%	DC 1.5V	Albert Fan
Radiated Emissions-30 MHz to 1000 MHz	24.0°C	54%	DC 1.5V	Albert Fan
Radiated Emissions-Above 1000 MHz	24.0°C	54%	DC 1.5V	Albert Fan
Bandwidth	25.0°C	45%	DC 5V	Francis Liu
Maximum Output Power	25.0°C	45%	DC 5V	Francis Liu
Conducted Spurious Emission	25.0°C	45%	DC 5V	Francis Liu
Power Spectral Density	25.0°C	45%	DC 5V	Francis Liu

2.. GENERAL INFORMATION

2.1. APPLICANT

CELSYS, Inc.

2F, Pacificmarks-Sinjuku-Parkside 4-15-7, Nishishinjuku Shinjuku-ku, Tokyo 160-0023 Japan

2.2. MANUFACTURER

Dong Guan IONE Electronic Technology Co., Ltd

Building 3 No.76,Yongjun 2nd Road,HuangJiang Town, DongGuan City,GuangDong Province,China

2.3. FACTORY

Dong Guan IONE Electronic Technology Co.,Ltd

Building 3 No.76,Yongjun 2nd Road,HuangJiang Town, DongGuan City,GuangDong Province,China

2.4. GENERAL DESCRIPTION OF EUT

Product Name	CLIP STUDIO TABMATE 2
Brand Name	CLIP STUDIO
Test Model	CES-50037
Series models	N/A
Model difference	N/A
Power Supply	DC 1.5V Dry cell battery
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Bit Rate of Transmitter	1Mbps, 2Mbps
Max. Output Power	-2.60 dBm
Antenna gain	-3.62 dBi
Antenna type	PCB antenna

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)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

2.5. 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_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 00/19/39
Mode 3	TX Mode_2Mbps Channel 00

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

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 3	TX Mode_2Mbps Channel 00

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 00/19/39

Conducted test	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 00/19/39

Note:

(1) For radiated emission above 1 GHz test, the spurious points of 1GHz~18GHz and 18GHz~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.

(2) For radiated emissions below 1 GHz test, the TX Mode_2Mbps Channel 0 is found to be the worst case and recorded.

2.6. 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 Version	nRF-DTM		
Frequency (MHz)	2402	2440	2480
1Mbps	4dBm	4dBm	4dBm
2Mbps	4dBm	4dBm	4dBm

2.7. SUPPORT UNITS

No.	Equipment	Manufacturer	Model	Series No
1	Notebook	L450	Think	/
2	/	/	/	/
3	/	/	/	/

3.. AC POWER LINE CONDUCTED EMISSIONS

3.1. LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	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.

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.

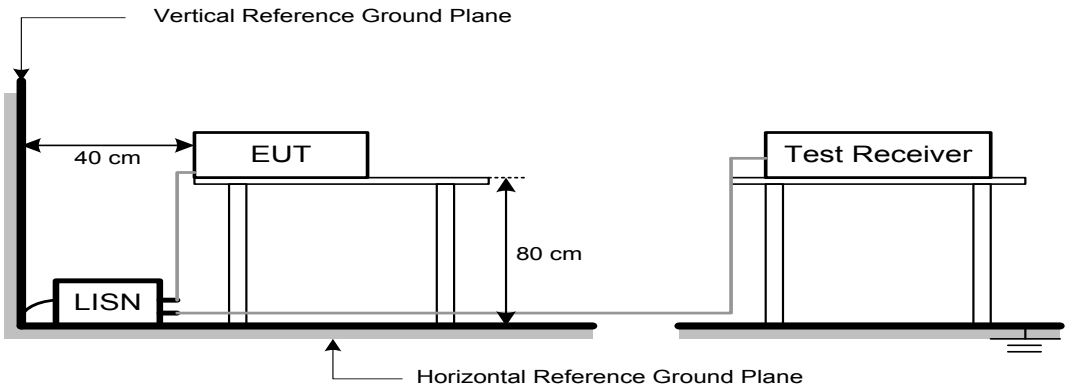
The following table is the setting of the receiver:

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

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 fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.6. TEST RESULTS

N/A(The EUT is powered by a dry battery, this test is not applicable)

4.. RADIATED EMISSIONS

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 CFR Title 47, Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).

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 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.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

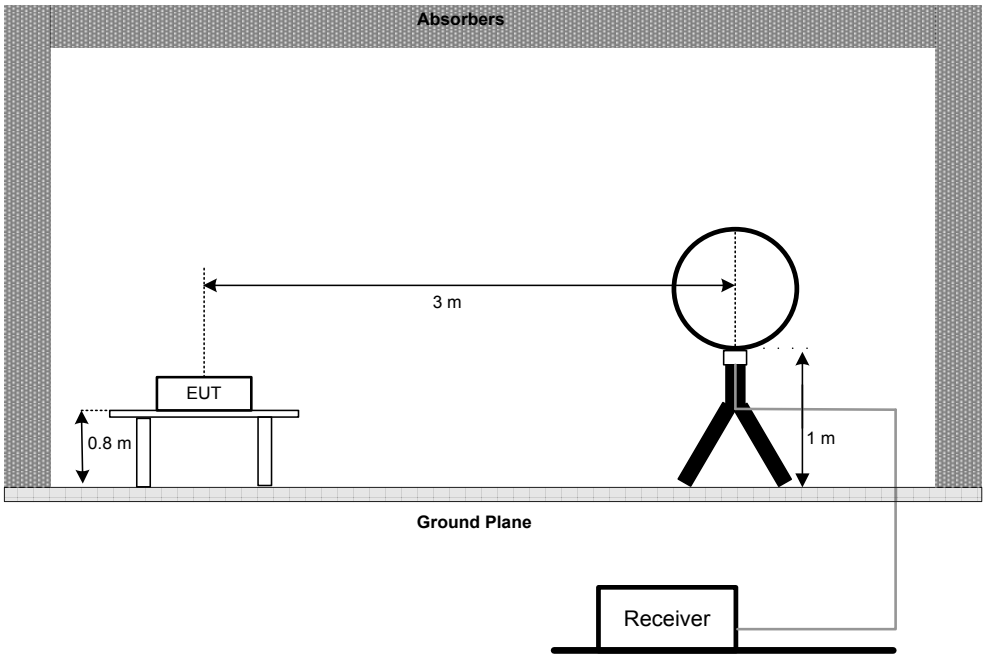
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

4.3. DEVIATION FROM TEST STANDARD

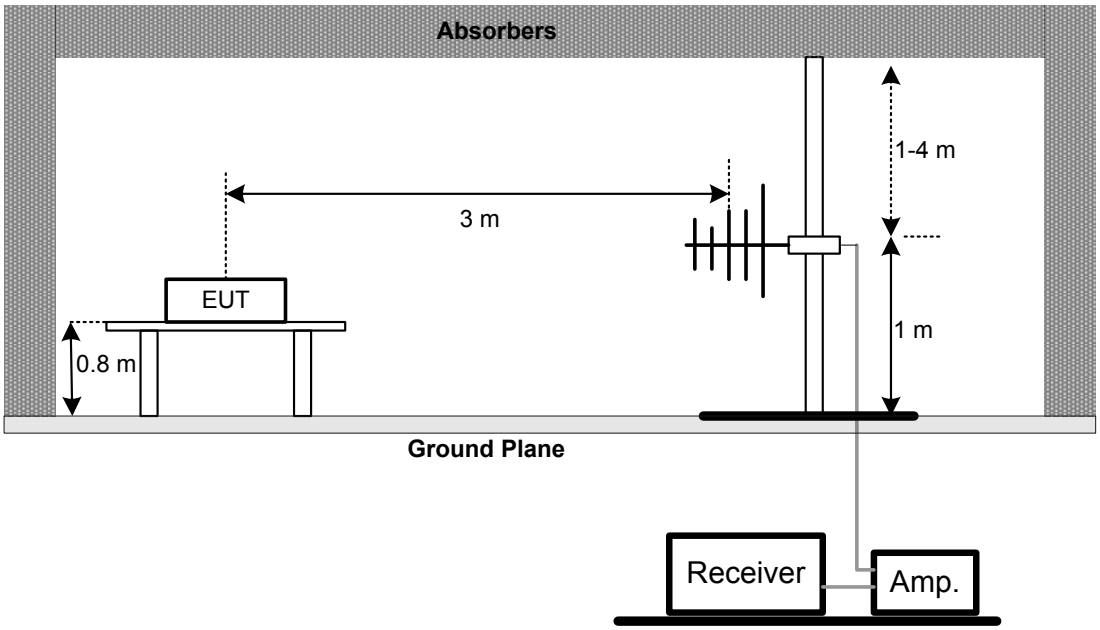
No deviation.

4.4. TEST SETUP

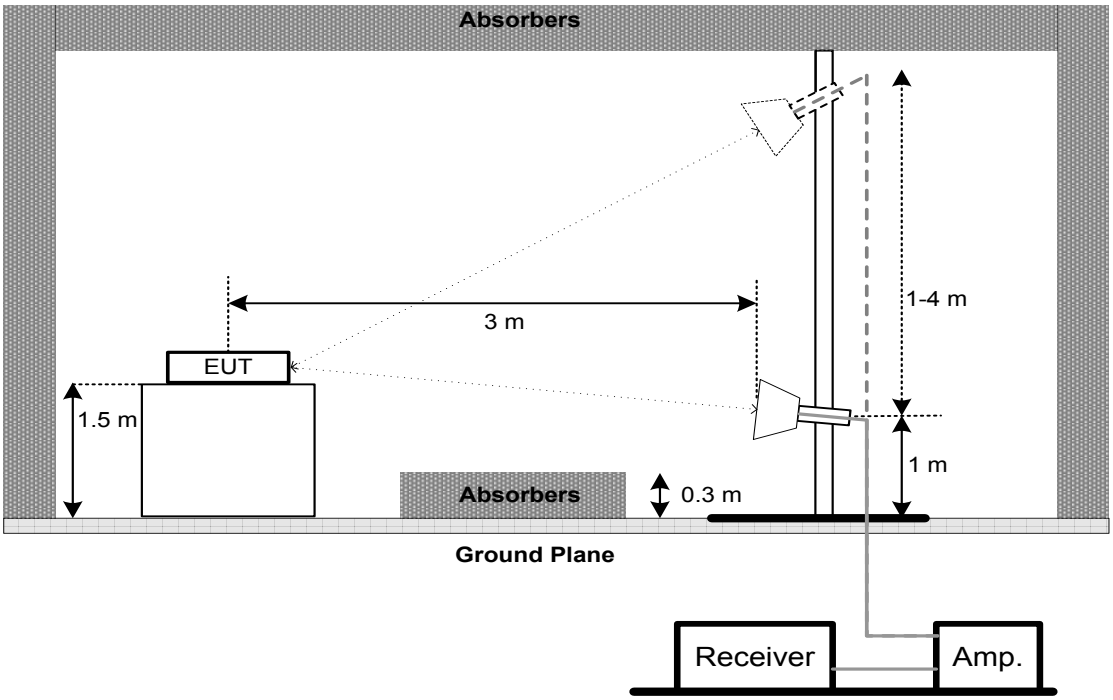
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5. EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6. TEST RESULT - 9 kHz TO 30 MHz

Please refer to the APPENDIX A.

Remark:

(1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7. TEST RESULT - 30 MHz TO 1000 MHz

Please refer to the APPENDIX B.

4.8. TEST RESULT - ABOVE 1000 MHz

Please refer to the APPENDIX C.

Remark:

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

5.. BANDWIDTH

5.1. LIMIT

Section	Test Item	Limit
FCC 15.247(a)(2)	6 dB Bandwidth	>= 500 kHz
	99% Emission Bandwidth	-

5.2. TEST PROCEDURE

a. The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.

b. The following table is the setting of the spectrum analyzer:

For 6 dB Bandwidth:

Spectrum Parameters	Setting
Span Frequency	> Measurement Bandwidth
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

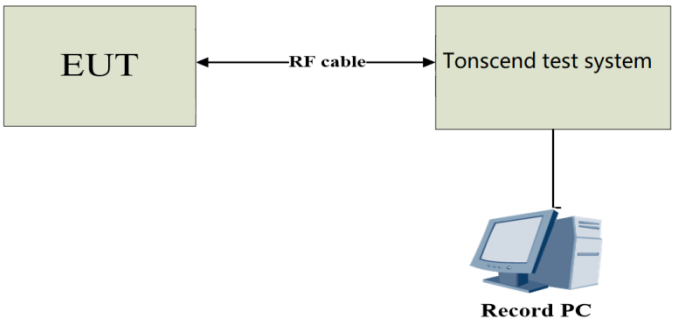
For 99% Emission Bandwidth:

Spectrum Parameters	Setting
Span Frequency	Between 1.5 times and 5.0 times the OBW
RBW	1% to 5% of the OBW
VBW	approximately three times RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3. DEVIATION FROM STANDARD

No deviation.

5.4. TEST SETUP



5.5. EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6. TEST RESULTS

Please refer to the APPENDIX D.

6.. MAXIMUM OUTPUT POWER

6.1. LIMIT

Section	Test Item	Limit
FCC 15.247(b)(3)	Maximum Output Power	1.0000 watt or 30.00 dBm

6.2. TEST PROCEDURE

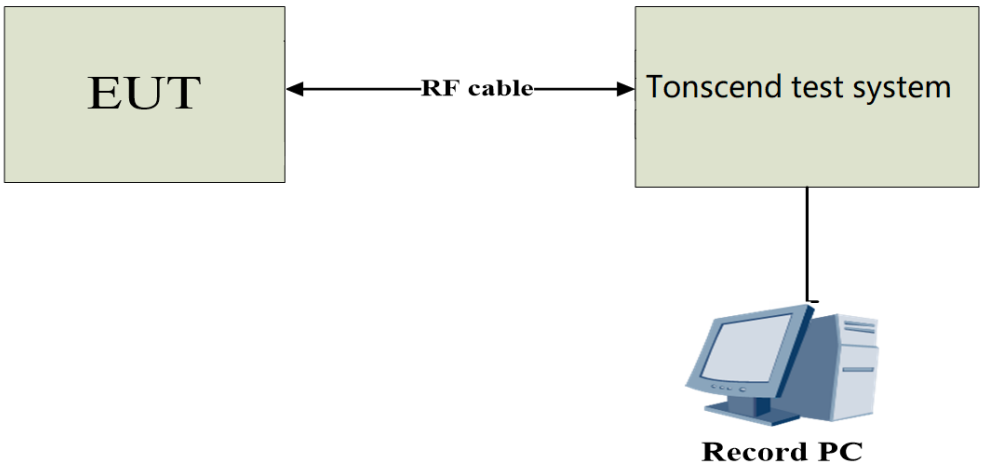
a. The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	≥ 3×RBW
RBW	3 MHz
VBW	3 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3. DEVIATION FROM STANDARD

No deviation.

6.4. TEST SETUP



6.5. EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6. TEST RESULTS

Please refer to the APPENDIX E.

7.. CONDUCTED SPURIOUS EMISSION

7.1. 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.

7.2. TEST PROCEDURE

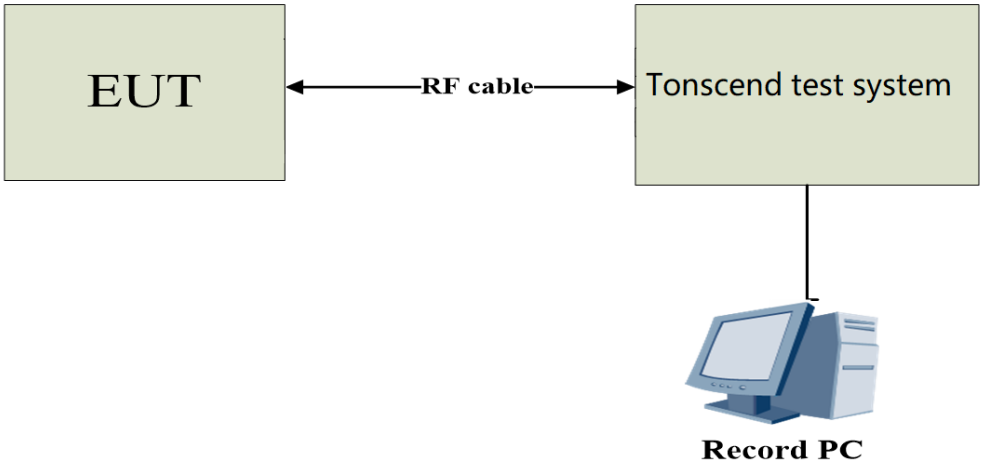
a. The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3. DEVIATION FROM STANDARD

No deviation.

7.4. TEST SETUP



7.5. EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6. TEST RESULTS

Please refer to the APPENDIX F.

8.. POWER SPECTRAL DENSITY

8.1. LIMIT

Section	Test Item	Limit
FCC 15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

8.2. TEST PROCEDURE

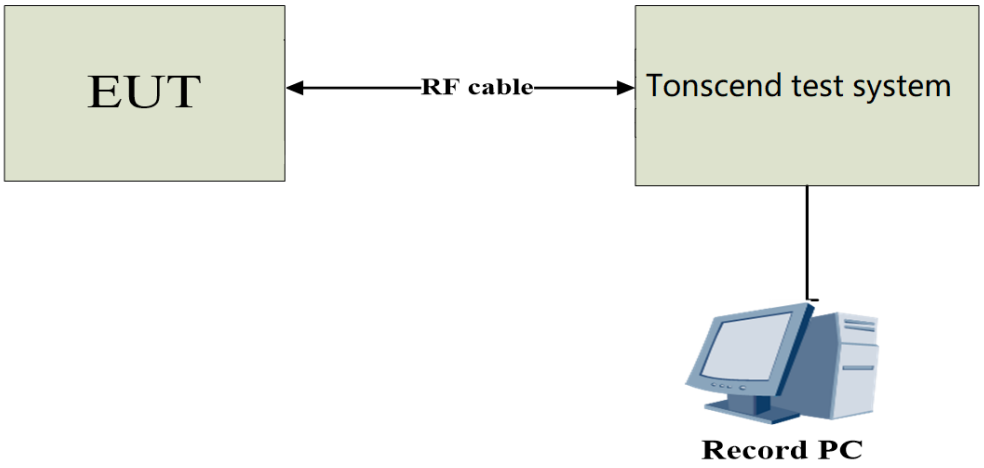
a. The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	2 MHz
RBW	3 kHz
VBW	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3. DEVIATION FROM STANDARD

No deviation.

8.4. TEST SETUP



8.5. EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6. TEST RESULTS

Please refer to the APPENDIX G.

9.. MEASUREMENT INSTRUMENTS LIST

Radiated Emissions						
No.	Equipment	Manufacturer	Type No.	Serial No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
1	Test receiver	Rohde&Schwarz	ESU	100184	2023/5/3	2024/5/2
2	MXA Signal Analyzer	Keysight	N9010A	MY51440158	2023/4/22	2024/4/21
3	Log periodic antenna	Schwarzbeck	VULB 9168	1151	2023/5/4	2024/5/3
4	Low frequency amplifier	/	LNA 0920N	2014	2023/5/3	2024/5/2
5	High frequency amplifier	Schwarzbeck	BBV 9718	284	2023/5/3	2024/5/2
6	Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1273	2023/5/4	2024/5/3
7	Temp&Humidity Recorder	Meideshi	JR900	/	2023/5/3	2024/5/2
8	Horn Antenna	SCHWARZBECK	BBHA 9170	9170#685	2023/7/16	2024/7/15
9	Loop Antenna	SCHWARZBECK	FMZB1519 B	00029	2023/7/16	2024/7/15
10	Broadband preamplifier	Schwarzbeck	BBV9721	9721-019	2023/5/3	2024/5/2
11	Test software	Farad Technology Co., Ltd	EZ-EMC Ver.TW-03A2			
RF conducted Emissions						
1	MXA Signal Analyzer	Keysight	N9021B	MY60080169	2023/4/23	2024/4/22
2	RF Control Unit	dsusoft	JS0806-2	21G8060449	2023/4/23	2024/4/22
3	power supply unit	dsusoft	JS0806-4ADC	N/A	2023/4/23	2024/4/22
4	VXG Signal Generator	Keysight	M9384B	MY61270787	2023/4/23	2024/4/22
5	EXG Analog Signal Generator	Keysight	N5173B	MY59101282	2023/4/23	2024/4/22
6	Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	1201.0002K50-116064-Dt	2023/4/23	2024/4/22
7	Test software	dsusoft	JS1120-3 Ver.3.2.22.0			

10.. ANTENNA REQUIREMENT

Test standard: FCC part 15.203

According to the manufacturer declared, the EUT has PCB antenna, the antenna gain is -3.62dBi and the antenna connector is designed with permanent attachment and no consideration of replacement.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

APPENDIX A - RADIATED EMISSION - 9 KHZ TO 30 MHZ

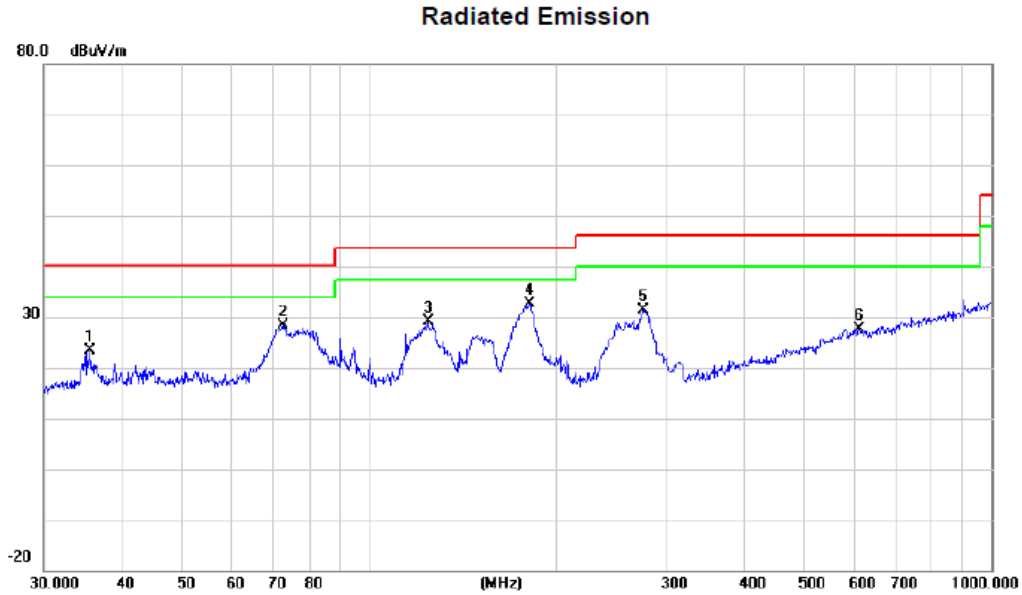
Radiated emission: 9KHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

APPENDIX B - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

Test Mode	TX Mode_2Mbps Channel 00	Polarization	Vertical

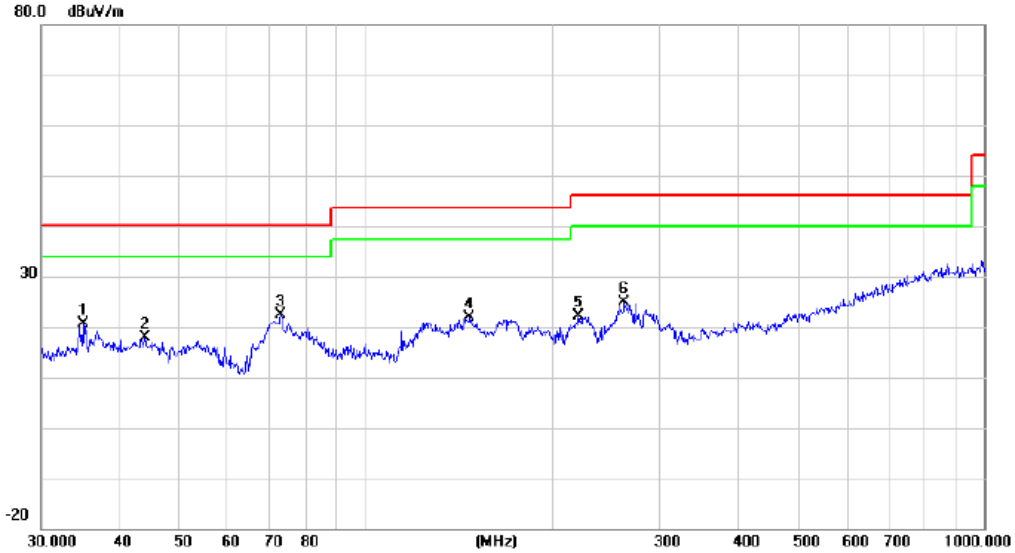


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.6240	34.79	-11.50	23.29	40.00	-16.71	peak			
2		72.8465	41.64	-13.36	28.28	40.00	-11.72	peak			
3		124.1330	39.83	-10.65	29.18	43.50	-14.32	peak			
4	*	180.6486	43.42	-10.85	32.57	43.50	-10.93	peak			
5		275.1570	40.28	-8.91	31.37	46.00	-14.63	peak			
6		612.0641	28.04	-0.41	27.63	46.00	-18.37	peak			

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

Test Mode	TX Mode_2Mbps Channel 00	Polarization	Horizontal

Radiated Emission

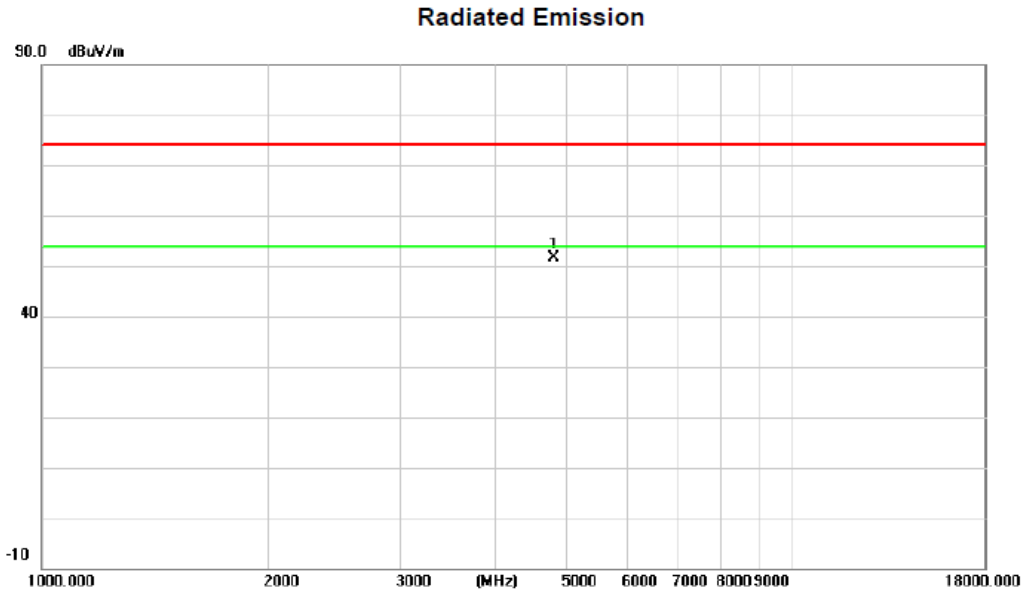


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.0048	32.27	-11.63	20.64	40.00	-19.36	peak			
2		44.1200	28.66	-10.75	17.91	40.00	-22.09	peak			
3	*	73.1025	35.71	-13.40	22.31	40.00	-17.69	peak			
4		147.4036	31.33	-9.55	21.78	43.50	-21.72	peak			
5		220.6170	32.76	-10.70	22.06	46.00	-23.94	peak			
6		261.9750	34.22	-9.30	24.92	46.00	-21.08	peak			

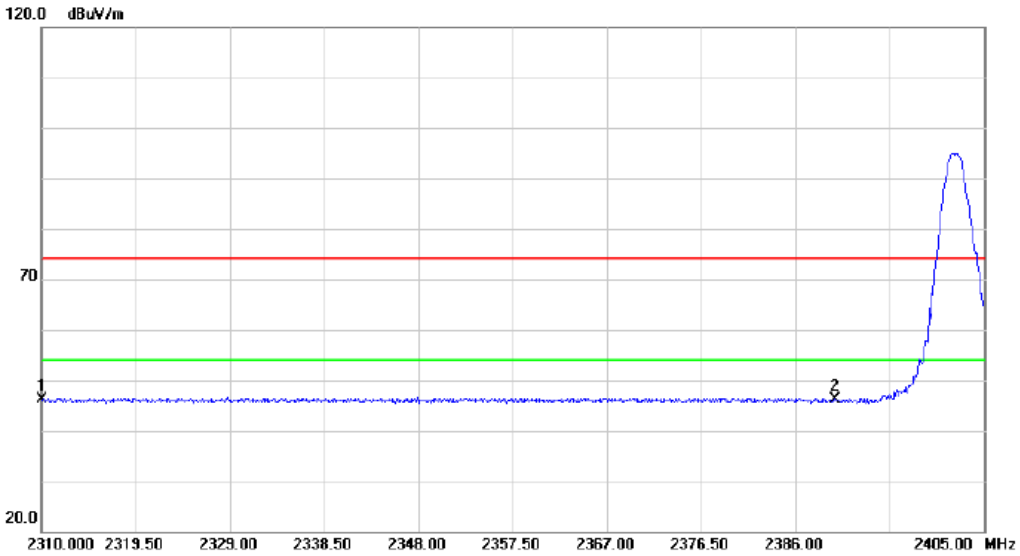
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C - RADIATED EMISSION - ABOVE 1000 MHZ

Test Mode	TX 2402 MHz_1Mbps	Polarization	Vertical



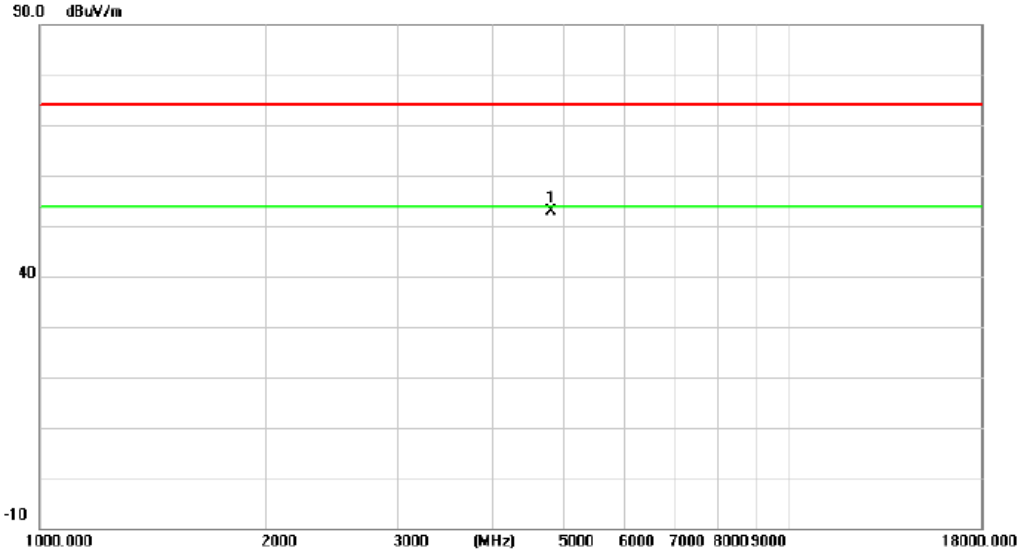
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4804.000	53.50	-1.99	51.51	74.00	-22.49	peak			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	45.82	0.19	46.01	74.00	-27.99	peak			
2	*	2390.000	45.71	0.41	46.12	74.00	-27.88	peak			

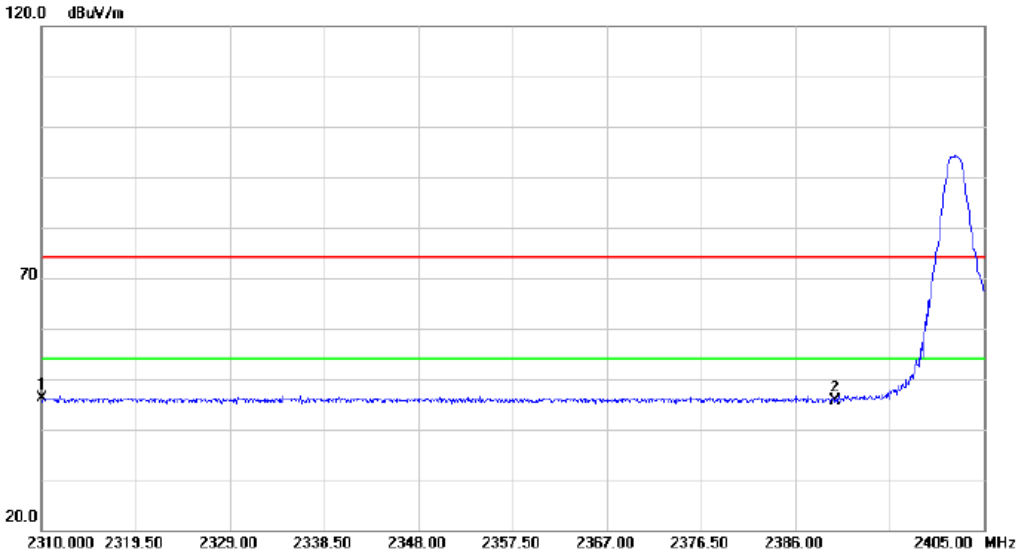
Test Mode	TX 2402 MHz_1Mbps	Polarization	Horizontal

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4804.110	54.83	-1.99	52.84	74.00	-21.16	peak			

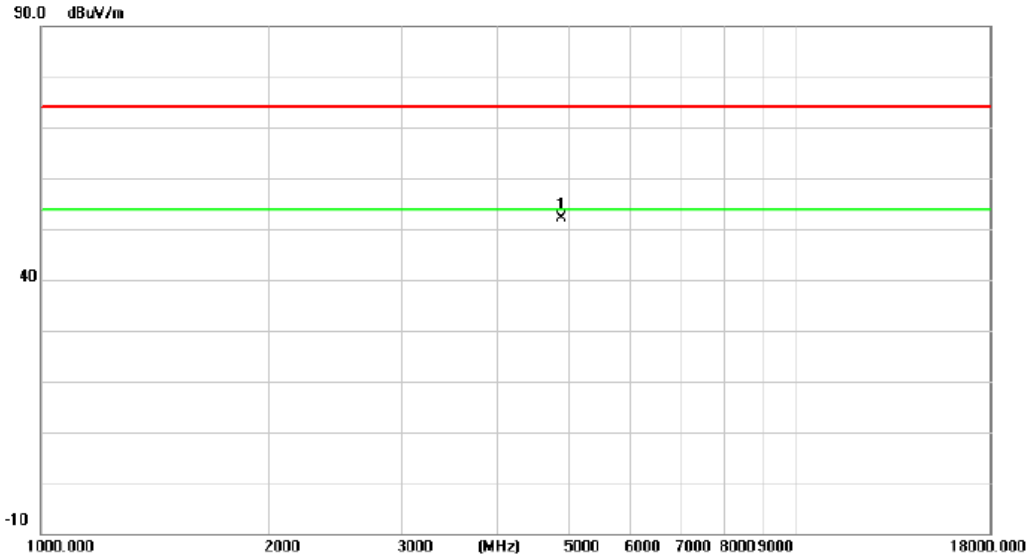
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2310.000	45.98	0.19	46.17	74.00	-27.83	peak			
2		2390.000	45.14	0.41	45.55	74.00	-28.45	peak			

Test Mode	TX 2440 MHz _1Mbps	Polarization	Vertical

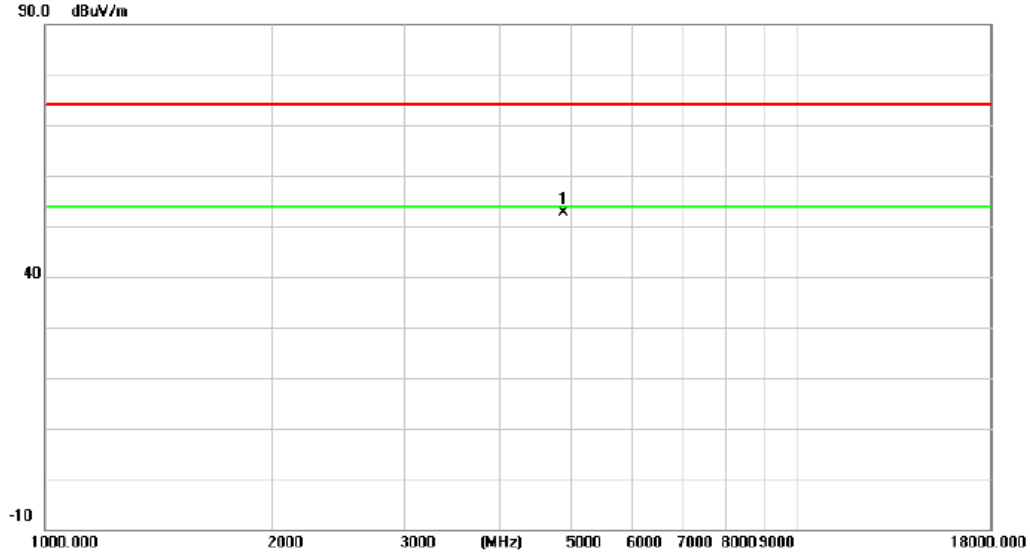
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4880.000	53.56	-1.55	52.01	74.00	-21.99	peak			

Test Mode	TX 2440 MHz _1Mbps	Polarization	Horizontal

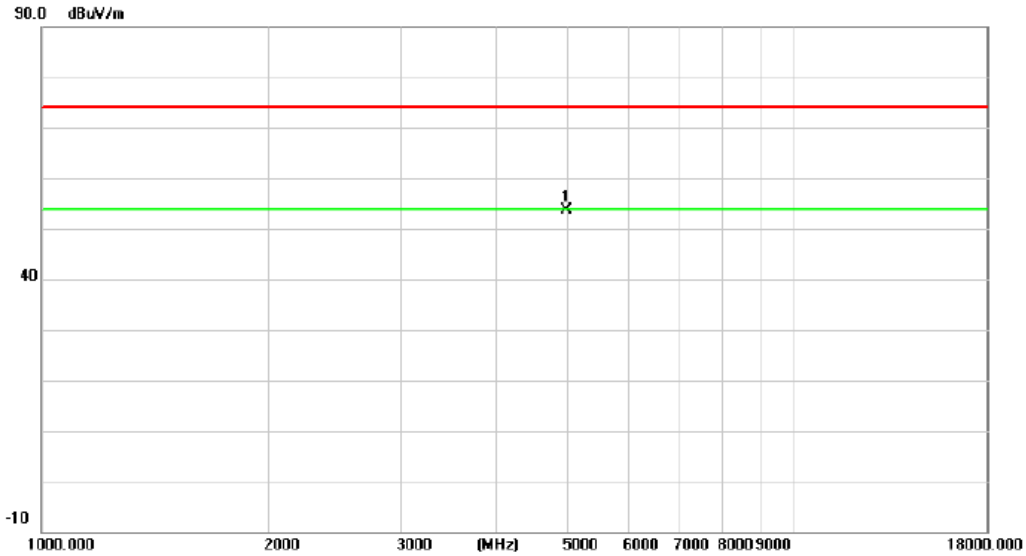
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4880.000	54.29	-1.55	52.74	74.00	-21.26	peak			

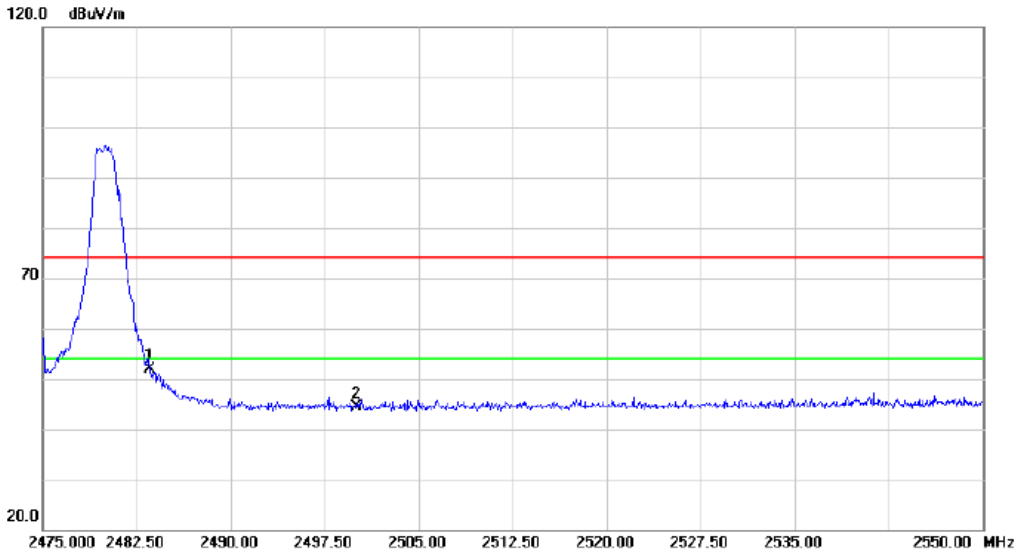
Test Mode	TX 2480 MHz_1Mbps	Polarization	Vertical

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4959.307	54.62	-1.09	53.53	74.00	-20.47	peak			

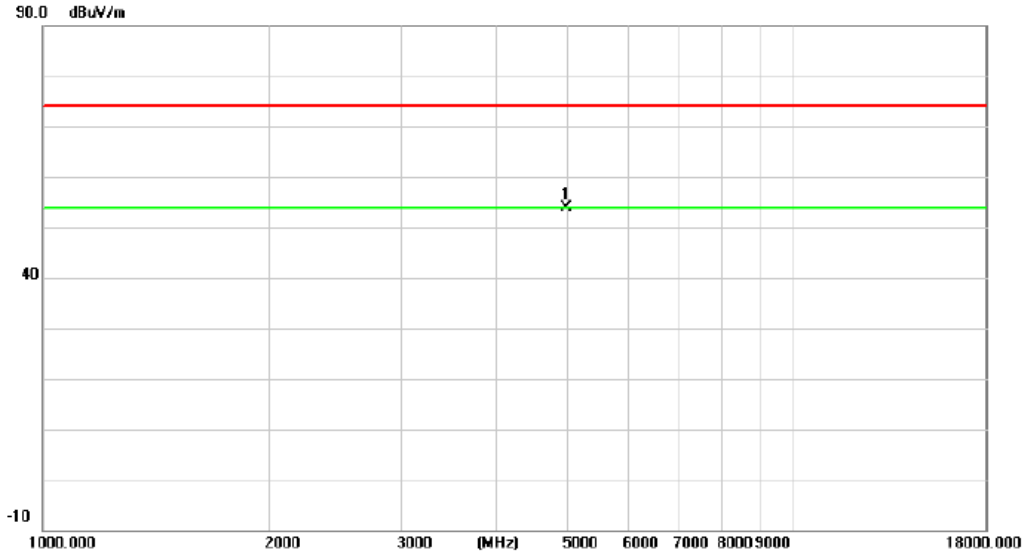
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	50.77	1.09	51.86	74.00	-22.14	peak			
2		2500.000	43.27	1.22	44.49	74.00	-29.51	peak			

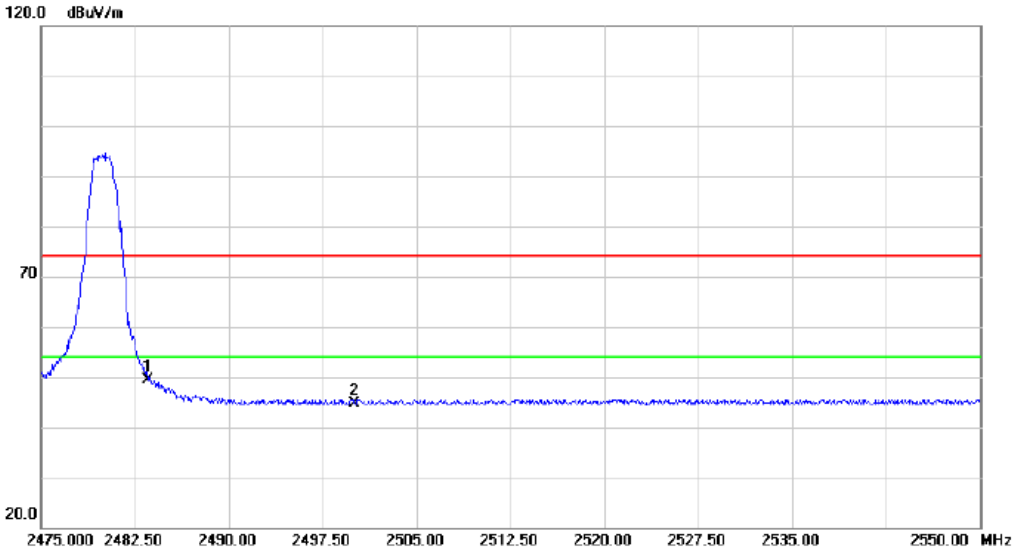
Test Mode	TX 2480 MHz_1Mbps	Polarization	Horizontal

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4959.307	54.91	-1.09	53.82	74.00	-20.18	peak			

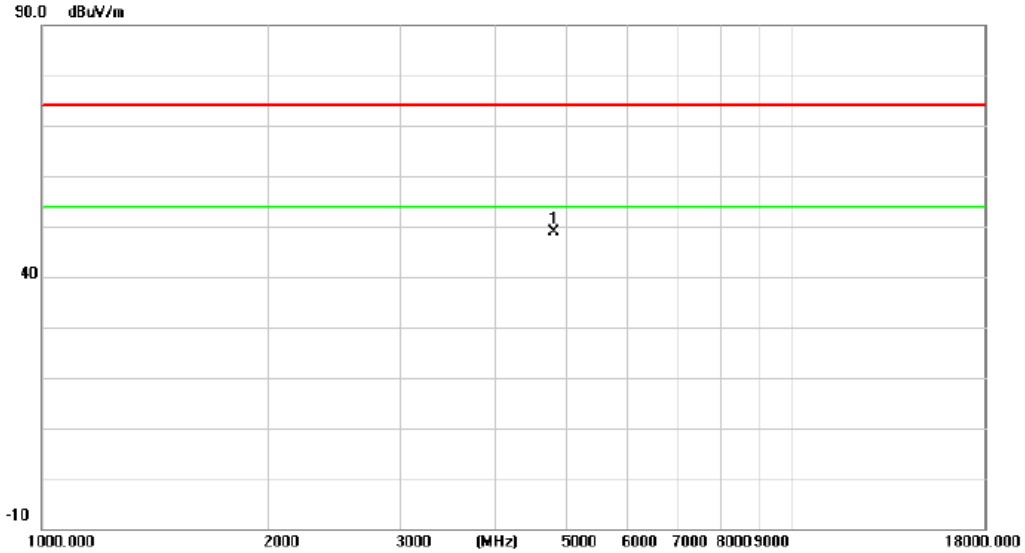
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	48.26	1.09	49.35	74.00	-24.65	peak			
2		2500.000	43.45	1.22	44.67	74.00	-29.33	peak			

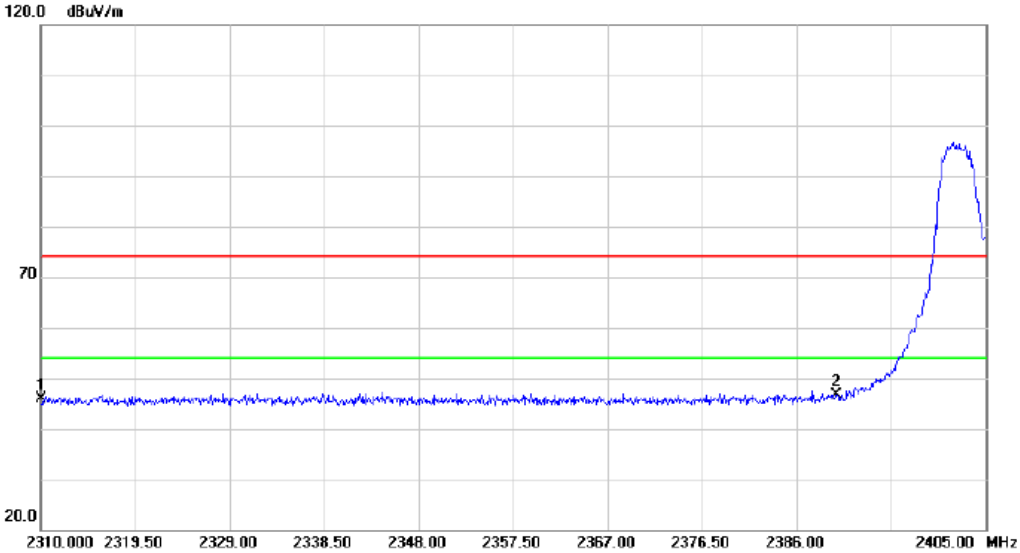
Test Mode	TX 2402 MHz_2Mbps	Polarization	Vertical

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4804.000	50.82	-1.99	48.83	74.00	-25.17	peak			

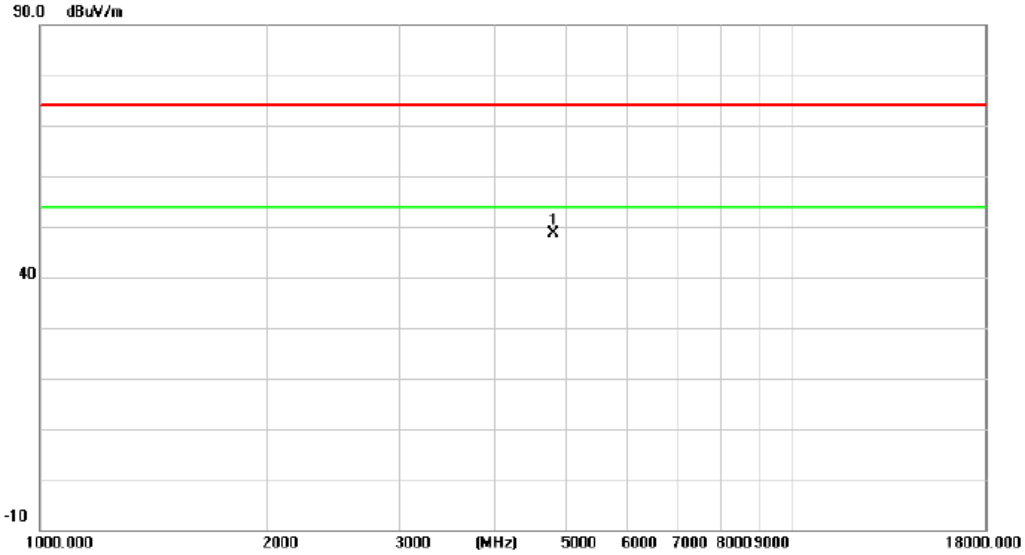
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	45.75	0.19	45.94	74.00	-28.06	peak			
2	*	2390.000	46.32	0.41	46.73	74.00	-27.27	peak			

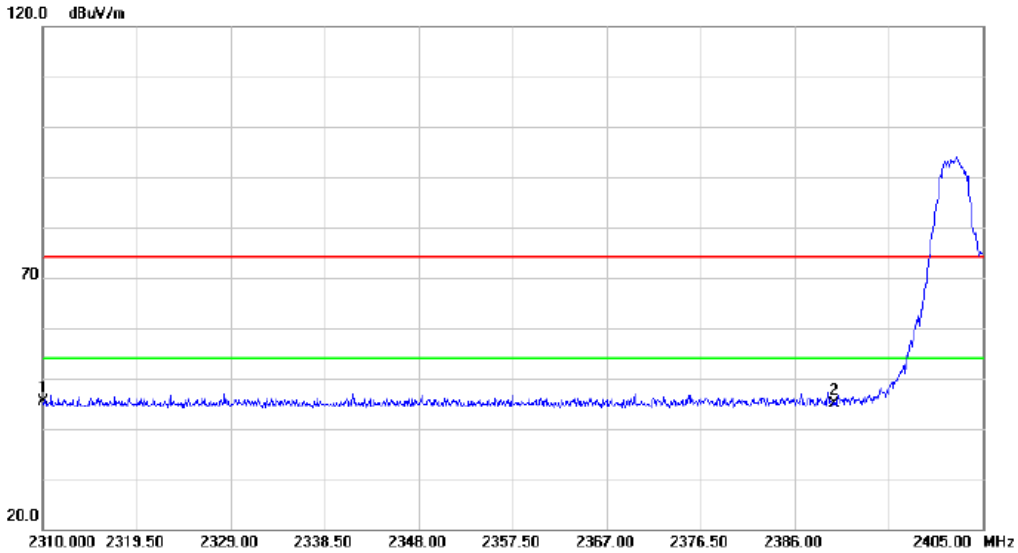
Test Mode	TX 2402 MHz_2Mbps	Polarization	Horizontal

Radiated Emission



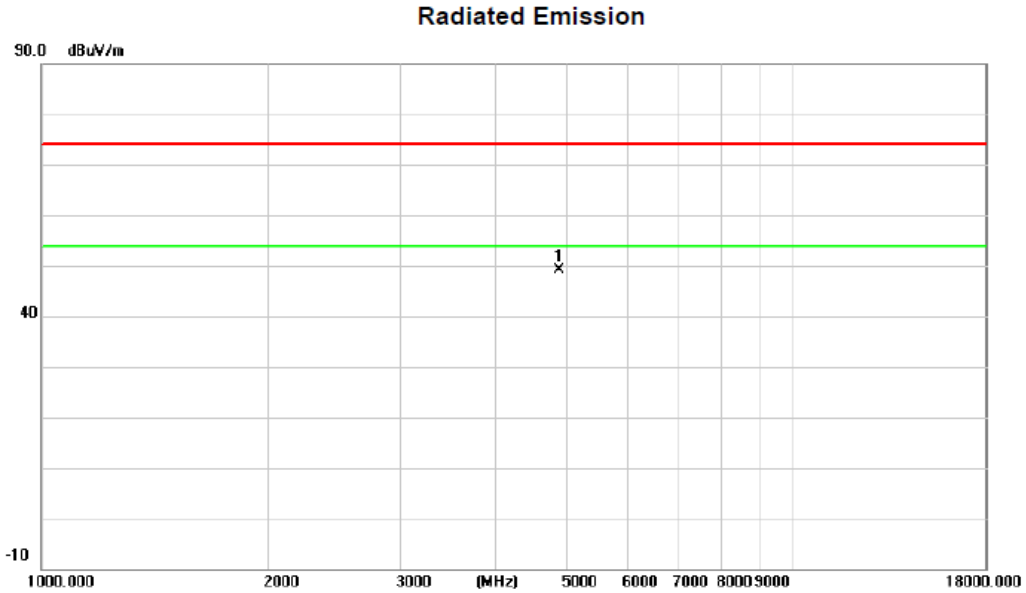
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4804.000	50.51	-1.99	48.52	74.00	-25.48	peak			

Radiated Emission



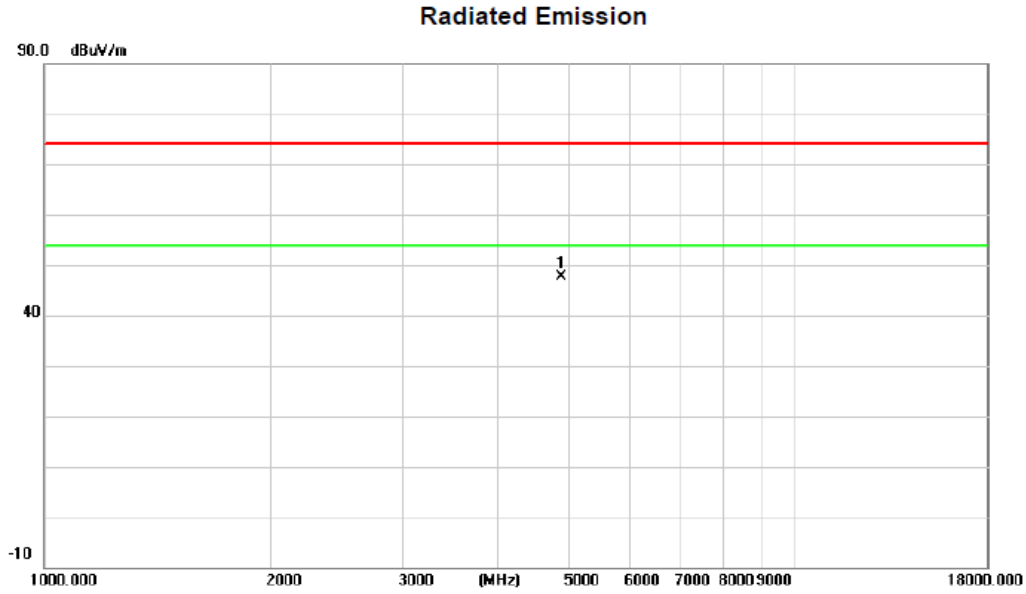
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2310.000	45.24	0.19	45.43	74.00	-28.57	peak			
2		2390.000	44.51	0.41	44.92	74.00	-29.08	peak			

Test Mode	TX 2440 MHz _2Mbps	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4880.000	50.78	-1.55	49.23	74.00	-24.77	peak			

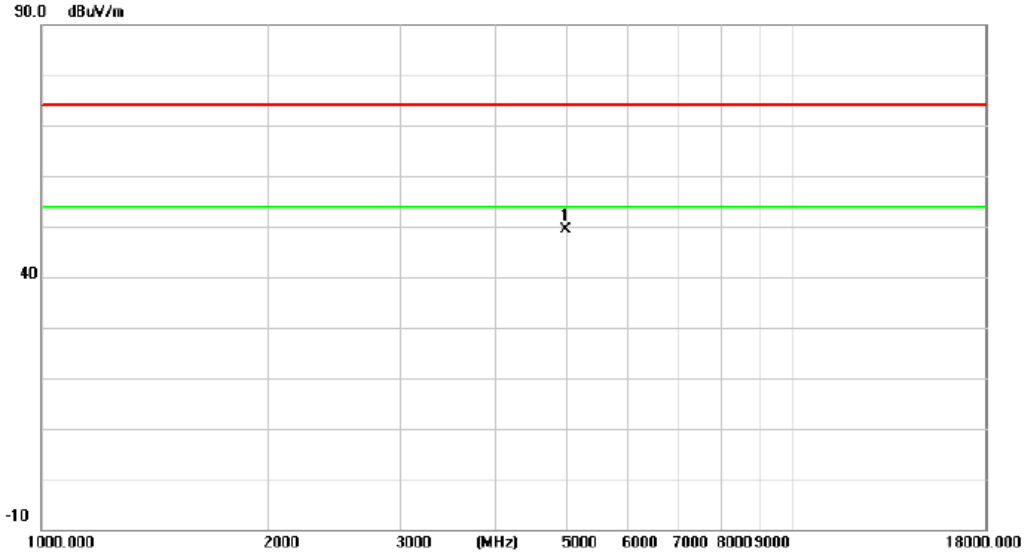
Test Mode	TX 2440 MHz _2Mbps	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4880.000	49.10	-1.55	47.55	74.00	-26.45	peak			

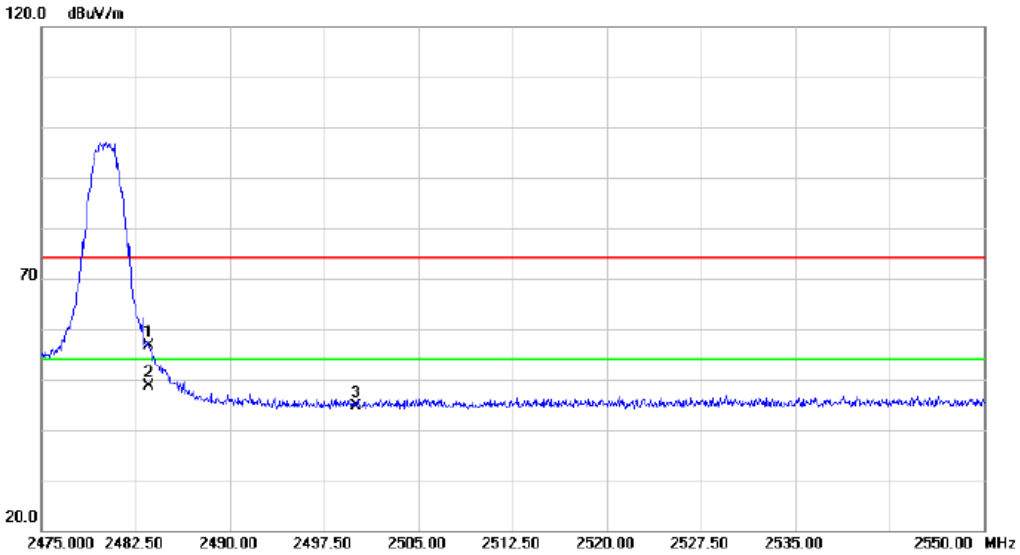
Test Mode	TX 2480 MHz_2Mbps	Polarization	Vertical

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4960.000	50.44	-1.08	49.36	74.00	-24.64	peak			

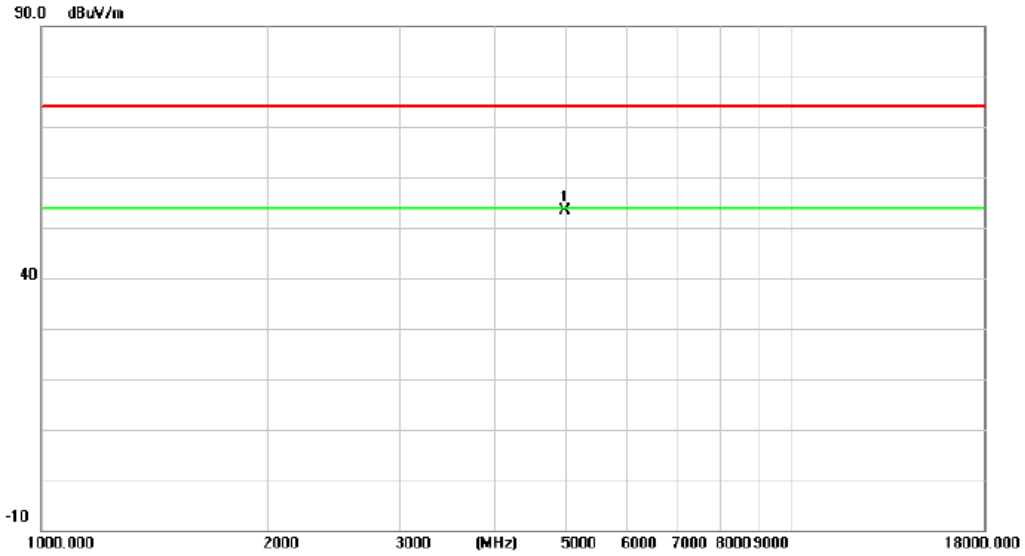
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	55.54	1.09	56.63	74.00	-17.37	peak			
2	*	2483.500	47.56	1.09	48.65	54.00	-5.35	AVG			
3		2500.000	43.30	1.22	44.52	74.00	-29.48	peak			

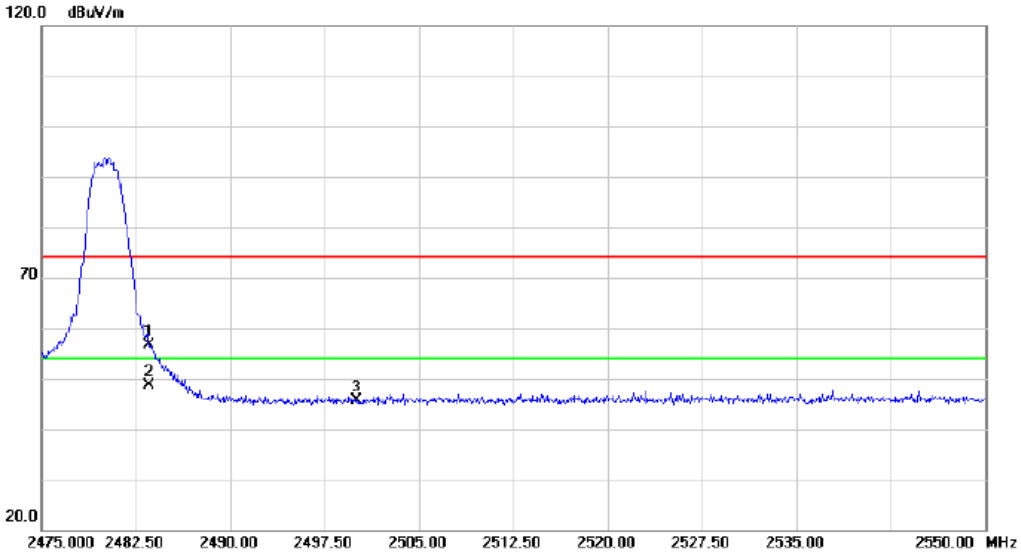
Test Mode	TX 2480 MHz _2Mbps	Polarization	Horizontal

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4959.307	54.38	-1.09	53.29	74.00	-20.71	peak			

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	55.45	1.09	56.54	74.00	-17.46	peak			
2	*	2483.500	47.42	1.09	48.51	54.00	-5.49	AVG			
3		2500.000	44.34	1.22	45.56	74.00	-28.44	peak			

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

APPENDIX D - BANDWIDTH

DTS Bandwidth

Test Mode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.688	2401.672	2402.360	0.5	PASS
		2440	0.692	2439.664	2440.356	0.5	PASS
		2480	0.692	2479.668	2480.360	0.5	PASS
BLE_2M	Ant1	2402	1.124	2401.460	2402.584	0.5	PASS
		2440	1.120	2439.460	2440.580	0.5	PASS
		2480	1.128	2479.460	2480.588	0.5	PASS

Test Graphs

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

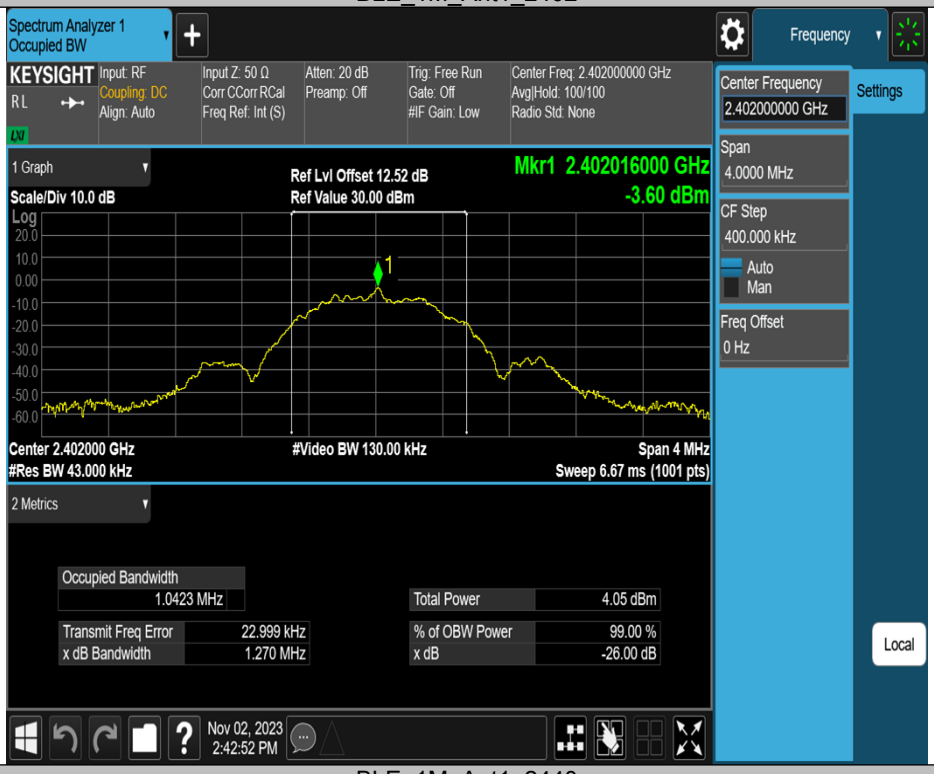
BLE_2M_Ant1_2480

Occupied Channel Bandwidth

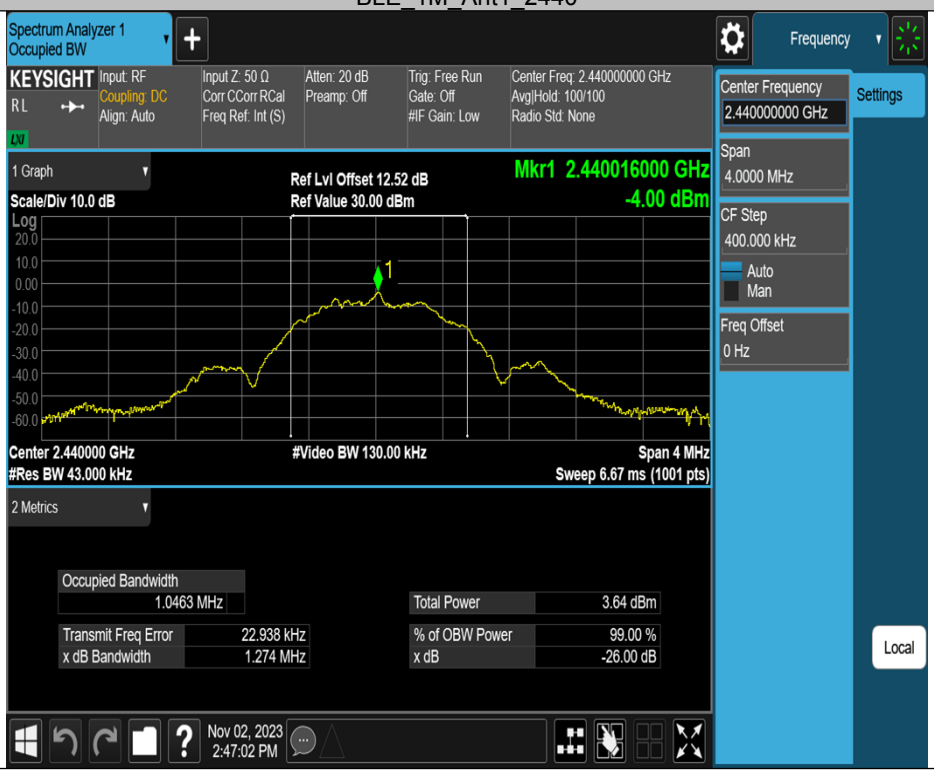
Test Mode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0423	2401.5019	2402.5442	---	---
		2440	1.0463	2439.4998	2440.5461	---	---
		2480	1.0492	2479.4976	2480.5468	---	---
BLE_2M	Ant1	2402	2.0511	2401.0092	2403.0603	---	---
		2440	2.0534	2439.0076	2441.0610	---	---
		2480	2.0592	2479.0034	2481.0626	---	---

Test Graphs

BLE_1M_Ant1_2402



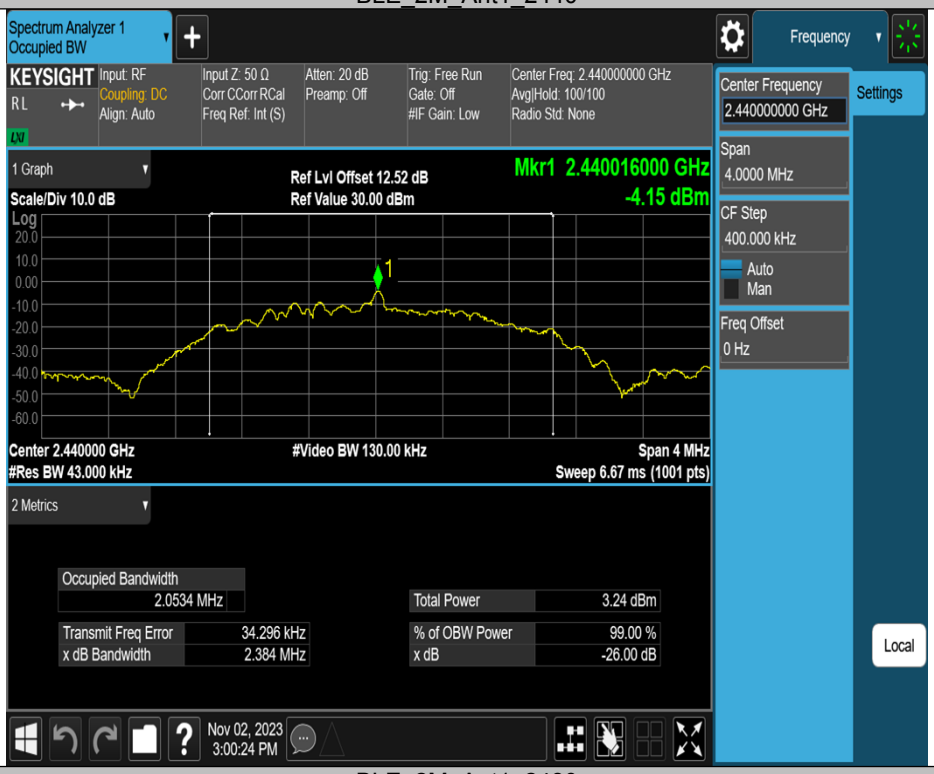
BLE_1M_Ant1_2440



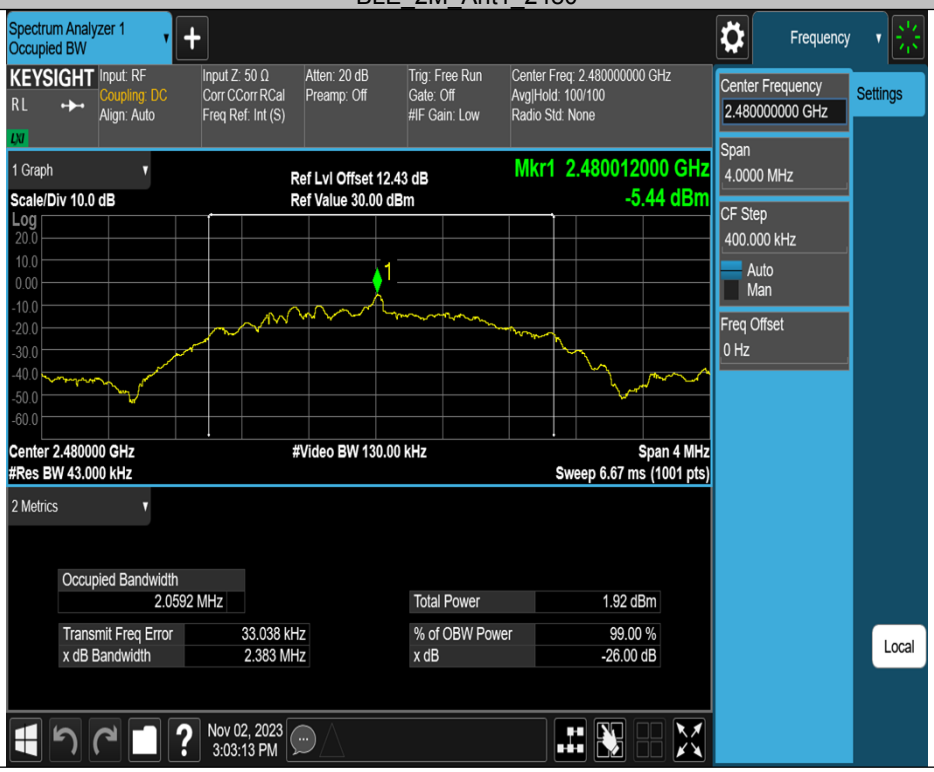
BLE_1M_Ant1_2480

BLE_2M_Ant1_2402

BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

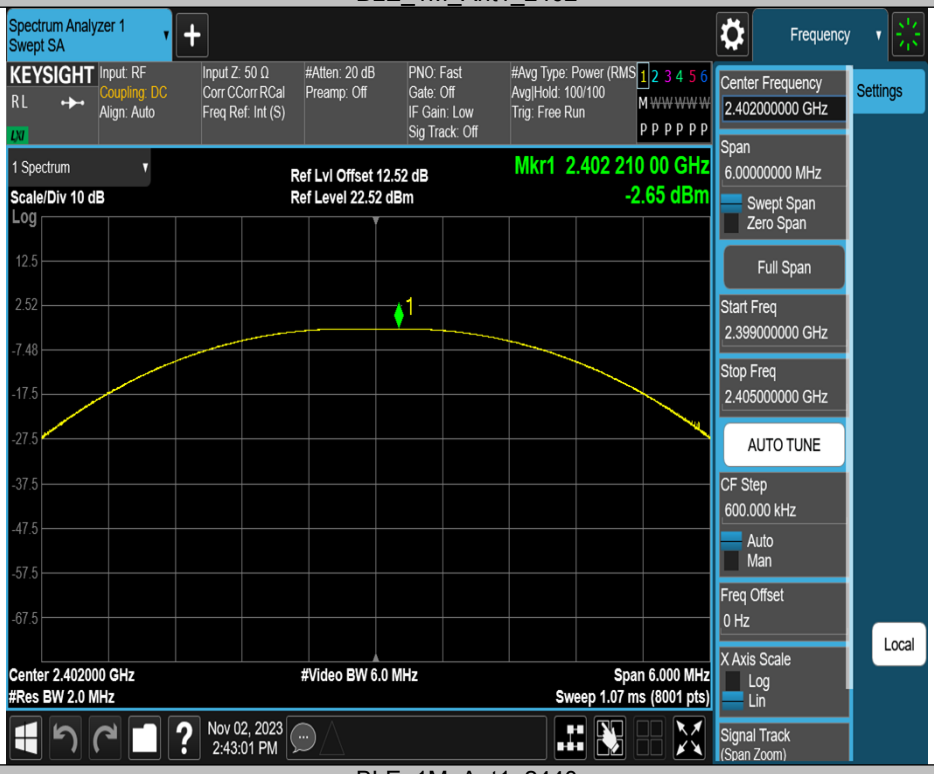


APPENDIX E - MAXIMUM OUTPUT POWER

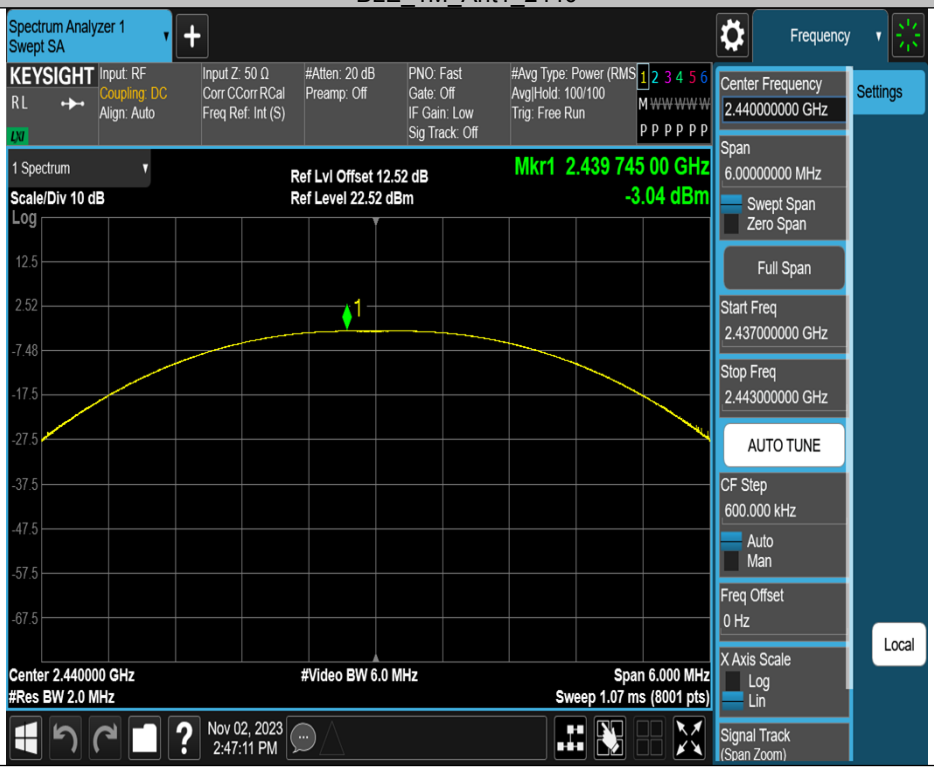
Test Mode	Antenna	Freq(MHz)	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-2.65	≤30	PASS
		2440	-3.04	≤30	PASS
		2480	-4.27	≤30	PASS
BLE_2M	Ant1	2402	**-2.60**	≤30	PASS
		2440	-2.96	≤30	PASS
		2480	-4.14	≤30	PASS

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



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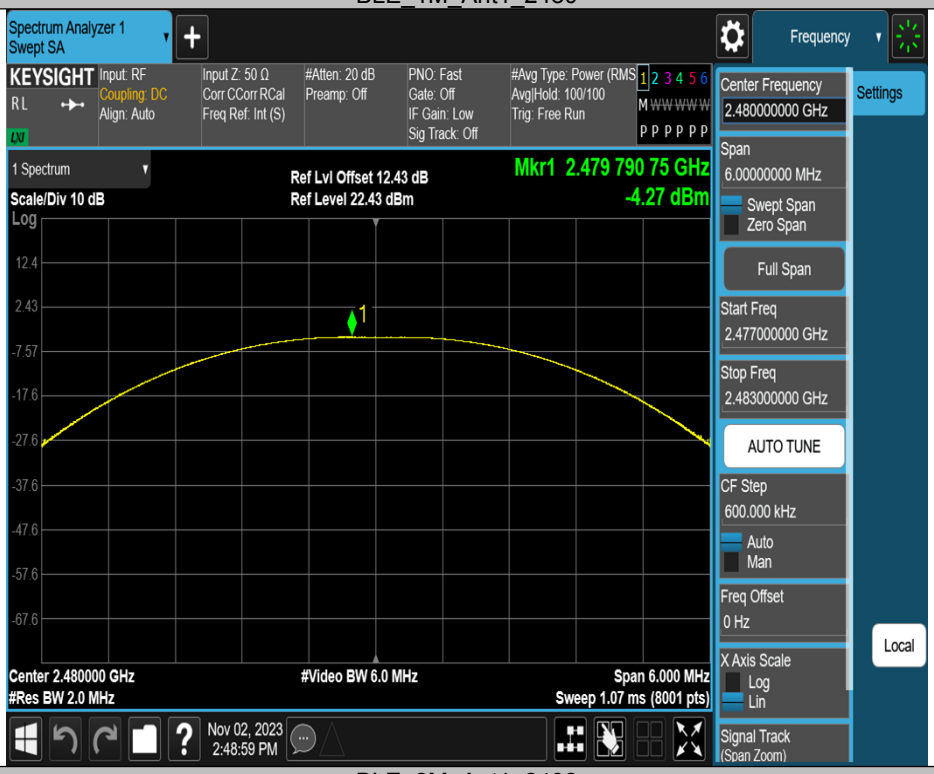

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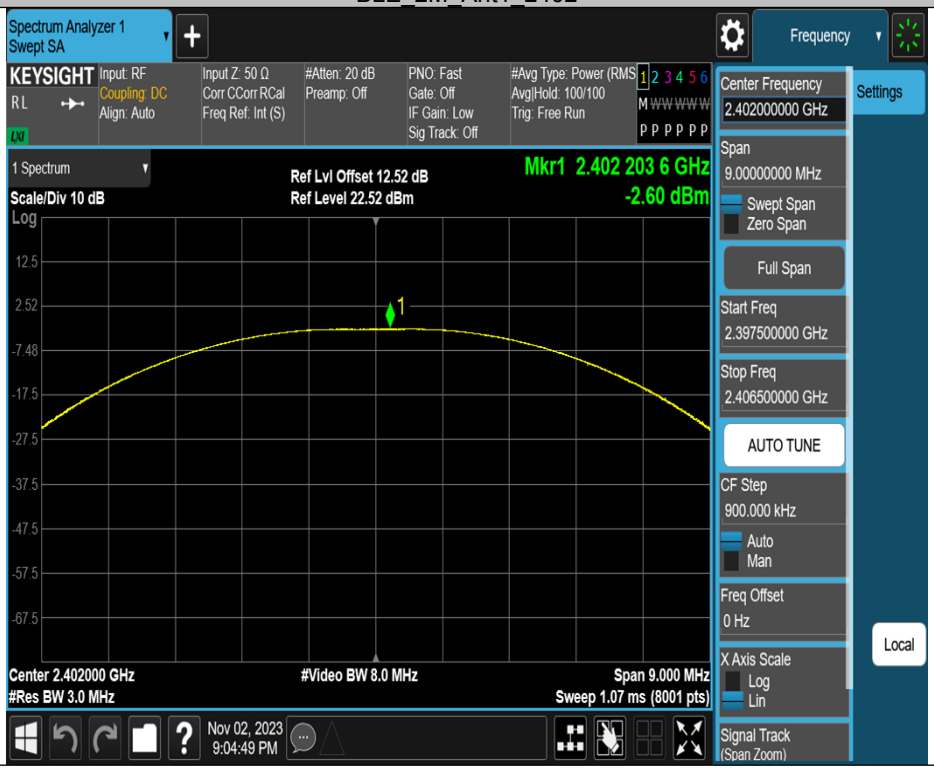

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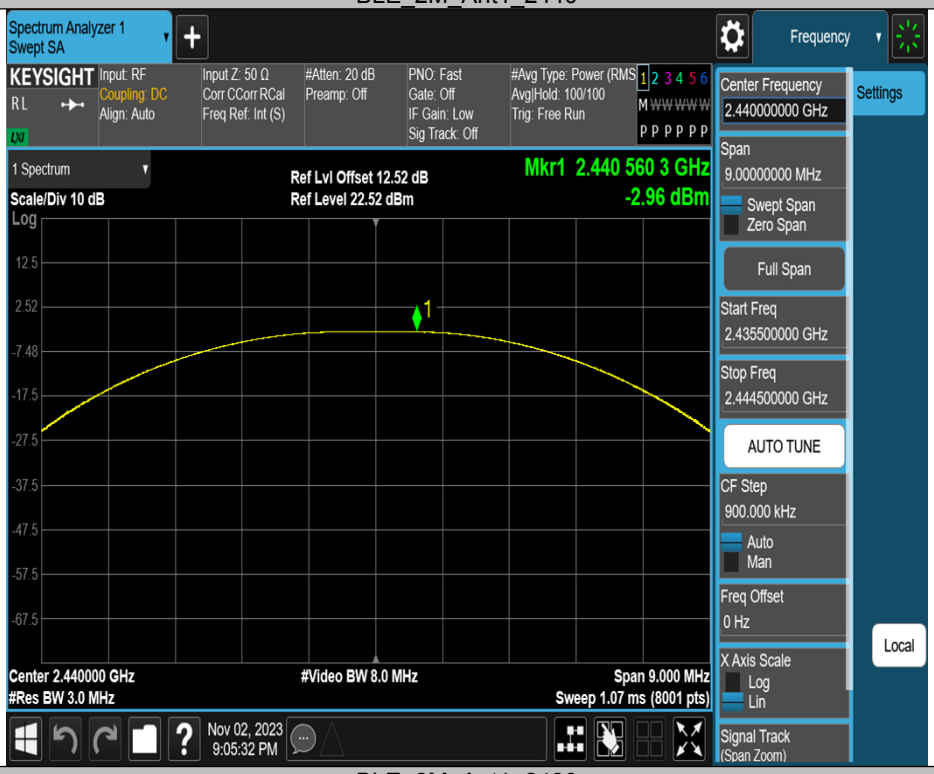

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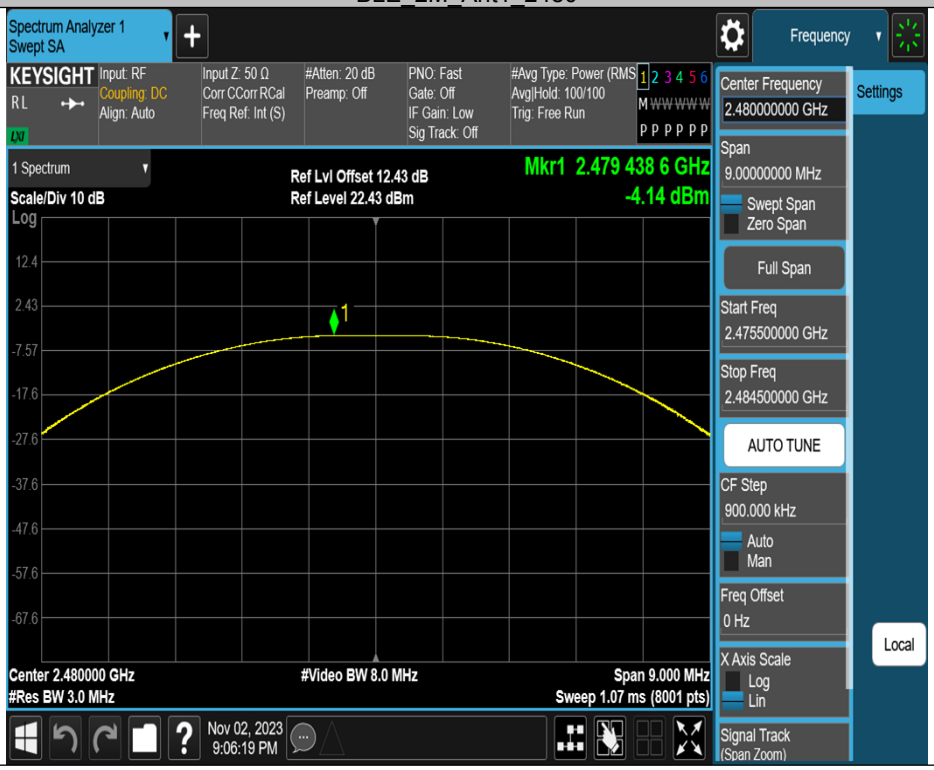

APPENDIX F - CONDUCTED SPURIOUS EMISSION