FCC Test Report

Product Name	Notebook
Model No.	NU50;NUx0xx (x=0~9;A~Z;a~z;_-)
FCC ID.	WL6-NU509560D2W

Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD
Address	No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan

Date of Receipt	June 23, 2020
Issued Date	Dec. 21, 2020
Report No.	2060931R-E3032110107
Report Version	V1.0

Test Report

Issued Date: Dec. 21, 2020
Report No.: 2060931R-E3032110107

Product Name	Notebook
Applicant	ELITEGROUP COMPUTER SYSTEMS CO., LTD
Address	No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan
Manufacturer	Golden Elite Technology (SHENZHEN) Co., Ltd.
Model No.	NU50;NUx0xx (x=0~9;A~Z;a~z;_-)
FCC ID.	WL6-NU509560D2W
EUT Rated Voltage	AC 100-240V, 50-60Hz
EUT Test Voltage	AC 120V / 60Hz
Trade Name	ECS ELITEGROUP
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Anita Chou

(Senior Engineering Adm. Specialist / Anita Chou)

Tested By : Yun Che Chen

(Engineer / Yunche Chen)

Approved By :

(Director / Vincent Lin)

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Revision History

Report No.	Version	Description	Issued Date
2060931R-E3032110107	V1.0	Initial issue of report.	2020-12-21

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Notebook
Trade Name	ECS ELITEGROUP
Model No.	NU50;NUx0xx (x=0~9;A~Z;a~z;_-)
FCC ID.	WL6-NU509560D2W
Frequency Range	2402 – 2480MHz
Channel Number	V5.0: 40CH
Type of Modulation	V5.0: GFSK
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
Power Adapter	MFR: FSP, M/N: FSP065-A1BR3 Input: AC 100-240V，50-60Hz 1.7A Output: DC 5V, 3A; 9V, 3A; 12V, 3A; 15V, 3A; 20V, 3.25A Cable Out: Shielded, 1m Power cord: Non-shielded, 0.8m

Antenna List

No.	Manufacturer	Part No. (Vendor)	Antenna Type	Peak Gain
1	WGT	13-130-XD2050 (Main) 13-130-XD2051 (Aux)	PIFA Antenna	2.00 dBi for 2.4GHz

Note: The antenna of EUT is conforming to FCC 15.203.

Center Frequency of Each Channel: (For V5.0)

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

Note:

1. The EUT is a Notebook with a built-in 2.4 GHz and 5 GHz WLAN and Bluetooth V5.0, V3.0, V2.1+EDR transceiver, this report for Bluetooth V5.0.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth V4.0 transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.

Test Mode	Mode 1: Transmit - BLE

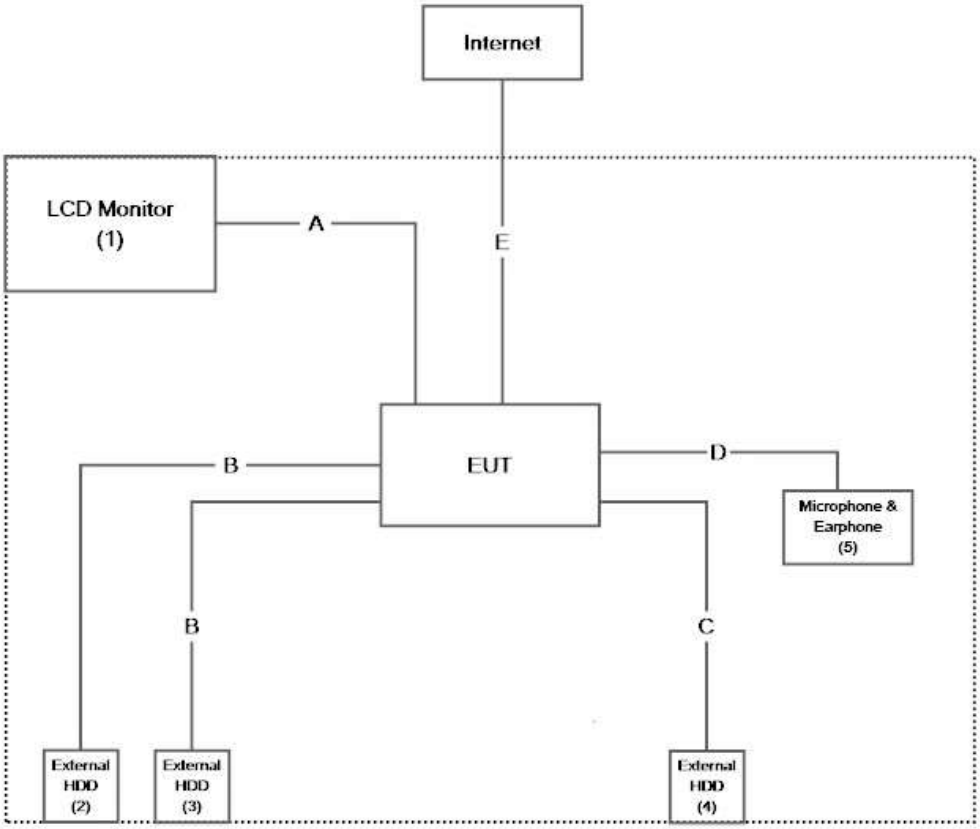
1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	LCD Monitor	DELL	ST2320Lf	CN-0M2NN6-72872-22I-C9VS	Non-Shielded, 1.8m
2	External HDD	Transcend	TS1TSJ25H3B	F21786-0125	N/A
3	External HDD	Transcend	TS1TSJ25H3B	F21786-0005	N/A
4	External HDD	Transcend	TS1TSJ25MC	F30467-0003	N/A
5	Microphone & Earphone	RONEVER	MOE241	N/A	N/A

Signal Cable Type		Signal cable Description
A	HDMI Cable	Non-shielded, 1.8m
B	USB Cable	Shielded, 0.5m, two PCS.
C	USB Type-C Cable	Shielded, 0.5m
D	Microphone & Earphone Cable	Non-shielded, 1.2m
E	LAN Cable	Non-shielded, 2.0m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “DRTU V.11.1941.0-10270” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (℃)	10~40 ℃	26.5 ℃
	Humidity (%RH)	10~90 %	56.0 %
Radiated Emission	Temperature (℃)	10~40 ℃	26.1 ℃
	Humidity (%RH)	10~90 %	73.0 %
Conductive	Temperature (℃)	10~40 ℃	28.0 ℃
	Humidity (%RH)	10~90 %	72.9 %

USA : FCC Registration Number: TW3023
Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: http://www.dekra.com.tw

USA : FCC Registration Number: TW0023
Canada : IC Registration Number: 25880

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist., New Taipei City 24457, Taiwan, R.O.C.
Phone number : 886-2-2602-7968
Fax number : 866-2-2602-3286
Email address : info.tw@dekra.com
Website : http://www.dekra.com.tw

1.6. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2020/04/06	2021/04/05
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2020/07/01	2021/06/30
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2020/07/01	2021/06/30
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2020/07/01	2021/06/30
X	EMI Test Receiver	R&S	ESCS 30	100369	2019/11/27	2020/11/26
X	LISN	R&S	ENV216	101105	2020/04/27	2021/04/26
X	LISN	R&S	ESH3-Z5	836679/014	2020/04/26	2021/04/25
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2020/06/19	2021/06/18

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test SystemV9.0.5.

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Test Receiver	R&S	ESR7	101602	2019/12/16	2020/12/15
X	Signal Analyzer	R&S	FSV40	101869	2020/06/24	2021/06/23
X	Loop Antenna	Teseq	HLA6121	37133	2019/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2020/01/20	2021/01/19
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2020/07/09	2021/07/08
X	Amplifier	EMCI	EMC001330	980254	2020/07/28	2021/06/10
X	Horn Antenna	ETS-LINDGREN	3117	00228113	2020/05/28	2021/05/27
X	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2020/07/09	2021/07/08
X	Amplifier	EMCI	EMC05820SE	980361	2019/09/23	2020/09/22
X	Amplifier	SGH	PRAMP118	20200202	2020/03/17	2021/03/16
X	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
X	Amplifier + Cable	EMCI	EMC184045SE	980369	2020/04/23	2021/04/22
	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2020/01/20	2021/01/19
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2020/07/09	2021/07/08
	Amplifier	EMCI	EMC001330	980255	2020/03/17	2021/03/16
	Horn Antenna	ETS-LINDGREN	3117	00228111	2020/05/28	2021/05/27
	Amplifier	SGH	PRAMP0510	20200206	2020/03/17	2021/03/16
	Amplifier	SGH	PRAMP118	20200202	2020/03/17	2021/03/16
X	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
X	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

Note:

1. Loop Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Test SystemV1.1.

For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2020.02.11	2021.02.10
X	Spectrum Analyzer	Agilent	N9010A	MY55150401	2020.09.15	2021.09.14
X	Power Meter	Anritsu	ML2496A	1548002	2020.02.10	2021.02.09
X	Power Sensor	Anritsu	MA2411B	1531023	2020.02.10	2021.02.09
X	Power Sensor	Anritsu	MA2411B	1531022	2020.02.10	2021.02.09

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test System V9.0.5.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

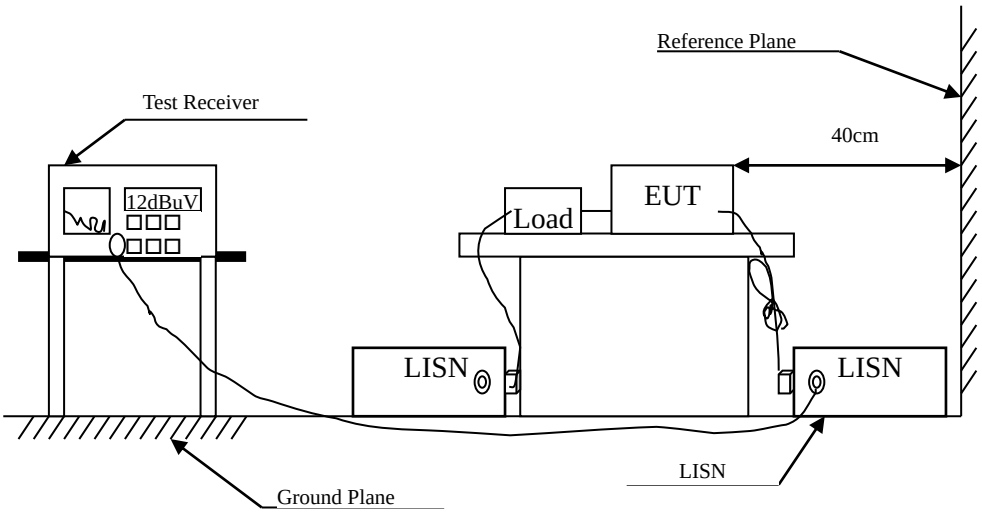
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	**Uncertainty**	
Conducted Emission	±3.42dB	
Peak Power Output	Power Meter ±0.89dB	Spectrum Analyzer ±2.06dB
Radiated Emission	9kHz~30MHz: ±3.88dB 30MHz~1GHz: ±4.06dB 1GHz~18GHz: ±3.71dB 18GHz~40GHz: ±3.73dB 40GHz~50GHz: ±3.75dB 50GHz~325GHz: ±4.39dB	
RF antenna conducted test	±2.06dB	
Band Edge	9kHz~30MHz: ±3.88dB 30MHz~1GHz: ±4.06dB 1GHz~18GHz: ±3.71dB 18GHz~40GHz: ±3.73dB 40GHz~50GHz: ±3.75dB 50GHz~325GHz: ±4.39dB	
6dB Bandwidth	±1544.74Hz	
Power Density	±2.06dB	
Duty Cycle (2.4GHz)	±2.31msec	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

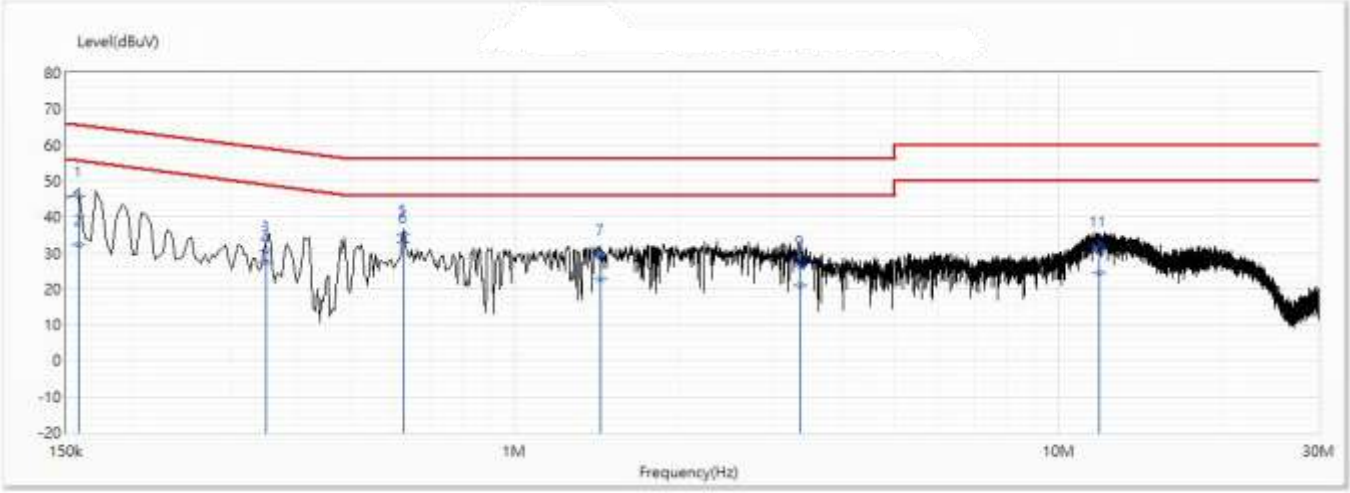
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to DTS test procedure of FCC KDB-558074 for compliance to FCC 47CFR Subpart C requirements.

2.4. Test Result of Conducted Emission

Product	:	Notebook
Test Item	:	Conducted Emission Test
Test date	:	2020/08/15
Test Mode	:	Mode 1: Transmit - BLE (2440MHz)

Line1



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.158	45.83	65.59	-19.76	36.02	9.81	QP
2	0.158	32.21	55.59	-23.38	22.40	9.81	AV
3	0.35	30.39	58.97	-28.58	20.59	9.80	QP
4	0.35	27.50	48.97	-21.47	17.70	9.80	AV
5	0.625	35.00	56.00	-21.00	25.20	9.80	QP
*6	0.625	32.99	46.00	-13.01	23.19	9.80	AV
7	1.435	29.61	56.00	-26.39	19.79	9.82	QP
8	1.435	22.62	46.00	-23.38	12.80	9.82	AV
9	3.356	26.58	56.00	-29.42	16.68	9.89	QP
10	3.356	20.85	46.00	-25.15	10.95	9.89	AV
11	11.855	31.73	60.00	-28.27	21.63	10.10	QP
12	11.855	24.41	50.00	-25.59	14.32	10.10	AV

Remark:

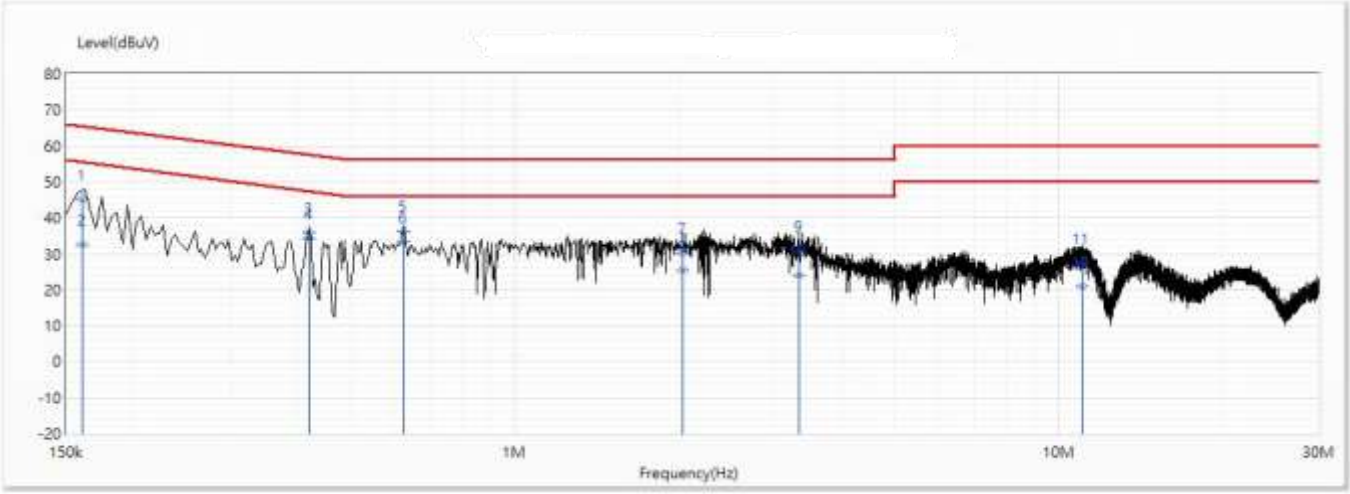
1. "*" means this data is the worst emission level;"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).

3. Margin=Emission Level-Limit

Product	:	Notebook
Test Item	:	Conducted Emission Test
Test date	:	2020/08/15
Test Mode	:	Mode 1: Transmit - BLE (2440MHz)

Neutral



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.161	45.28	65.42	-20.14	35.50	9.79	QP
2	0.161	32.40	55.42	-23.02	22.62	9.79	AV
3	0.419	35.88	57.47	-21.59	26.10	9.79	QP
4	0.419	34.42	47.47	-13.05	24.63	9.79	AV
5	0.624	36.19	56.00	-19.81	26.40	9.79	QP
*6	0.624	33.29	46.00	-12.71	23.50	9.79	AV
7	2.036	30.34	56.00	-25.66	20.50	9.84	QP
8	2.036	25.37	46.00	-20.63	15.53	9.84	AV
9	3.322	30.92	56.00	-25.08	21.04	9.88	QP
10	3.322	24.01	46.00	-21.99	14.13	9.88	AV
11	11.01	27.57	60.00	-32.43	17.45	10.11	QP
12	11.01	21.12	50.00	-28.88	11.00	10.11	AV

Remark:

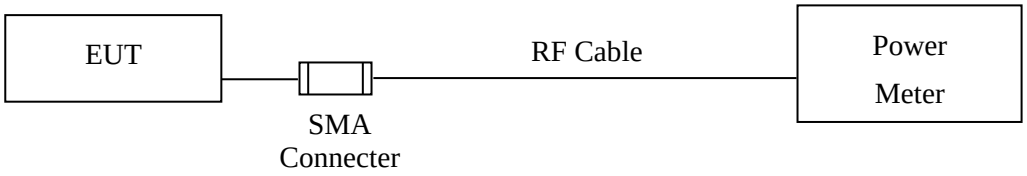
1. "*" means this data is the worst emission level;"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).

3. Margin=Emission Level-Limit

3. Peak Power Output

3.1. Test Setup



3.2. Limit

The maximum peak power shall be less 1Watt.

3.3. Test Procedure

The EUT was tested according to C63.10:2013 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using C63.10:2013 Section 11.9.1.3 PKPM1 Peak power meter method.

3.4. Test Result of Peak Power Output

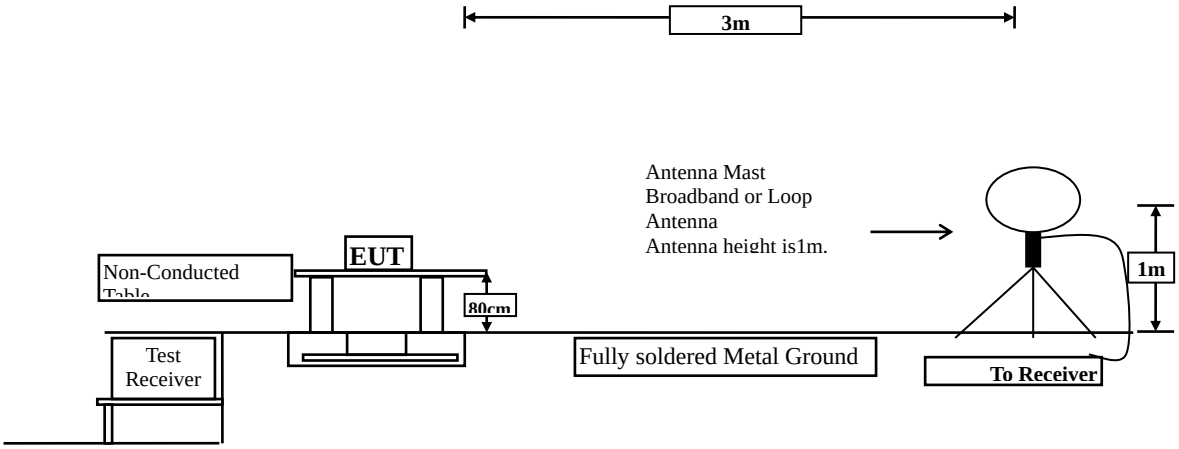
Product : Notebook
Test Item : Peak Power Output
Test Mode : Mode 1: Transmit - BLE
Test Date : 2020/08/28

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402	7.78	1 Watt= 30 dBm	Pass
Channel 19	2440	7.68	1 Watt= 30 dBm	Pass
Channel 39	2480	7.90	1 Watt= 30 dBm	Pass

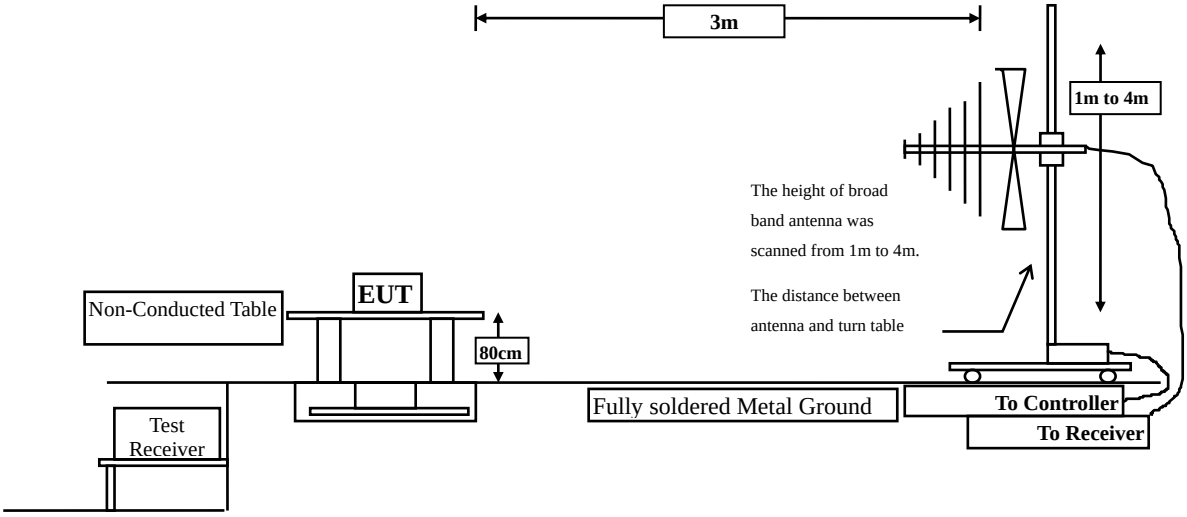
4. Radiated Emission

4.1. Test Setup

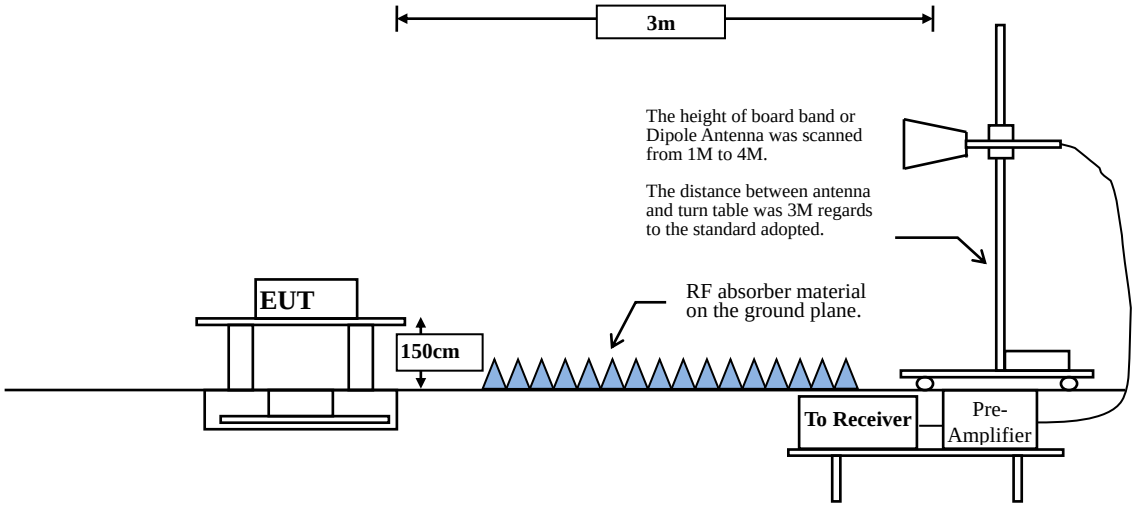
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

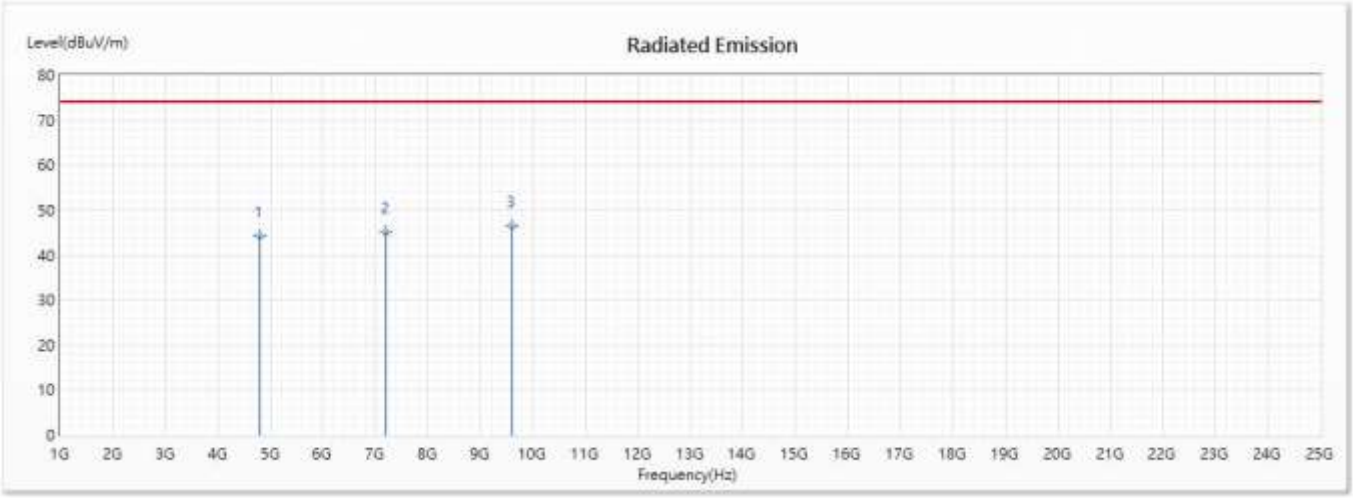
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE	62.07	0.3913	2556	3000

Note: Duty Cycle Refer to Section 9

4.4. Test Result of Radiated Emission

Product : Notebook
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - BLE(2402MHz)
Test Date : 2020/07/28

Horizontal



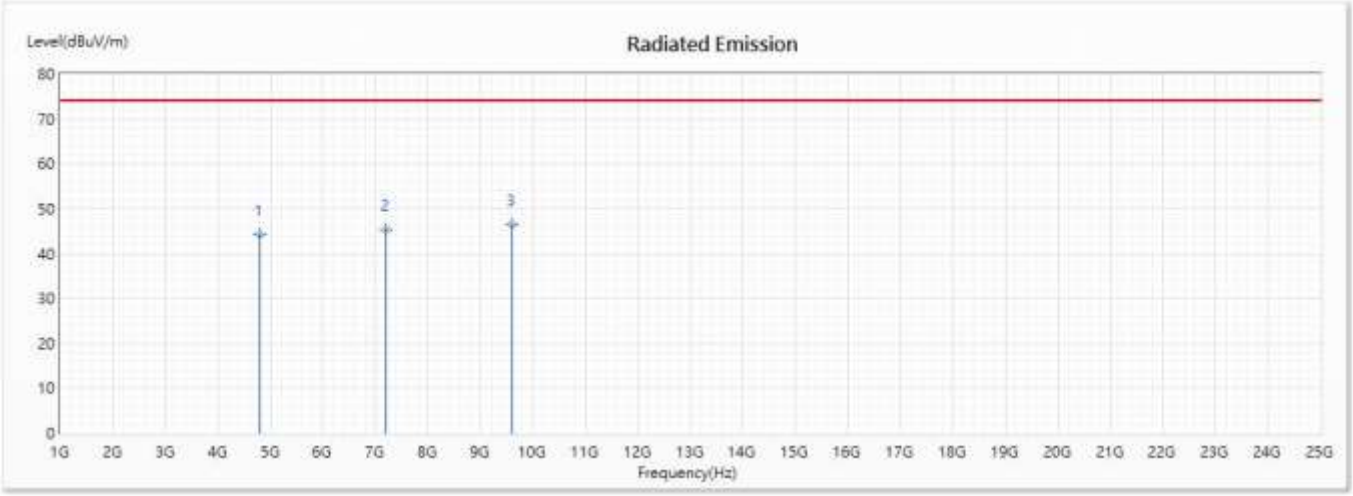
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	4804	44.23	74.00	-29.77	56.46	-12.23	PK
2	7206	45.11	74.00	-28.89	57.97	-12.86	PK
* 3	9608	46.35	74.00	-27.65	59.67	-13.32	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Notebook
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE (2402MHz)
Test Date	:	2020/07/28

Vertical



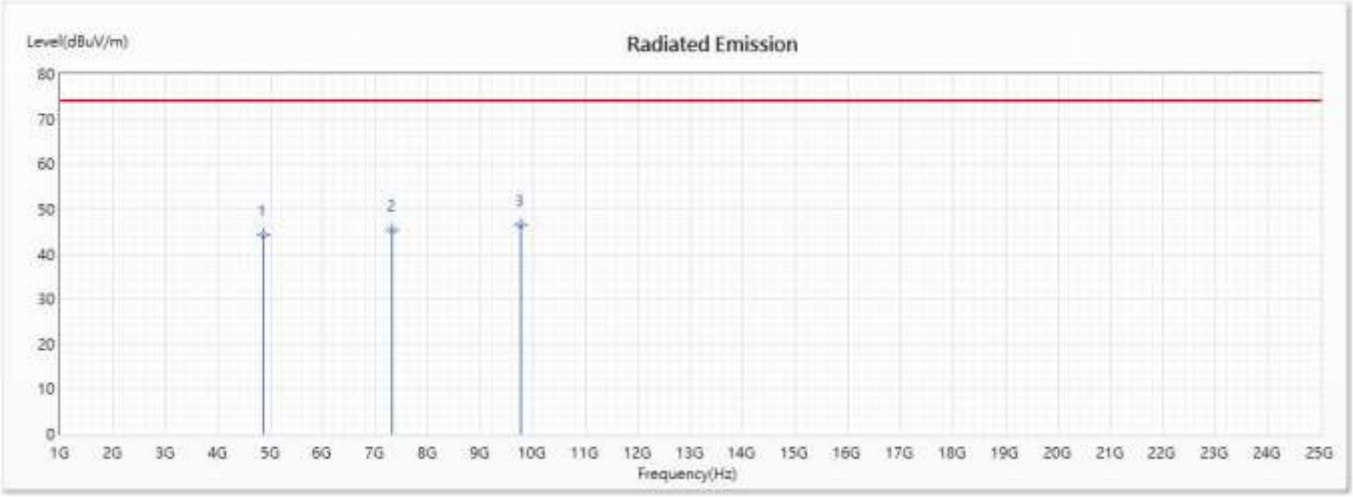
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	4804	44.31	74.00	-29.69	56.54	-12.23	PK
2	7206	45.23	74.00	-28.77	58.09	-12.86	PK
* 3	9608	46.42	74.00	-27.58	59.74	-13.32	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Notebook
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE(2440MHz)
Test Date	:	2020/07/28

Horizontal



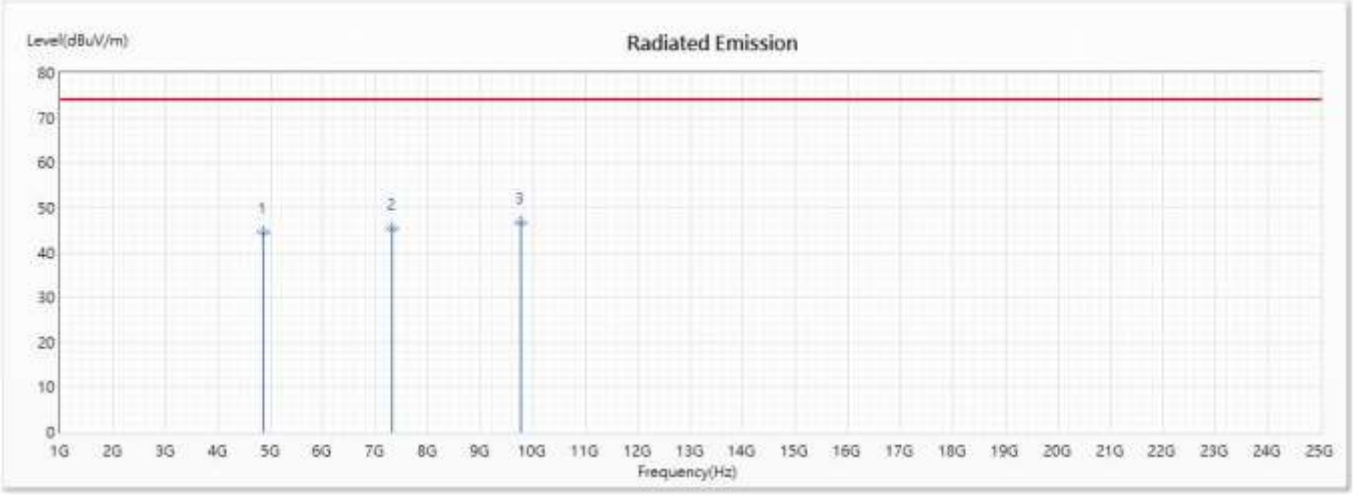
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	4880	44.36	74.00	-29.64	55.80	-11.44	PK
2	7320	45.28	74.00	-28.72	58.73	-13.45	PK
* 3	9760	46.51	74.00	-27.49	58.79	-12.28	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Notebook
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE (2440MHz)
Test Date	:	2020/07/28

Vertical



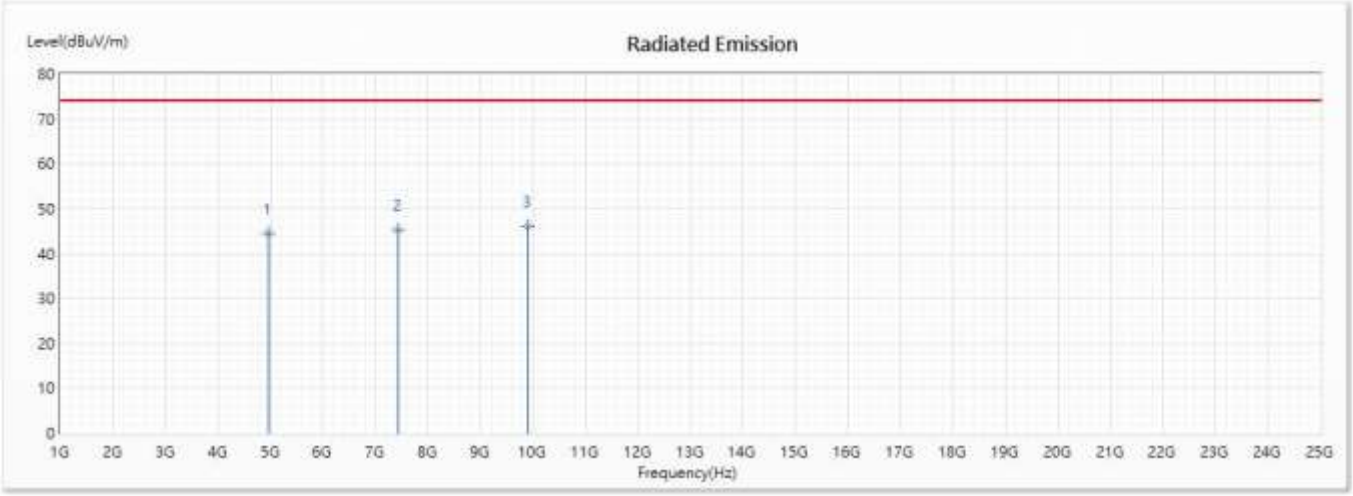
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	4880	44.45	74.00	-29.55	55.89	-11.44	PK
2	7320	45.33	74.00	-28.67	58.78	-13.45	PK
* 3	9760	46.63	74.00	-27.37	58.91	-12.28	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Notebook
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE (2480MHz)
Test Date	:	2020/07/28

Horizontal



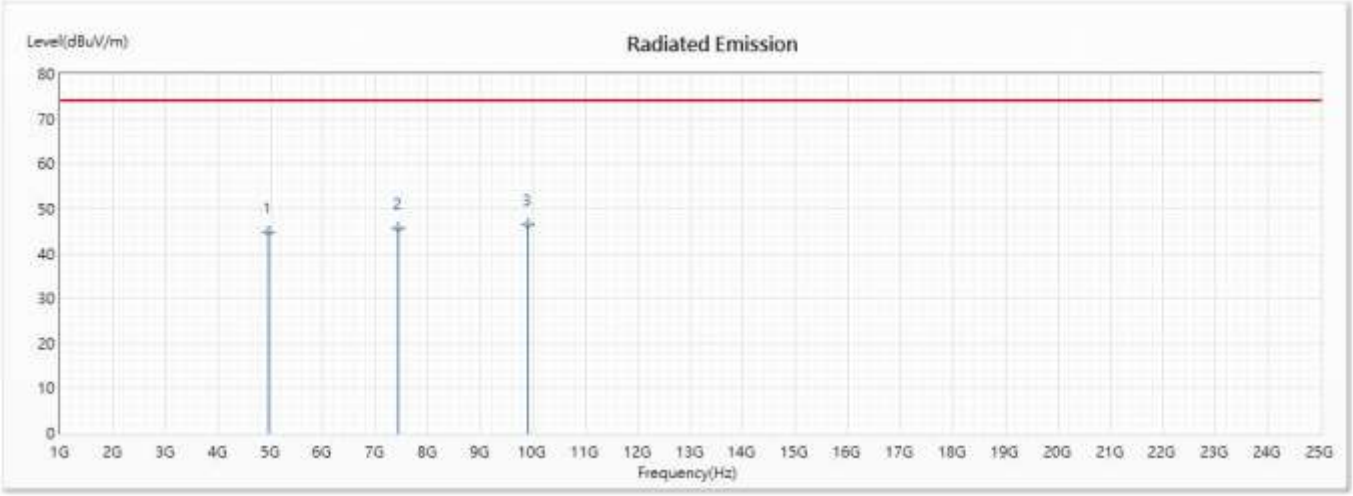
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	4960	44.55	74.00	-29.45	55.26	-10.71	PK
2	7440	45.32	74.00	-28.68	59.84	-14.52	PK
* 3	9920	46.27	74.00	-27.73	60.34	-14.07	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Notebook
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE (2480MHz)
Test Date	:	2020/07/28

Vertical



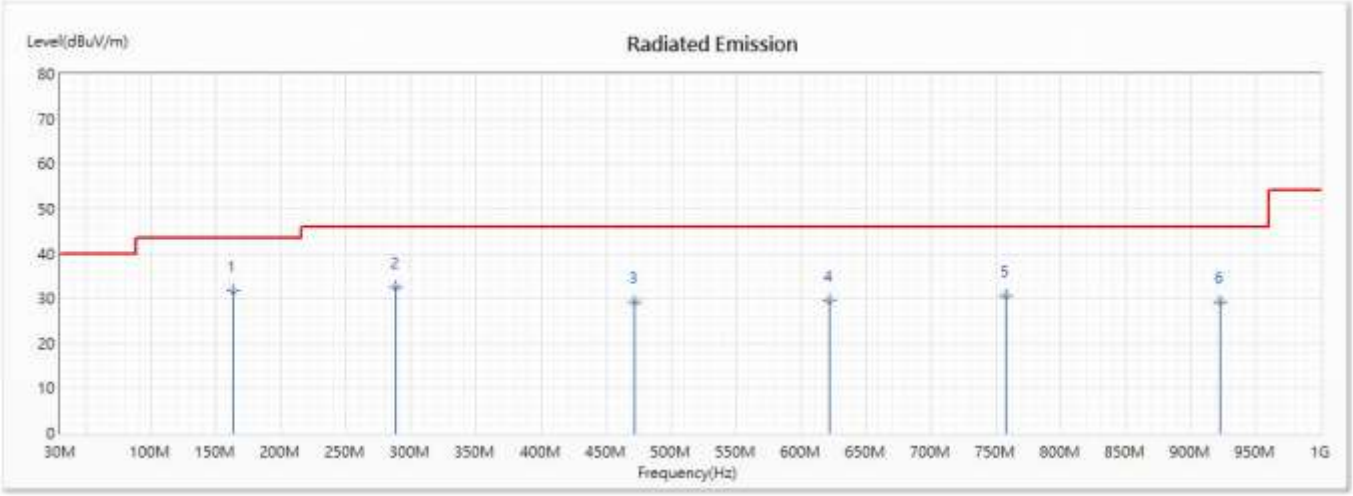
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	4960	44.67	74.00	-29.33	55.38	-10.71	PK
2	7440	45.53	74.00	-28.47	60.05	-14.52	PK
* 3	9920	46.39	74.00	-27.61	60.46	-14.07	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	:	Notebook
Test Item	:	General Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE (2440MHz)
Test Date	:	2020/07/28

Horizontal



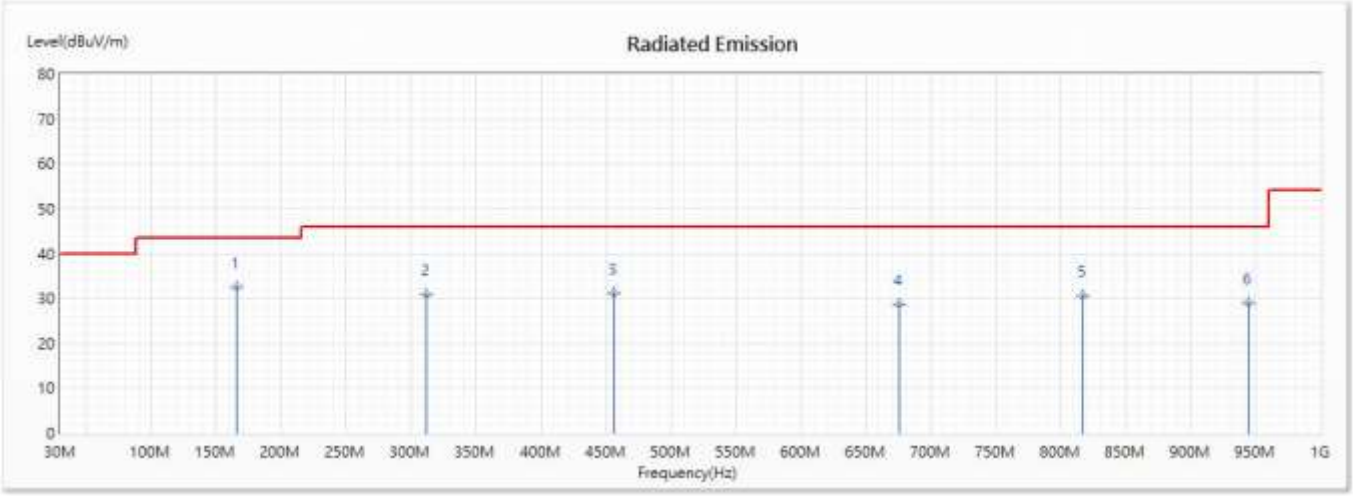
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	162.89	31.58	43.50	-11.92	43.75	-12.17	QP
2	288.02	32.38	46.00	-13.62	41.92	-9.54	QP
3	472.32	29.08	46.00	-16.92	33.04	-3.96	QP
4	621.7	29.55	46.00	-16.45	30.42	-0.87	QP
5	757.5	30.55	46.00	-15.45	31.06	-0.51	QP
6	922.4	29.17	46.00	-16.83	32.47	-3.30	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	Notebook
Test Item	:	General Radiated Emission
Test Mode	:	Mode 1: Transmit - BLE (2440MHz)
Test Date	:	2020/07/28

Vertical



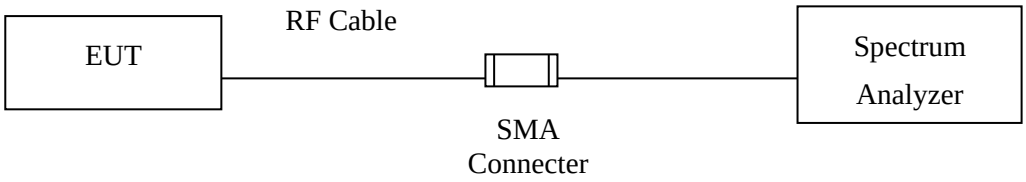
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	165.8	32.48	43.50	-11.02	44.57	-12.09	QP
2	312.27	30.80	46.00	-15.20	37.35	-6.55	QP
3	455.83	31.18	46.00	-14.82	34.02	-2.84	QP
4	676.02	28.61	46.00	-17.39	30.97	-2.36	QP
5	816.67	30.59	46.00	-15.41	32.69	-2.10	QP
6	944.71	28.95	46.00	-17.05	30.53	-1.58	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

5. RF Antenna Conducted Test

5.1. Test Setup



5.2. Limits

According to FCC Section 15.247(d). 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.3. Test Procedure

The EUT was tested according to C63.10:2013 Section 11.11 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

5.4. Test Result of RF Antenna Conducted Test

Product : Notebook
Test Item : RF Antenna Conducted Test
Test Mode : Mode 1: Transmit - BLE
Test Date : 2020/07/28

Figure Channel 00:

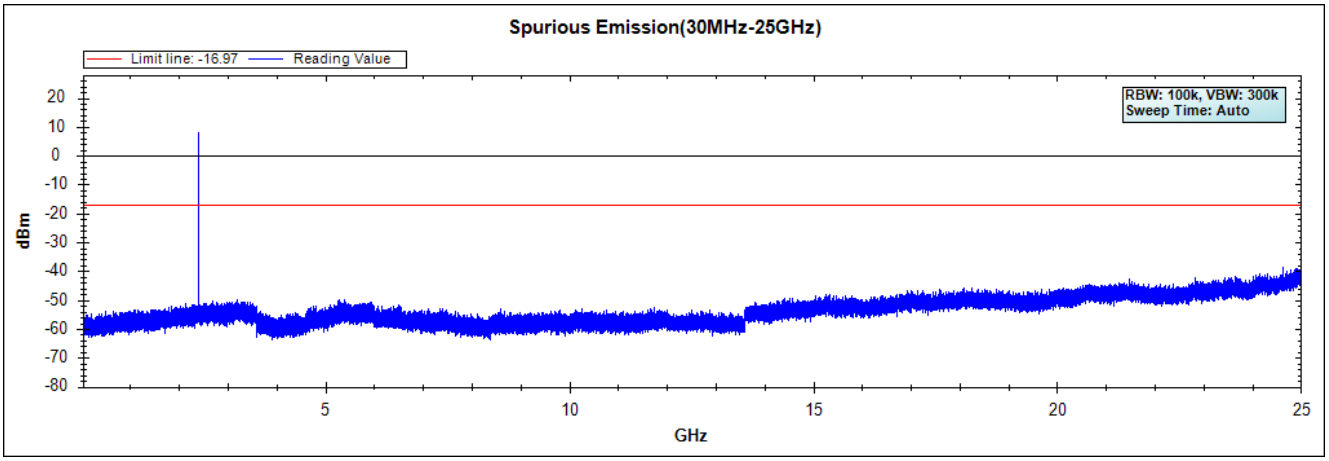


Figure Channel 19:

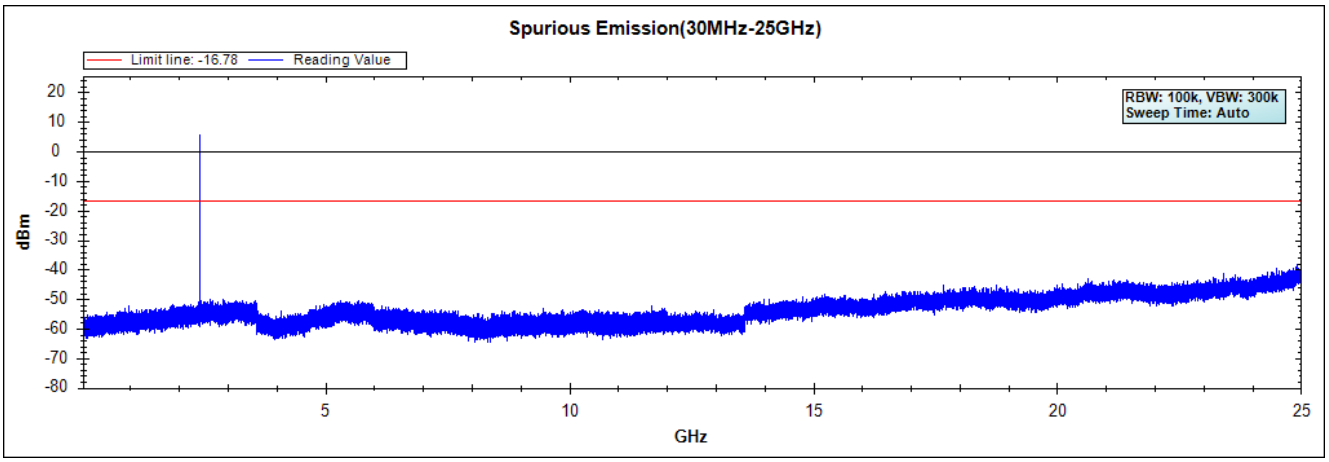
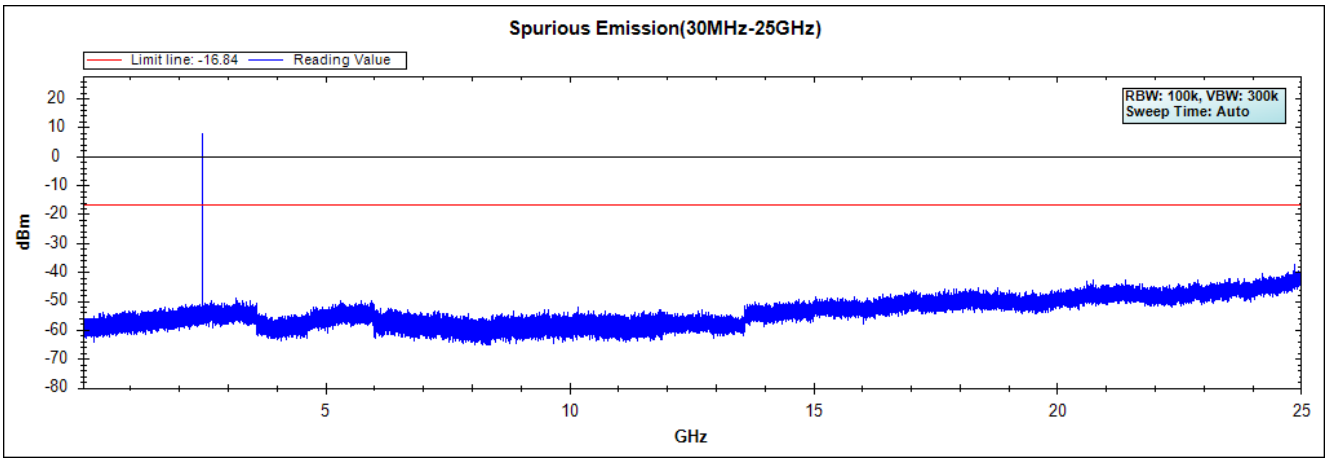


Figure Channel 39:

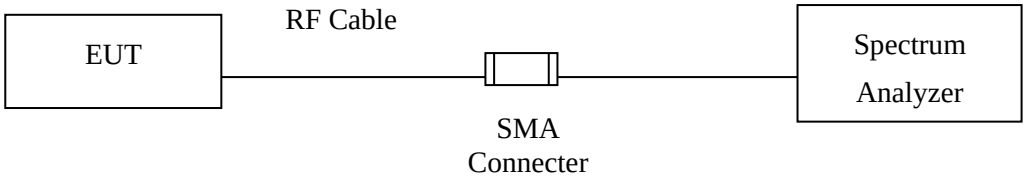


Note: The above test pattern is synthesized by multiple of the frequency range.

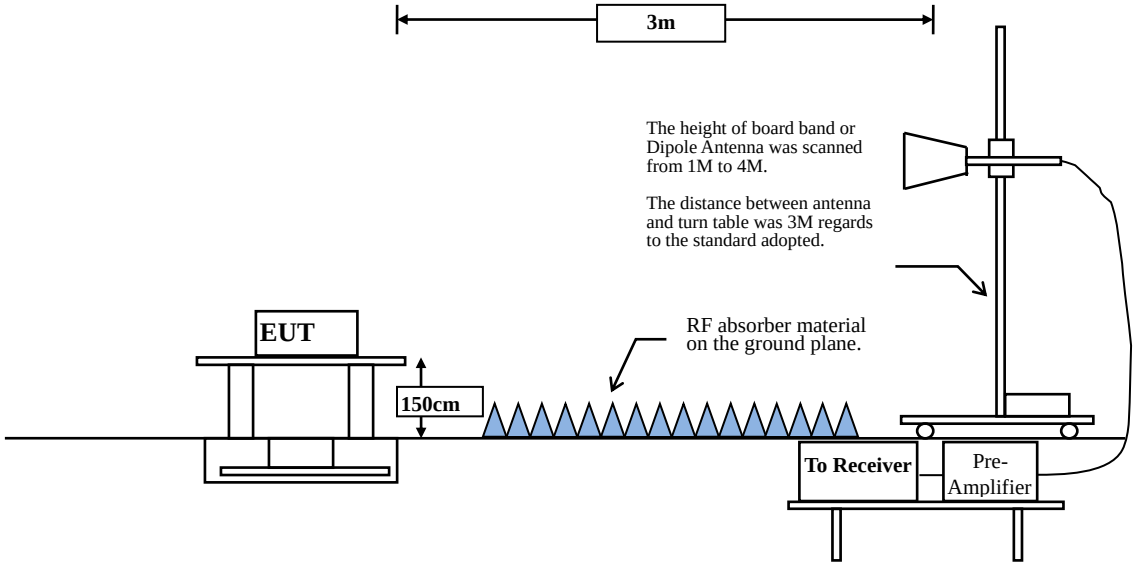
6. Band Edge

6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.2. Limit

According to FCC Section 15.247(d). 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

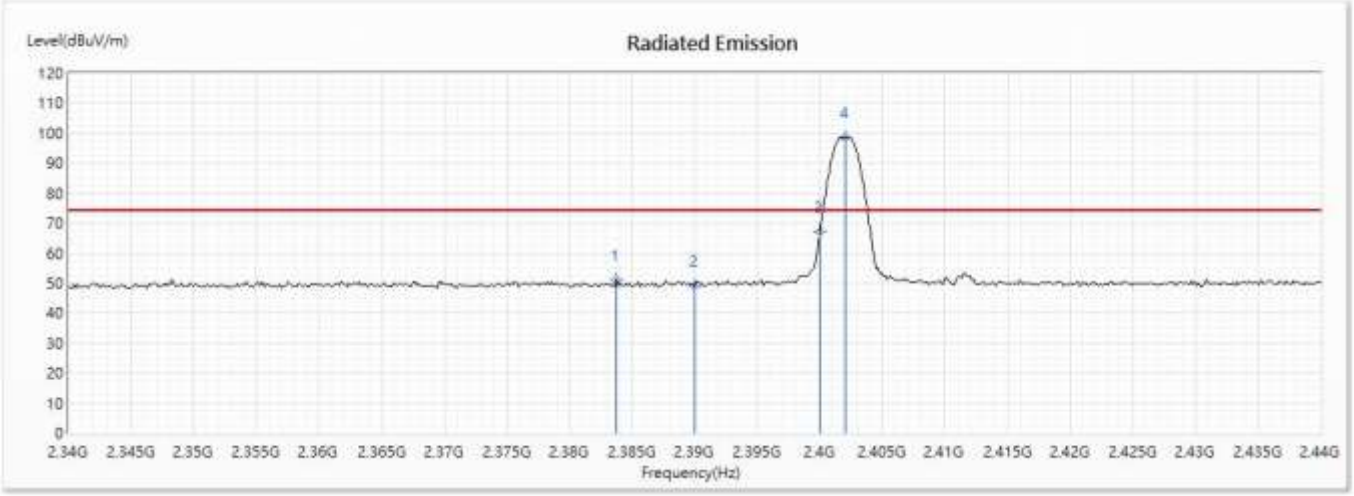
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE	62.07	0.3913	2556	3000

Note: Duty Cycle Refer to Section 9

6.4. Test Result of Band Edge

Product : Notebook
Test Item : Band Edge
Test Mode : Mode 1: Transmit - BLE (2402MHz)
Test Date : 2020/07/28

Horizontal



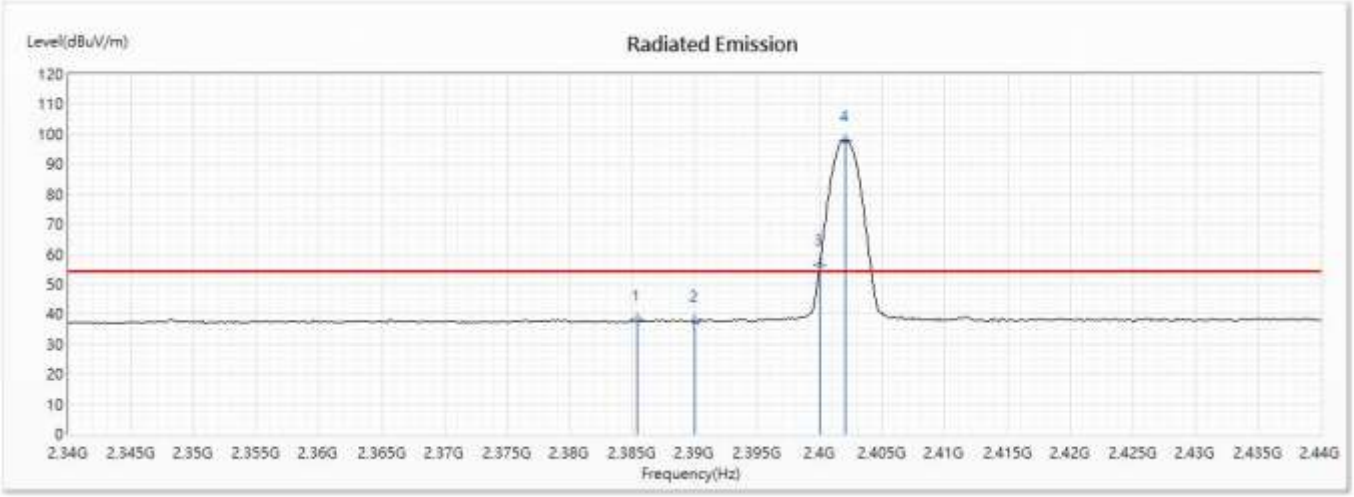
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2383.768	51.03	74.00	-22.97	38.23	12.80	PK
2	2390	49.29	74.00	-24.71	36.45	12.84	PK
3	2400	67.12	--	--	54.20	12.92	PK
! 4	2402.029	98.51	--	--	85.58	12.93	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge
Test Mode : Mode 1: Transmit - BLE (2402MHz)
Test Date : 2020/07/28

Horizontal



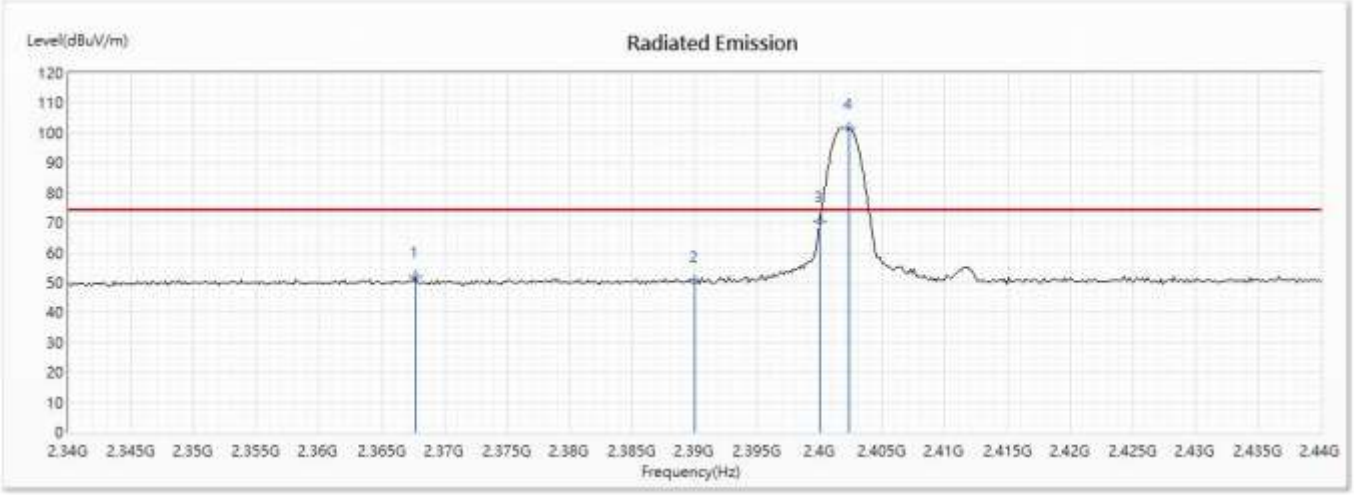
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2385.362	38.02	54.00	-15.98	25.21	12.81	AV
2	2390	37.61	54.00	-16.39	24.77	12.84	AV
! 3	2400	56.59	--	--	43.67	12.92	AV
! 4	2402.029	97.97	--	--	85.04	12.93	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge
Test Mode : Mode 1: Transmit - BLE (2402MHz)
Test Date : 2020/07/28

Vertical



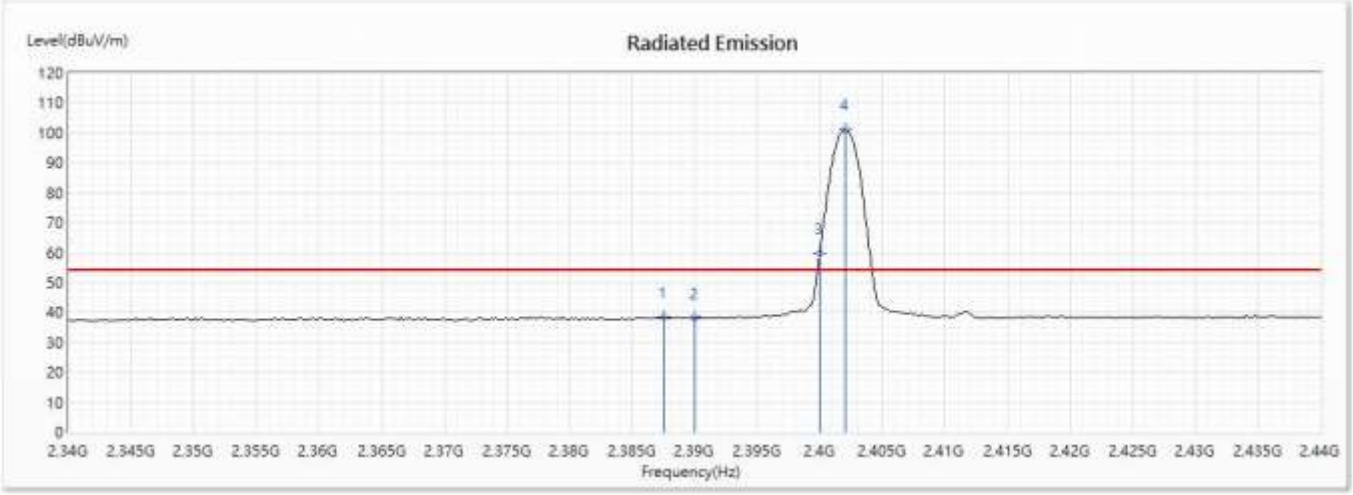
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2367.681	51.86	74.00	-22.14	39.18	12.68	PK
2	2390	50.39	74.00	-23.61	37.55	12.84	PK
3	2400	70.34	--	--	57.42	12.92	PK
! 4	2402.319	101.58	--	--	88.65	12.93	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product	:	Notebook
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - BLE (2402MHz)
Test Date	:	2020/07/28

Vertical



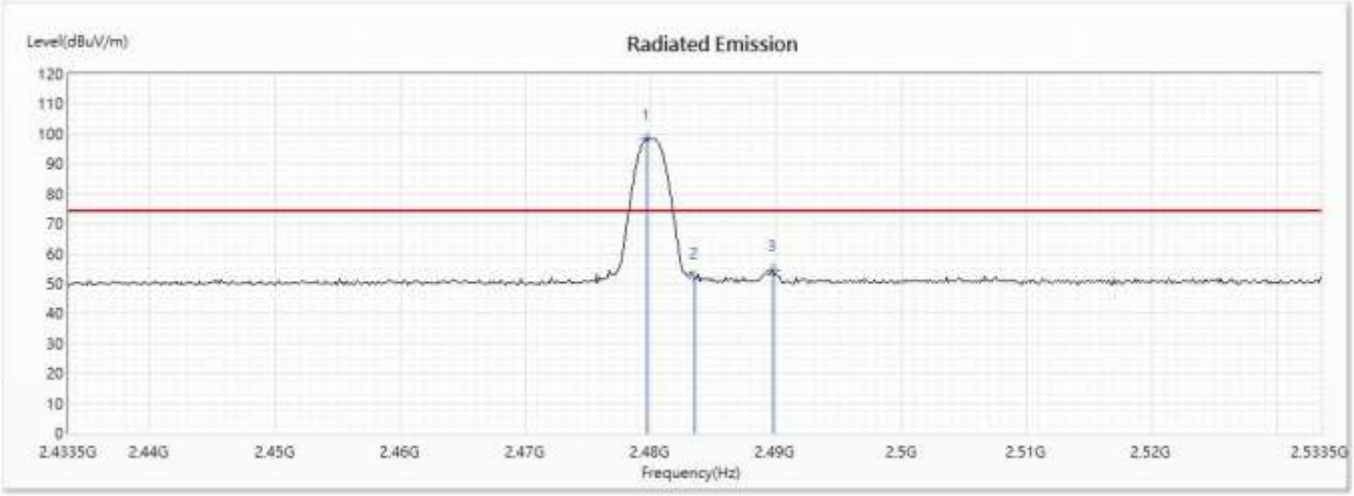
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2387.536	38.40	54.00	-15.60	25.57	12.83	AV
2	2390	38.15	54.00	-15.85	25.31	12.84	AV
! 3	2400	59.98	--	--	47.06	12.92	AV
! 4	2402.029	101.02	--	--	88.09	12.93	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge
Test Mode : Mode 1: Transmit - BLE (2480MHz)
Test Date : 2020/07/28

Horizontal



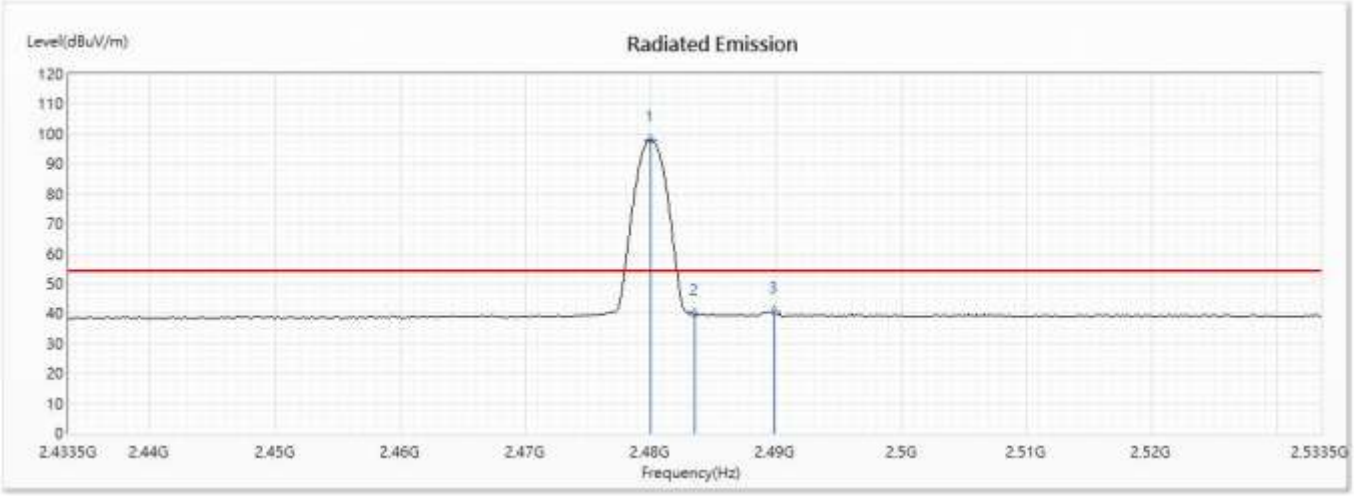
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2479.732	98.26	--	--	84.85	13.41	PK
2	2483.5	51.94	74.00	-22.06	38.49	13.45	PK
3	2489.732	54.34	74.00	-19.66	40.85	13.49	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product	:	Notebook
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - BLE (2480MHz)
Test Date	:	2020/07/28

Horizontal



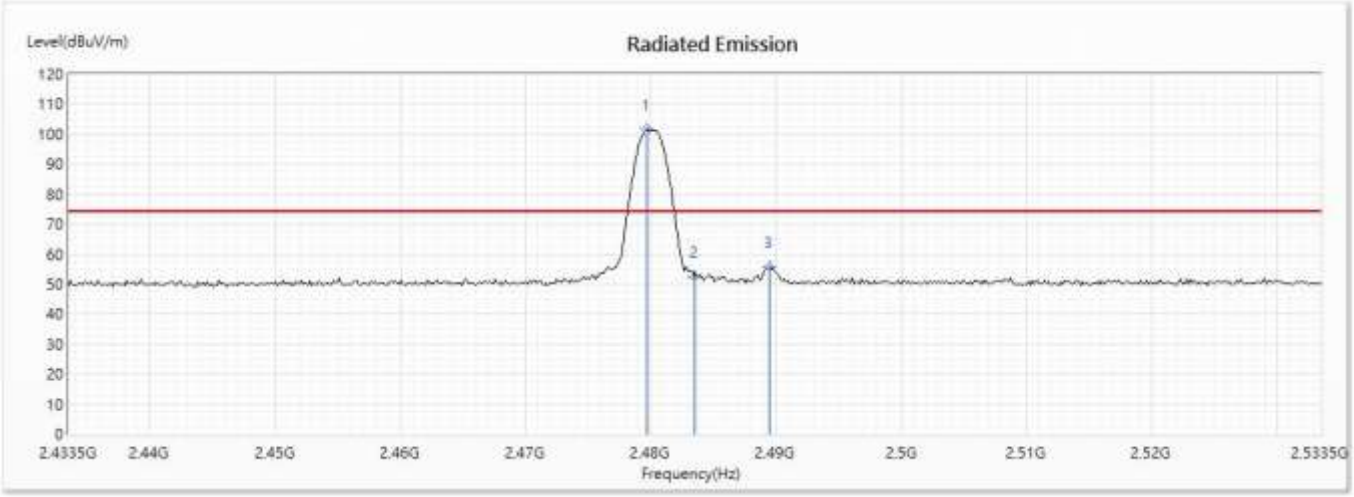
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2480.022	97.73	--	--	84.32	13.41	AV
2	2483.5	39.84	54.00	-14.16	26.39	13.45	AV
3	2489.877	40.50	54.00	-13.50	27.00	13.50	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product	:	Notebook
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - BLE (2480MHz)
Test Date	:	2020/07/28

Vertical



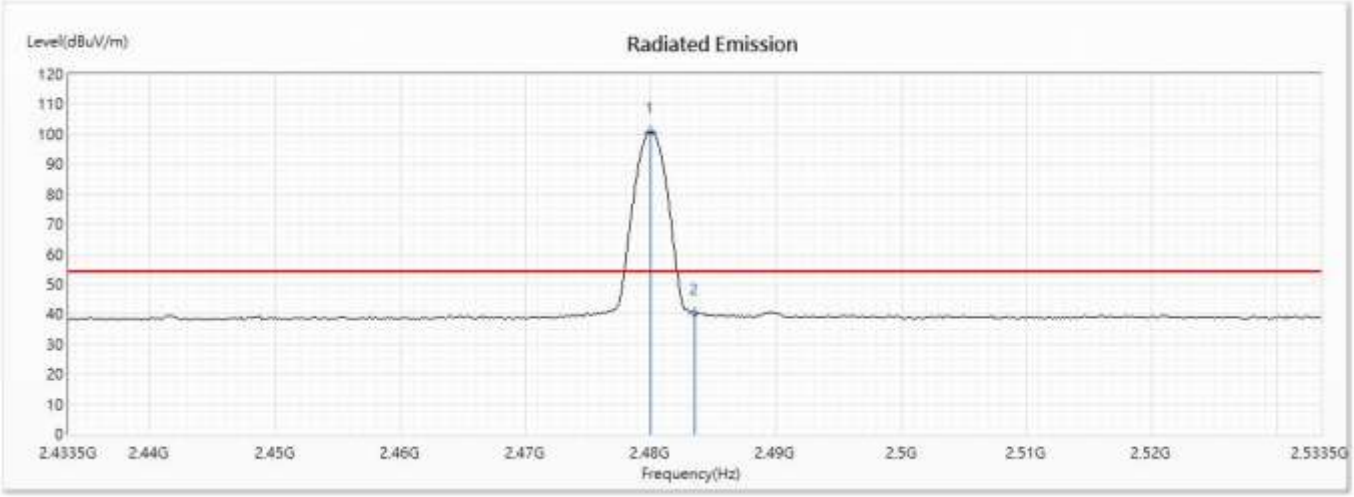
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2479.732	101.42	--	--	88.01	13.41	PK
2	2483.5	52.54	74.00	-21.46	39.09	13.45	PK
3	2489.442	55.65	74.00	-18.35	42.16	13.49	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product	:	Notebook
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - BLE (2480MHz)
Test Date	:	2020/07/28

Vertical



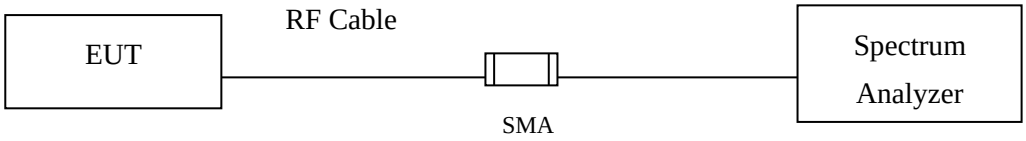
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2480.022	100.83	--	--	87.42	13.41	AV
2	2483.5	40.32	54.00	-13.68	26.87	13.45	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

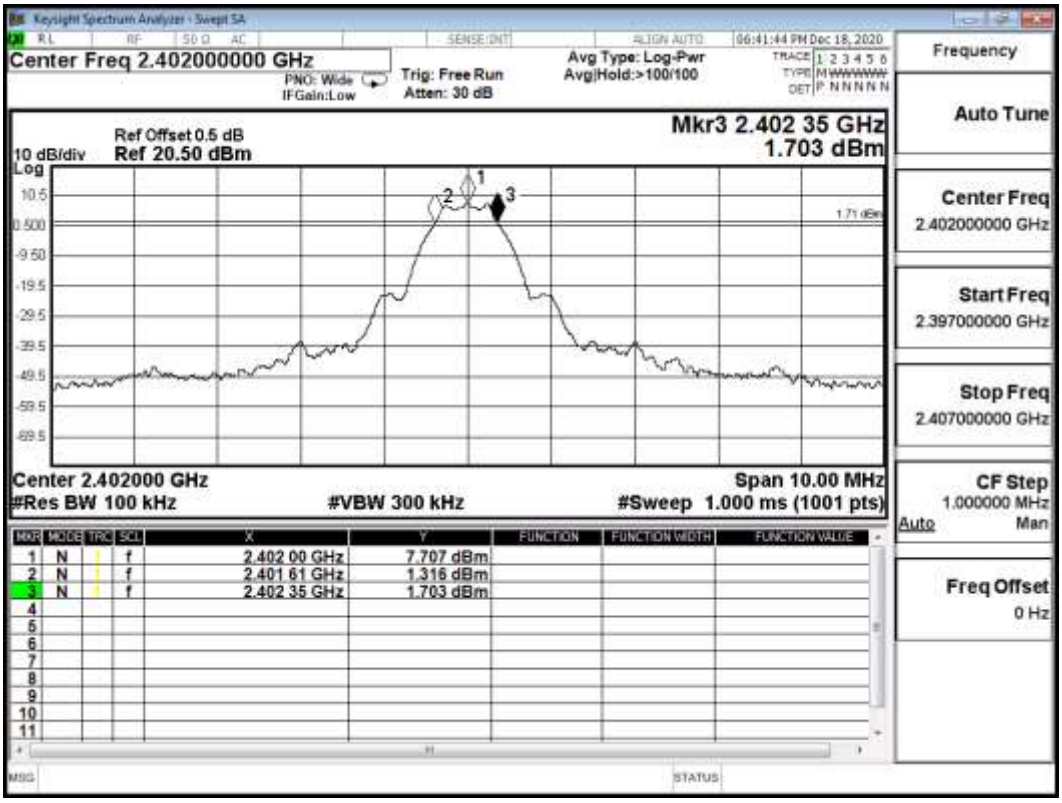
The EUT was setup according to ANSI C63.4, 2014; tested according to ANSI C63.10 Section 11.8 for compliance to FCC 47CFR 15.247 requirements.

7.4. Test Result of 6dB Bandwidth

Product : Notebook
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit - BLE (2402MHz)
Test Date : 2020/12/18

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	740	>500	Pass

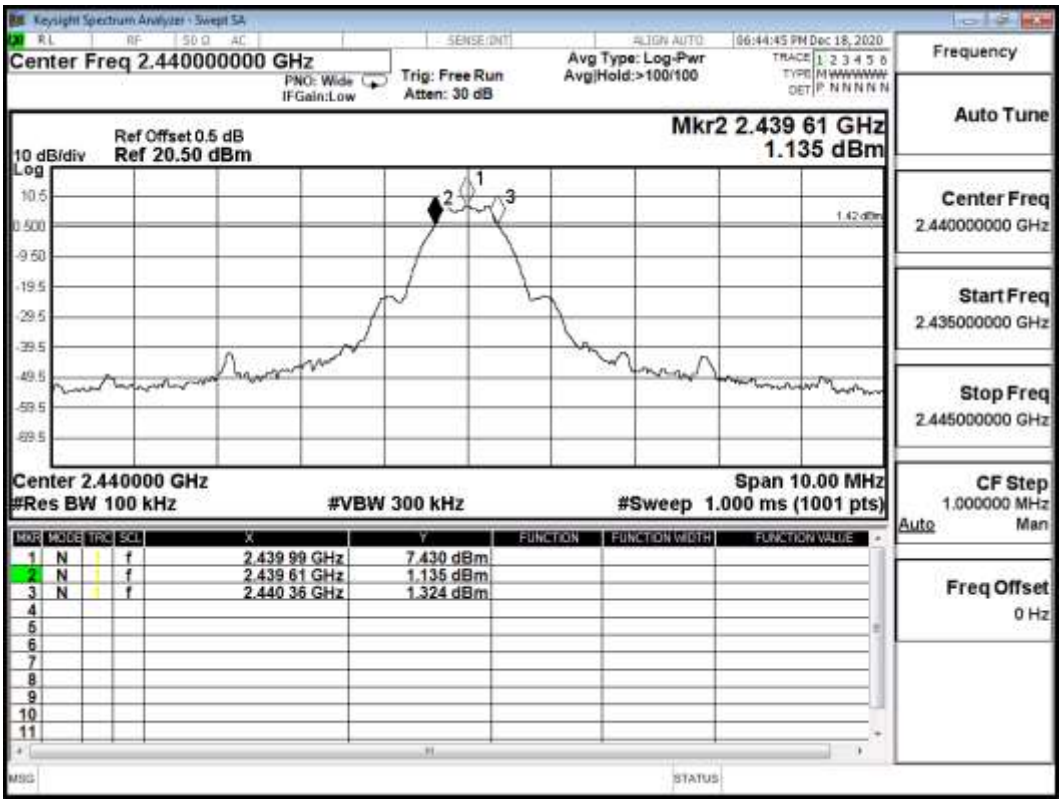
Figure Channel 00:



Product : Notebook
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit - BLE (2440MHz)
Test Date : 2020/12/18

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
19	2440	750	>500	Pass

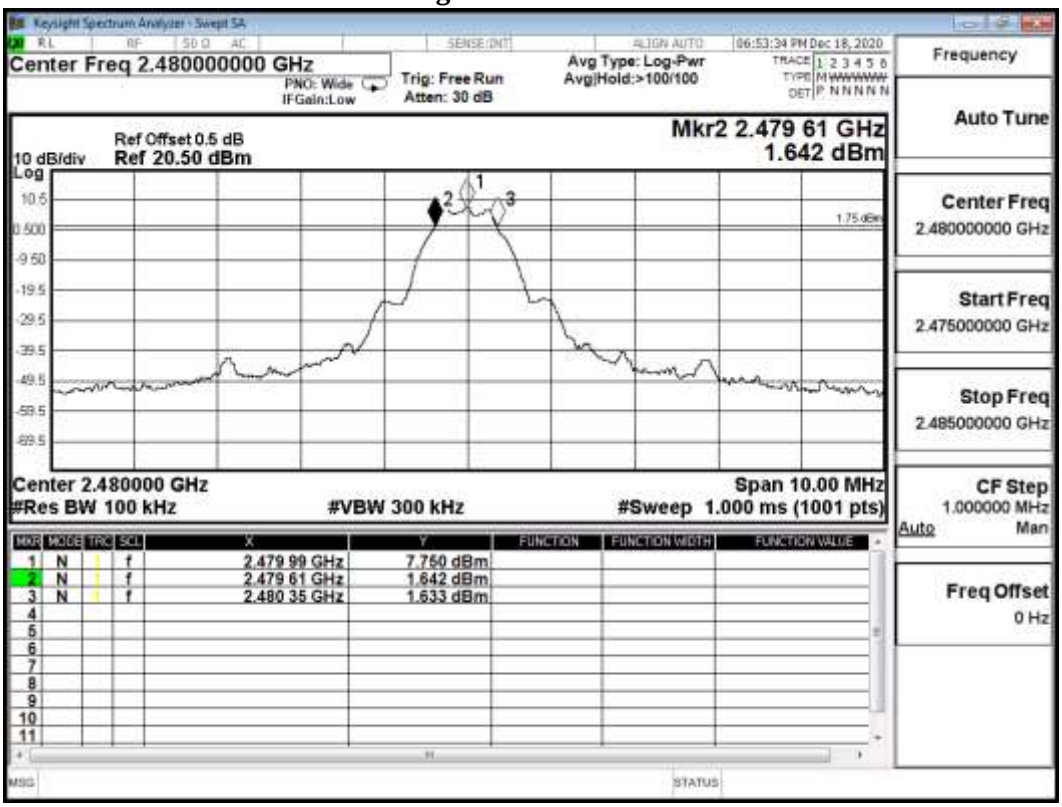
Figure Channel 19:



Product : Notebook
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit - BLE (2480MHz)
Test Date : 2020/12/18

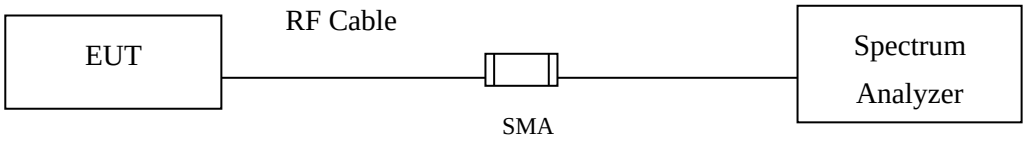
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2480	740	>500	Pass

Figure Channel 39:



8. Power Density

8.1. Test Setup



8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

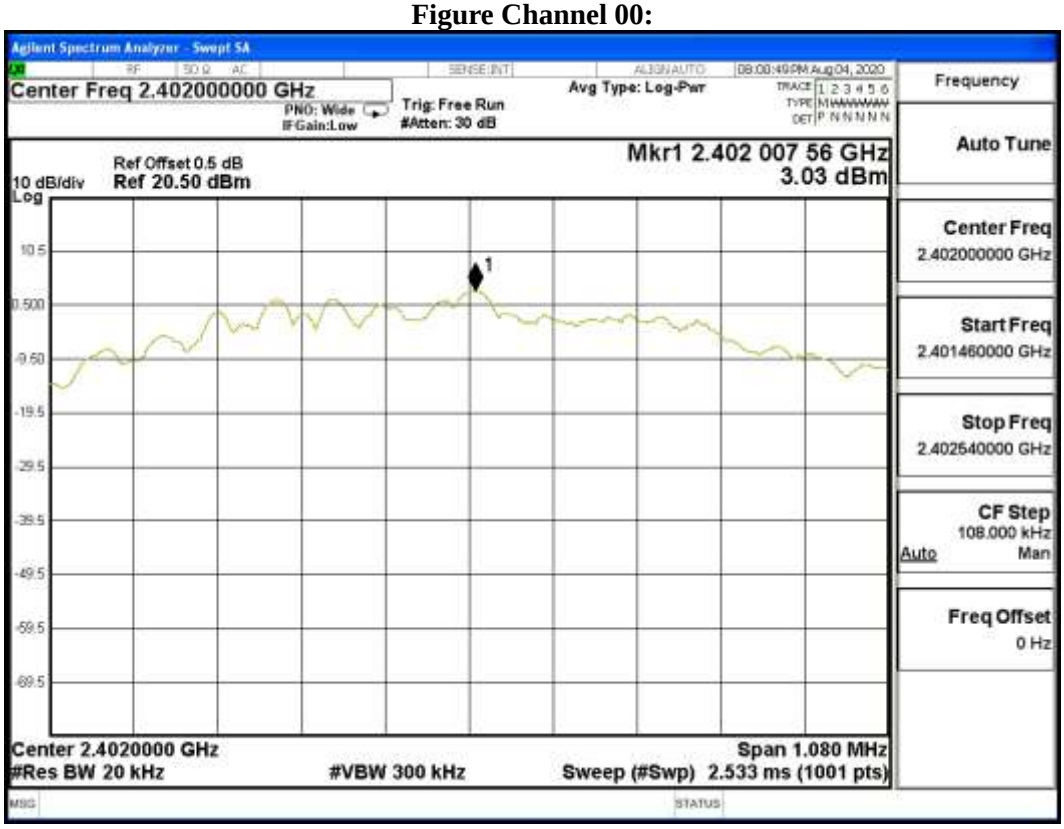
The maximum power spectral density using C63.10 Section 11.10.2 Method PKPSD (peak PSD)

8.4. Test Result of Power Density

Product : Notebook
Test Item : Power Density Data
Test Mode : Mode 1: Transmit - BLE (2402MHz)
Test Date : 2020/12/18

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	3.03	≦8dBm	Pass

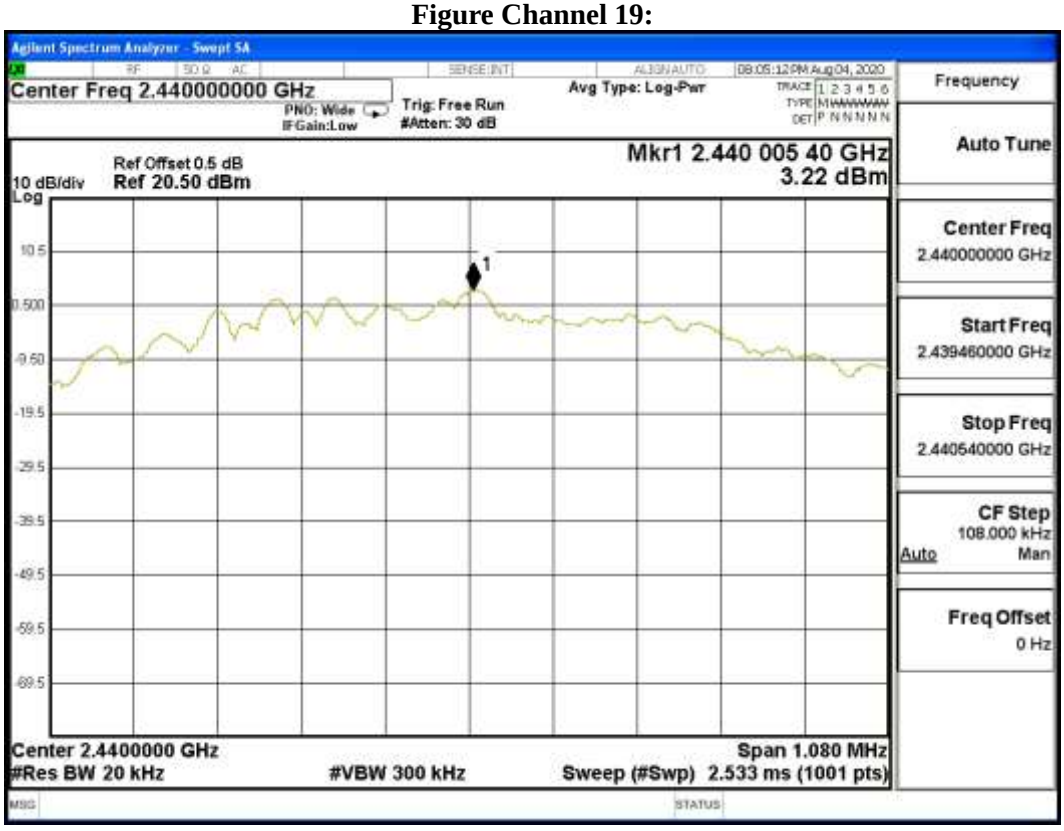
Figure Channel 00:



Product : Notebook
Test Item : Power Density Data
Test Mode : Mode 1: Transmit - BLE (2440MHz)
Test Date : 2020/12/18

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2440	3.22	≦8dBm	Pass

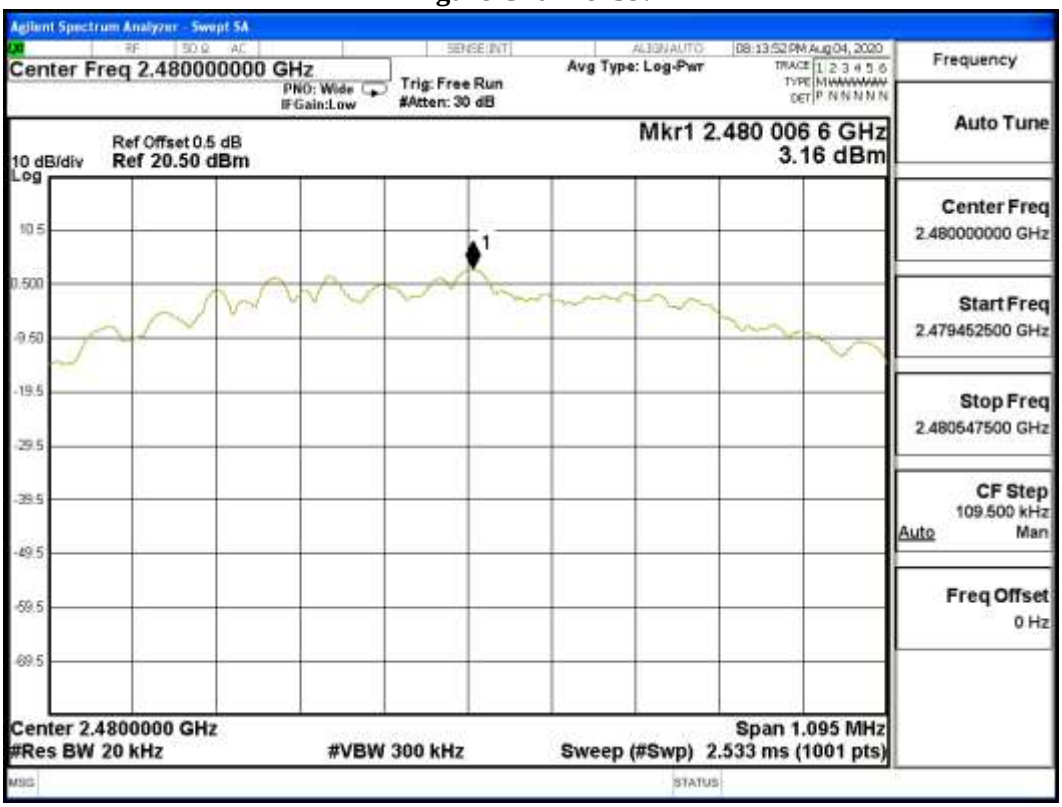
Figure Channel 19:



Product : Notebook
Test Item : Power Density Data
Test Mode : Mode 1: Transmit - BLE (2480MHz)
Test Date : 2020/12/18

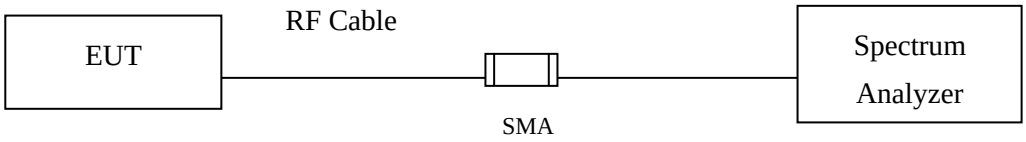
Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	3.16	≦8dBm	Pass

Figure Channel 39:



9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to ANSI C63.10 2013 for compliance to FCC 47CFR 15.247 requirements.

9.3. Test Result of Duty Cycle

Product : Notebook
Test Item : Duty Cycle
Test Mode : Mode 1: Transmit - BLE

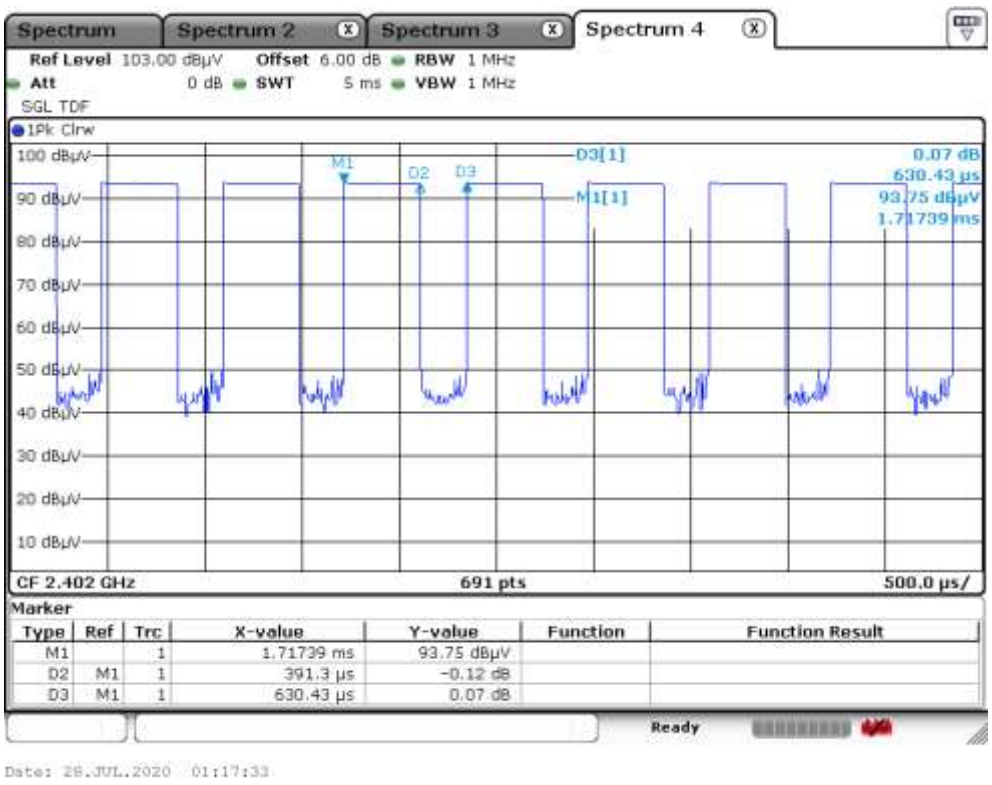
Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE	0.3913	0.6304	62.07	2.07



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.