

FCC Test Report

Product Name	Notebook PC
Model No.	GZ700G, GZ765G, GZ775G, AZ700G
FCC ID	MSQ-GZ700SYS

Applicant	ASUSTeK Computer Inc
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt	Dec. 20, 2018
Issued Date	Mar. 29, 2019
Report No.	18C0277R-RFUSP15V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Mar. 29, 2019

Report No.: 18C0277R-RFUSP15V00



Product Name	Notebook PC
Applicant	ASUSTeK Computer Inc
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan
Manufacturer	ASUSTeK Computer Inc
Model No.	GZ700G, GZ765G, GZ775G, AZ700G
EUT Rated Voltage	AC 100-240V~50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	ASUS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2016 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Genie Chang
(Senior Adm. Specialist / Genie Chang)

Tested By : Jason Tuan
(Engineer / Jason Tuan)

Approved By : Vincent Lin
(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Notebook PC
Trade Name	ASUS
Model No.	GZ700G, GZ765G, GZ775G, AZ700G
FCC ID	MSQ-GZ700SYS
Frequency Range	2402~2480MHz
Channel Control	Auto
Antenna Type	Loop Antenna
Channel Number	40
Type of Modulation	GFSK
Power Adapter	MFR: ASUS, M/N: ADP-280BB B Input: AC 100-240V~50-60Hz, 3.2A Output: DC 20V, 14A Cable Out: Non-shielded, 1.2m, with two ferrite cores bonded. Power Cord: Non-shielded, 1.8m

Antenna List

No.	Manufacturer	Part No.	ASUS No.	Antenna Type	Peak Gain
1	NANYA	2.52*0.6,12L(8)1.2MM	08702-00503000	Loop Antenna	-2.89 dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203

Center Frequency of Each Channel

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 PC with a built-in 2.4GHz GFSK transceiver.
2. The different of each model is shown as below:

Model	GZ700G	GZ765G,	GZ775G,	AZ700G
Product Name	Notebook PC			
Trade Name	ASUS			
Country	World wide	France 、 Germany		Korea

3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249 for spread spectrum devices.

Test Mode	Mode 1: Transmit
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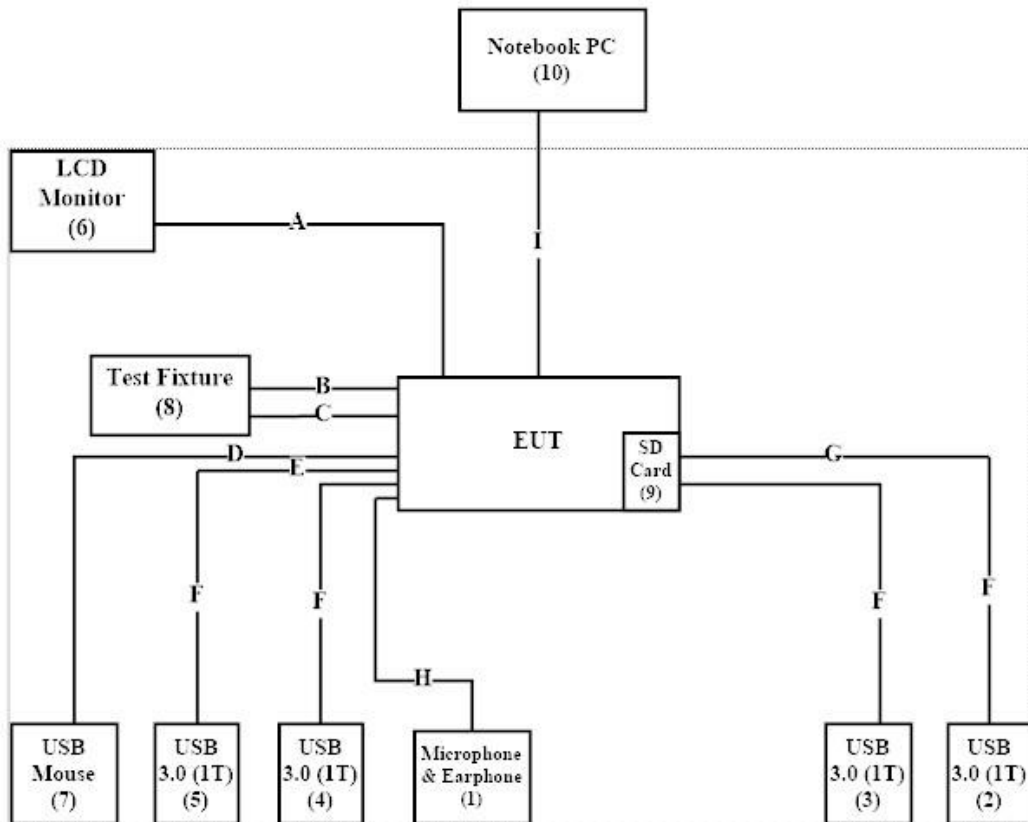
1.3. Tested System Details

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	Microphone & Earphone	PCHOME	N/A	N/A	N/A
2	USB 3.0(1T)	Transcend	TS1TSJ25M3	C13890-3746	N/A
3	USB 3.0(1T)	Transcend	TS1TSJ25M3	C13890-3746	N/A
4	USB 3.0(1T)	Transcend	TS1TSJ25M3	C13890-3746	N/A
5	USB 3.0(1T)	Transcend	TS1TSJ25M3	C13890-3746	N/A
6	LCD Monitor	ASUS	VS229HA	F4LMQS135395	Non-shielded, 1.8m
7	Mouse	Logitech	M-SBM96B	810-000440	N/A
8	Test Fixture	TEXAS INSTRUMENTS	N/A	N/A	N/A
9	SD Card 2GB	Transcend	TS2GSDC	205380-8142	N/A
10	Notebook PC	DELL	Latitude 5491	1PL56S2	Non-shielded, 0.8m

	Signal Cable Type	Signal cable Description
A	HDMI Cable	Non-shielded, 1.5m
B	Signal Cable	Non-shielded, 0.1m, five PCS.
C	USB Cable	Non-shielded, 0.2m
D	USB Cable	Non-shielded, 2m
E	Type C to USB Cable	Non-shielded, 1m
F	USB Cable	Non-shielded, 0.2m
G	Type C to USB Cable	Non-shielded, 0.15m
H	Microphone & Earphone Cable	Non-shielded, 2.5m
I	LAN Cable	Non-shielded, 3m

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute "SmartRF_Studio_7-2.11.0" program on the EUT.
- (3) Configure the test mode and the test channel
- (4) start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en.aspx

Site Description: Accredited by TAF
Accredited Number: 3023

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Site Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
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E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW3023

1.7. 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	2019/02/26	2020/02/25
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2018/09/27	2019/09/26
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2018/08/01	2019/07/31
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2018/07/25	2019/07/24
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2018/07/25	2019/07/24
X	EMI Test Receiver	R&S	ESCS 30	100369	2018/11/19	2019/11/18
X	LISN	R&S	ENV216	101105	2018/03/30	2019/03/29
X	LISN	R&S	ESH3-Z5	836679/014	2018/04/02	2019/04/01
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2018/06/21	2019/06/20

For Radiated measurements /Site3/CB8

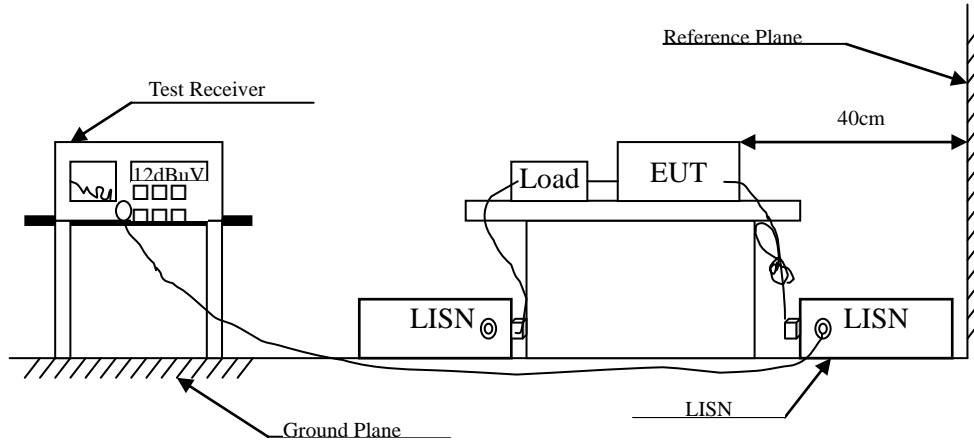
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2019/03/12	2020/03/11
X	Loop Antenna	Teseq	HLA6121	37133	2017/10/13	2019/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2018/06/24	2019/06/23
X	Coaxial Cable	DEKRA	RG 214	LC003-RG	2018/06/14	2019/06/13
X	Pre-Amplifier	Jet-Power	JPA-10M1G33	170101000330010	2018/06/14	2019/06/13
X	Horn Antenna	ETS-Lindgren	3117	00135205	2018/05/03	2019/05/02
X	Horn Antenna	SCHWARZBECK	9120D	576	2018/12/18	2019/12/17
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2018/04/10	2019/04/09
X	Horn Antenna	Com-Power	AH-840	101043	2019/01/19	2020/01/18
X	Amplifier + Cable	EMCI	EMC184045SE	980370	2018/03/21	2019/03/20
X	Filter	MICRO-TRONICS	BRM50702	G270	2018/08/06	2019/08/05
X	Filter	MICRO-TRONICS	BRM50716	G196	2018/08/06	2019/08/05

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 :QuiTek EMI 2.0 V2.1.113.

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 simulators 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 refers 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 of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

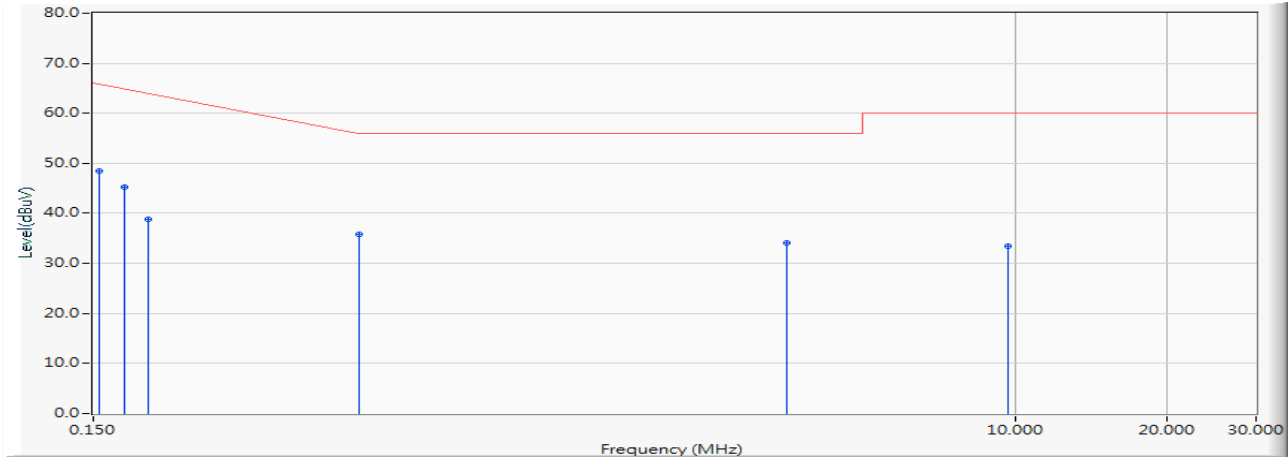
2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Product : Notebook PC
 Test Item : Conducted Emission Test
 Test Date : 2018/12/01
 Test Mode : Mode 1: Transmit (2440MHz)

Line 1



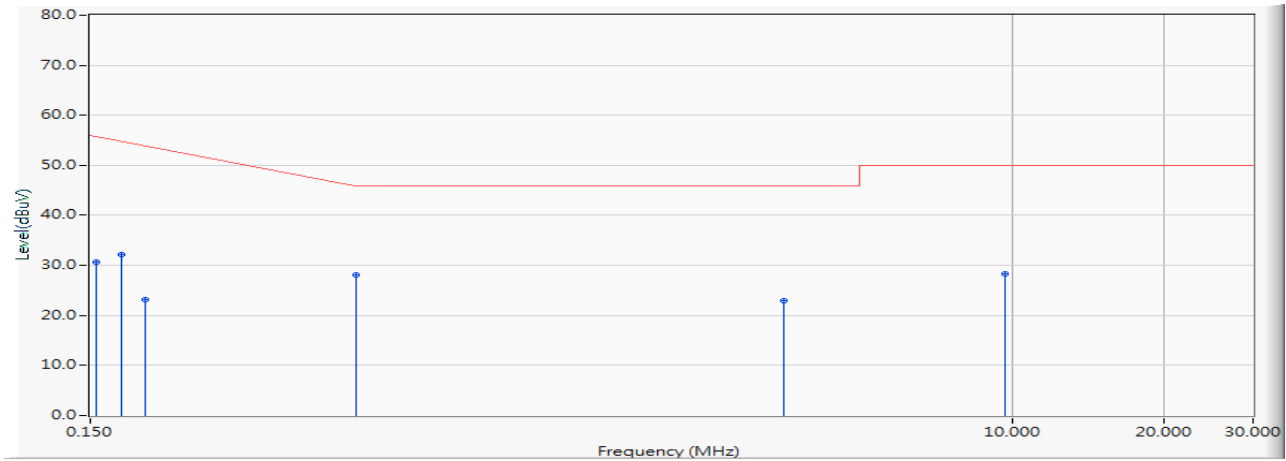
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.154	9.748	38.780	48.528	-17.358	65.886	QUASPEAK
2		0.173	9.742	35.600	45.342	-20.001	65.343	QUASPEAK
3		0.193	9.738	29.040	38.778	-25.993	64.771	QUASPEAK
4		0.502	9.750	25.980	35.730	-20.270	56.000	QUASPEAK
5		3.541	9.880	24.230	34.110	-21.890	56.000	QUASPEAK
6		9.662	10.066	23.360	33.426	-26.574	60.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook PC
 Test Item : Conducted Emission Test
 Test Date : 2018/12/01
 Test Mode : Mode 1: Transmit (2440MHz)

Line 1



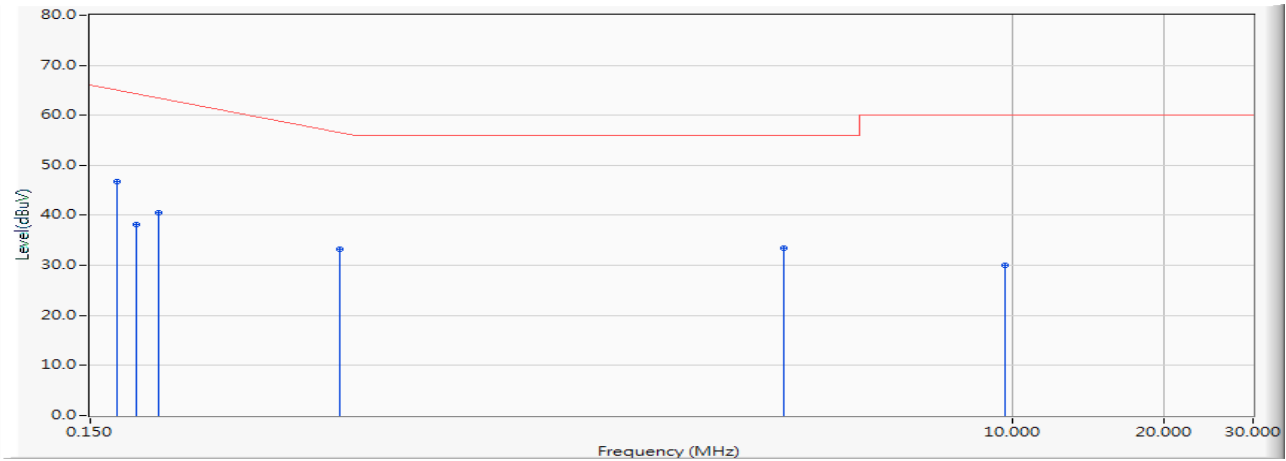
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.154	9.748	20.970	30.718	-25.168	55.886	AVERAGE
2		0.173	9.742	22.530	32.272	-23.071	55.343	AVERAGE
3		0.193	9.738	13.370	23.108	-31.663	54.771	AVERAGE
4	*	0.502	9.750	18.330	28.080	-17.920	46.000	AVERAGE
5		3.541	9.880	13.150	23.030	-22.970	46.000	AVERAGE
6		9.662	10.066	18.180	28.246	-21.754	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook PC
 Test Item : Conducted Emission Test
 Test Date : 2018/12/01
 Test Mode : Mode 1: Transmit (2440MHz)

Line 2



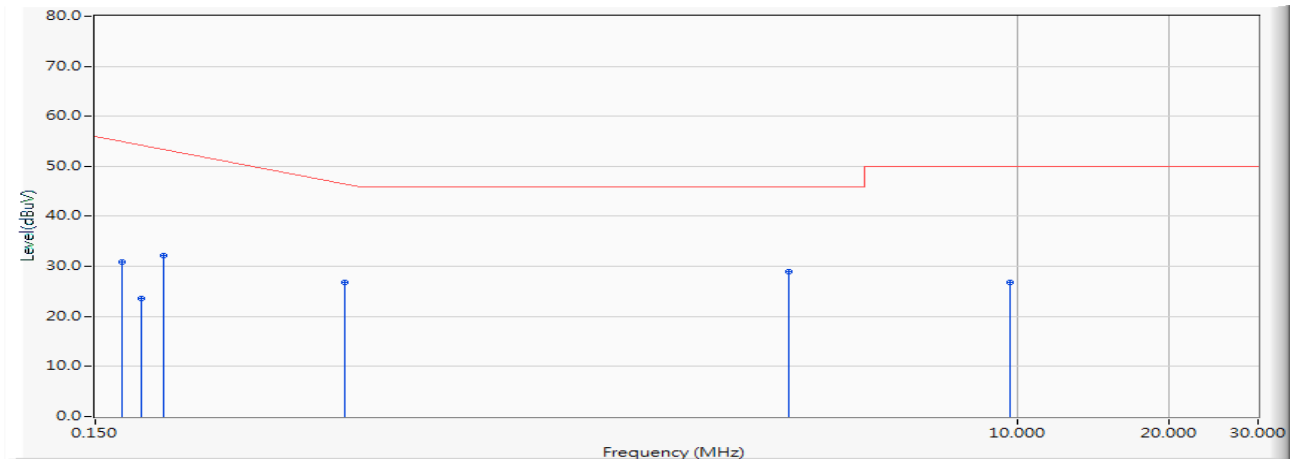
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.170	9.737	37.000	46.737	-18.692	65.429	QUASPEAK
2		0.185	9.737	28.400	38.137	-26.863	65.000	QUASPEAK
3		0.205	9.738	30.740	40.478	-23.951	64.429	QUASPEAK
4		0.466	9.739	23.500	33.239	-23.732	56.971	QUASPEAK
5		3.545	9.870	23.610	33.480	-22.520	56.000	QUASPEAK
6		9.697	10.086	19.870	29.956	-30.044	60.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Notebook PC
 Test Item : Conducted Emission Test
 Test Date : 2018/12/01
 Test Mode : Mode 1: Transmit (2440MHz)

Line 2



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.170	9.737	21.150	30.887	-24.542	55.429	AVERAGE
2	0.185	9.737	13.820	23.557	-31.443	55.000	AVERAGE
3	0.205	9.738	22.530	32.268	-22.161	54.429	AVERAGE
4	0.466	9.739	17.070	26.809	-20.162	46.971	AVERAGE
5	* 3.545	9.870	19.000	28.870	-17.130	46.000	AVERAGE
6	9.697	10.086	16.790	26.876	-23.124	50.000	AVERAGE

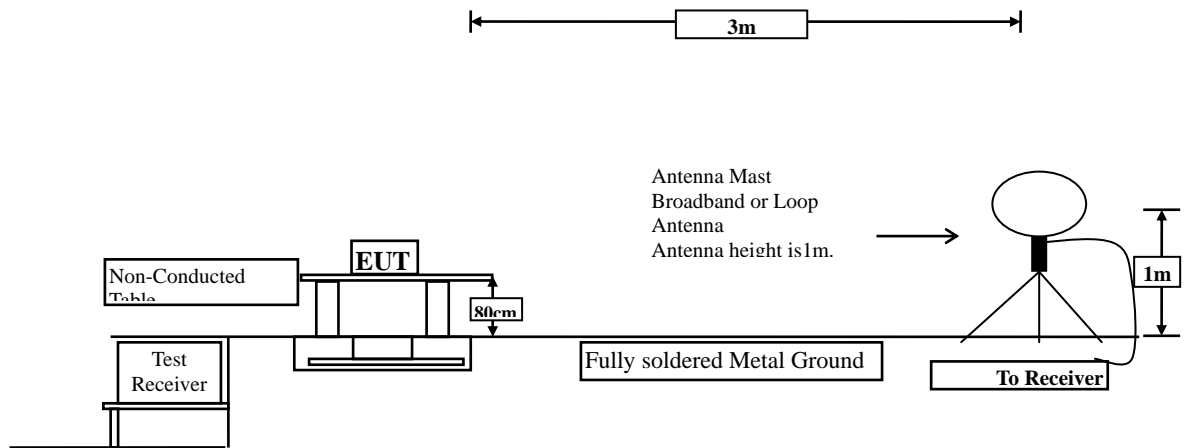
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

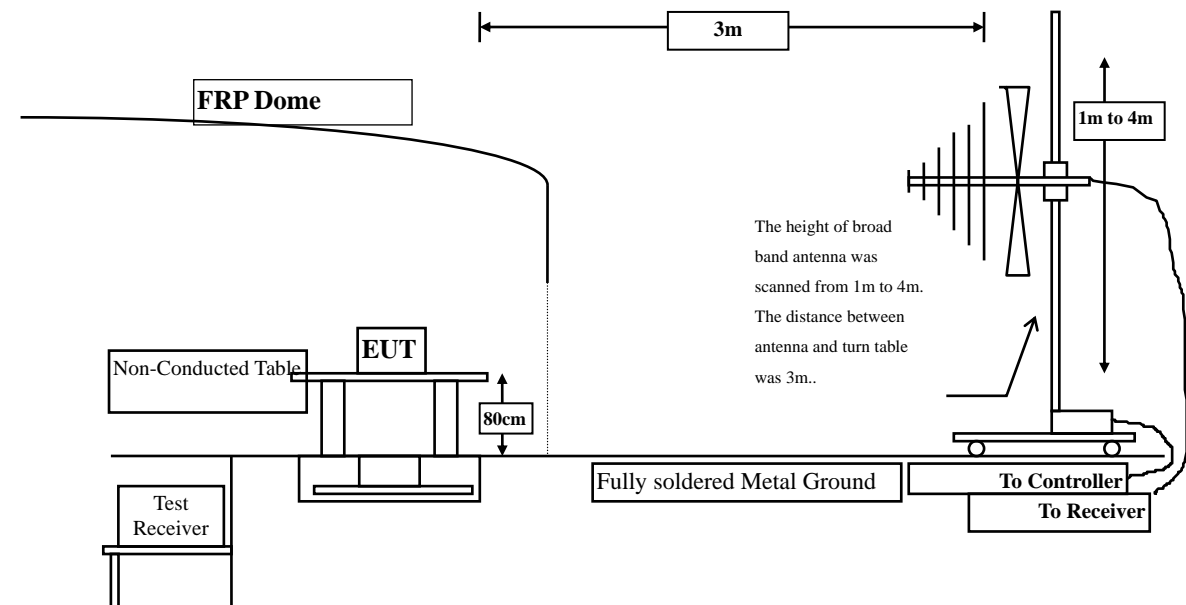
3. Radiated Emission

3.1. Test Setup

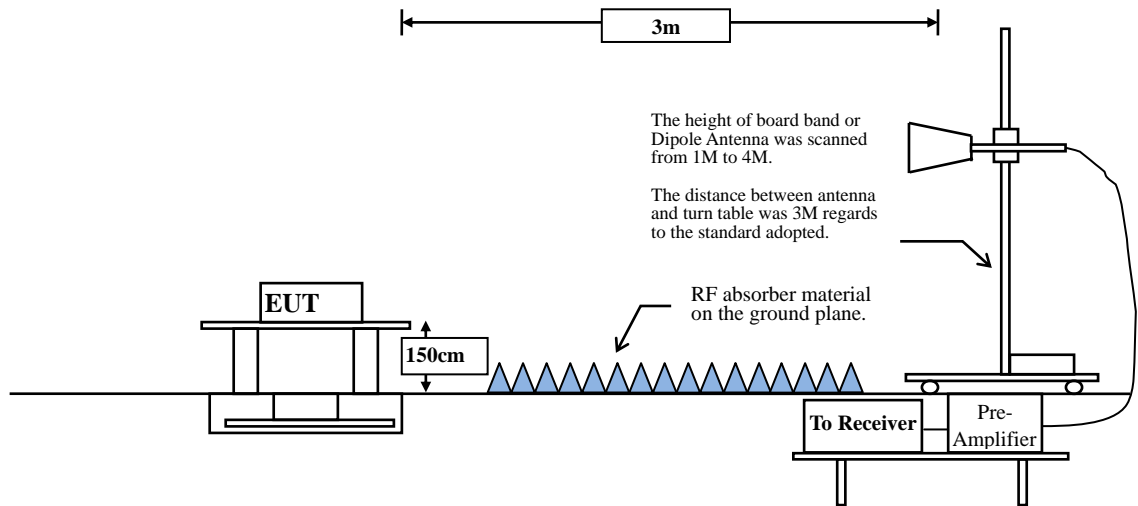
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB 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(a) 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: E field strength (dBuV/m) = 20 log E field strength (uV/m)

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 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 worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

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

3.4. Uncertainty

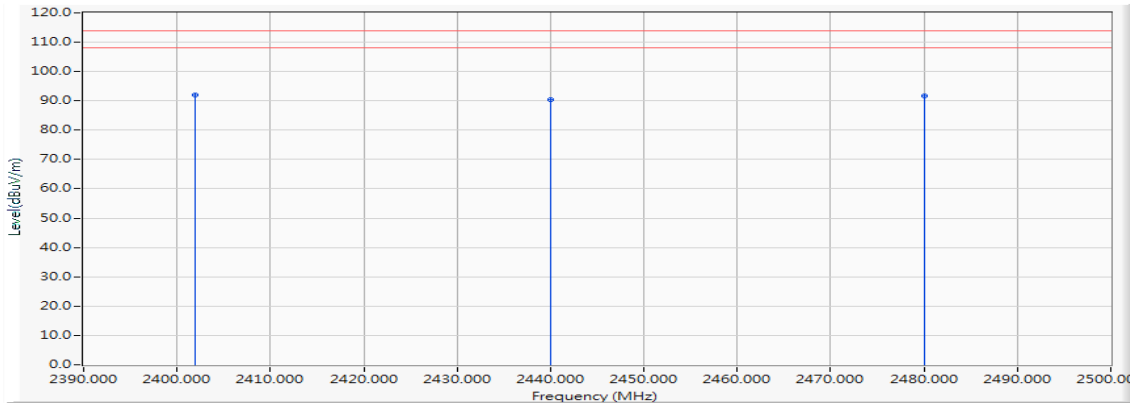
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

3.5. Test Result of Radiated Emission

Product : Notebook PC
 Test Item : Fundamental Radiated Emission
 Test Site : No.3OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit

Horizontal – Peak Detector:



Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
2402.000	-2.657	94.684	92.027	-21.973	114.000
2440.000	-2.636	92.945	90.308	-23.692	114.000
2480.000	-2.605	94.422	91.817	-22.183	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Average Detector:

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
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Horizontal

Average Detector:

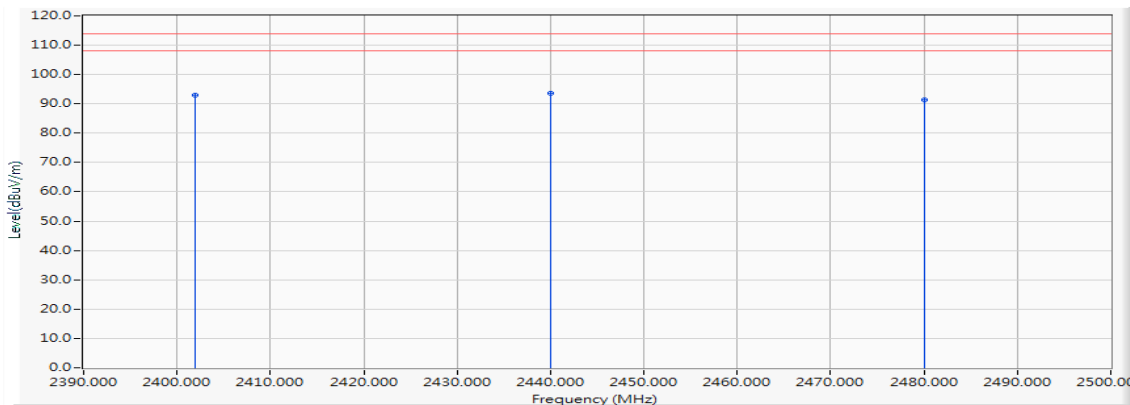
2402.000	92.027	-24.013	68.014	-25.986	94.000
2440.000	90.308	-24.013	66.295	-27.705	94.000
2480.000	91.817	-24.013	67.804	-26.196	94.000

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : Notebook PC
 Test Item : Fundamental Radiated Emission
 Test Site : No.3OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit

Vertical - Peak Detector:



Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
2402.000	-4.171	97.195	93.024	-20.976	114.000
2440.000	-4.099	97.676	93.577	-20.423	114.000
2480.000	-3.978	95.413	91.435	-22.565	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Average Detector:

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
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Vertical

Average Detector:

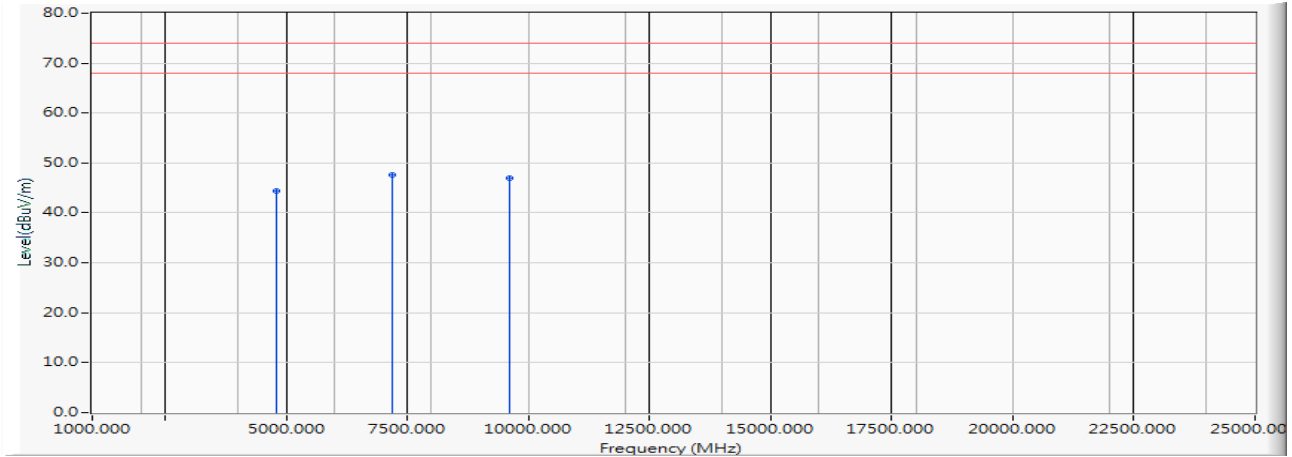
2402.000	93.024	-24.013	69.011	-24.989	94.000
2440.000	96.577	-24.013	72.564	-21.436	94.000
2480.000	91.435	-24.013	67.422	-26.578	94.000

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : Notebook PC
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2402MHz)

Horizontal



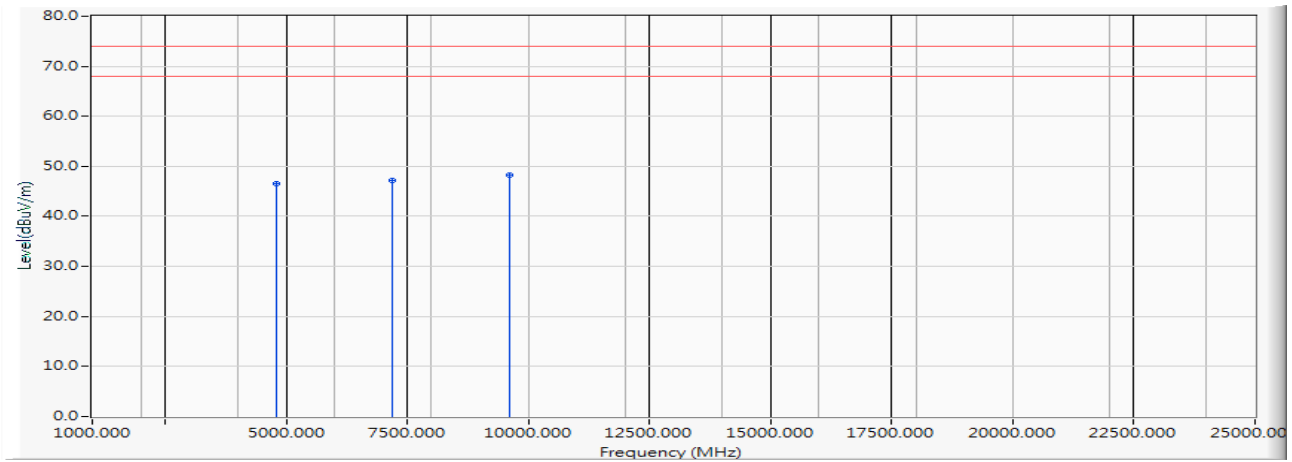
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4804.000	2.511	41.968	44.478	-29.522	74.000	PEAK
2	* 7206.000	9.511	38.058	47.569	-26.431	74.000	PEAK
3	9608.000	10.394	36.628	47.022	-26.978	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2402MHz)

Vertical



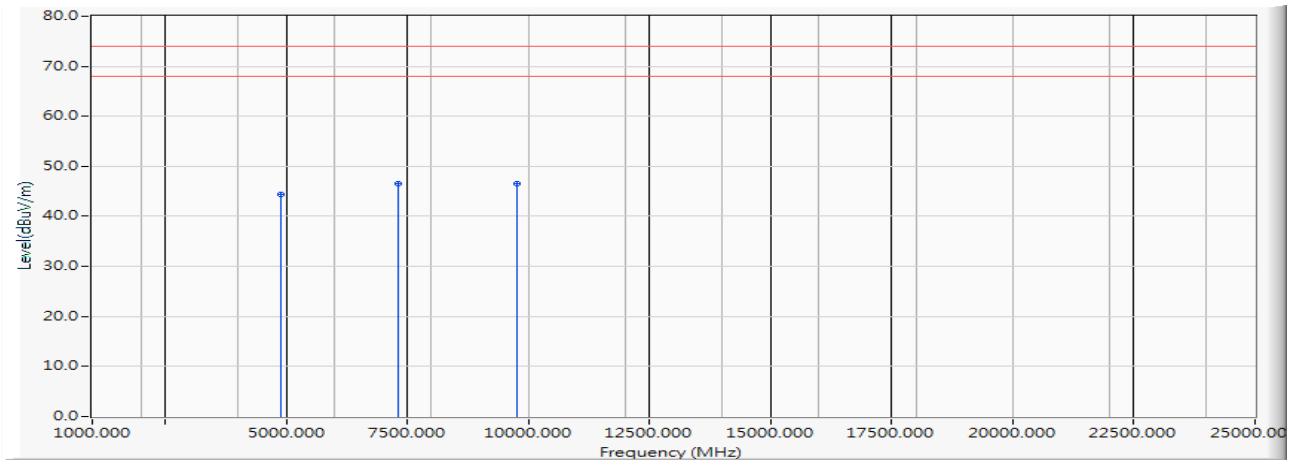
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4804.000	2.923	43.710	46.632	-27.368	74.000	PEAK
2	7206.000	9.988	37.196	47.185	-26.815	74.000	PEAK
3	* 9608.000	10.847	37.361	48.208	-25.792	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2440 MHz)

Horizontal



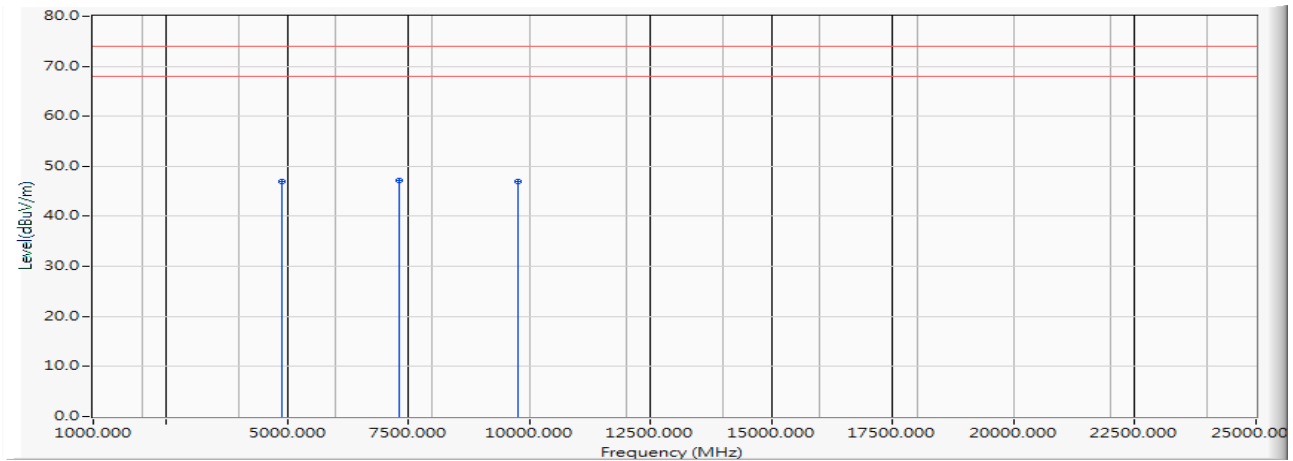
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4880.000	2.038	42.317	44.355	-29.645	74.000	PEAK
2	* 7320.000	9.699	36.909	46.608	-27.392	74.000	PEAK
3	9760.000	9.665	36.943	46.608	-27.392	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2440 MHz)

Vertical



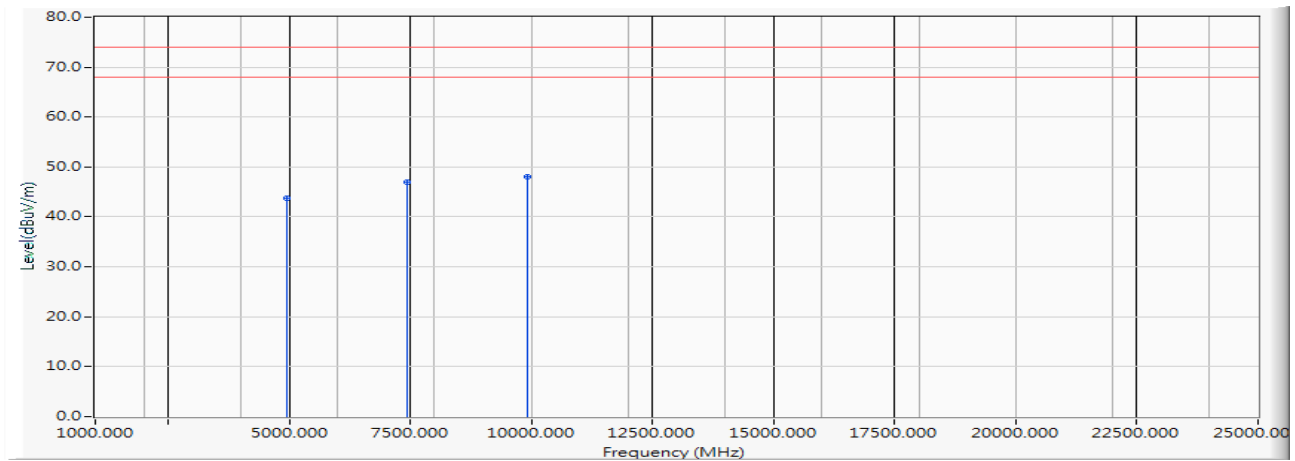
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4880.000	2.499	44.558	47.057	-26.943	74.000	PEAK
2	* 7320.000	10.303	36.794	47.097	-26.903	74.000	PEAK
3	9757.000	10.288	36.747	47.035	-26.965	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2480 MHz)

Horizontal



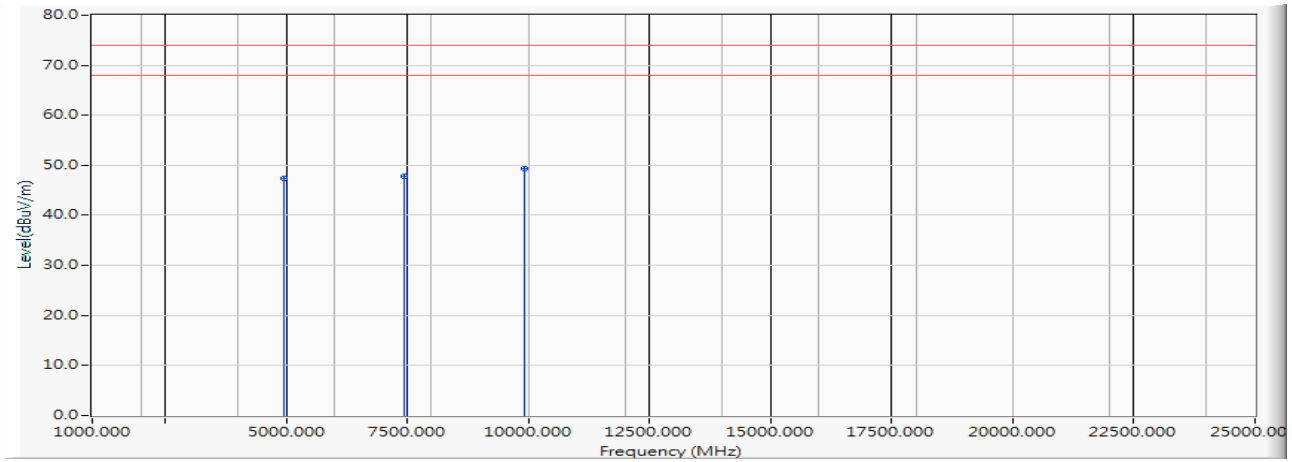
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	2.582	41.064	43.646	-30.354	74.000	PEAK
2		7440.000	10.555	36.352	46.907	-27.093	74.000	PEAK
3	*	9920.000	10.206	37.901	48.107	-25.893	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2480 MHz)

Vertical



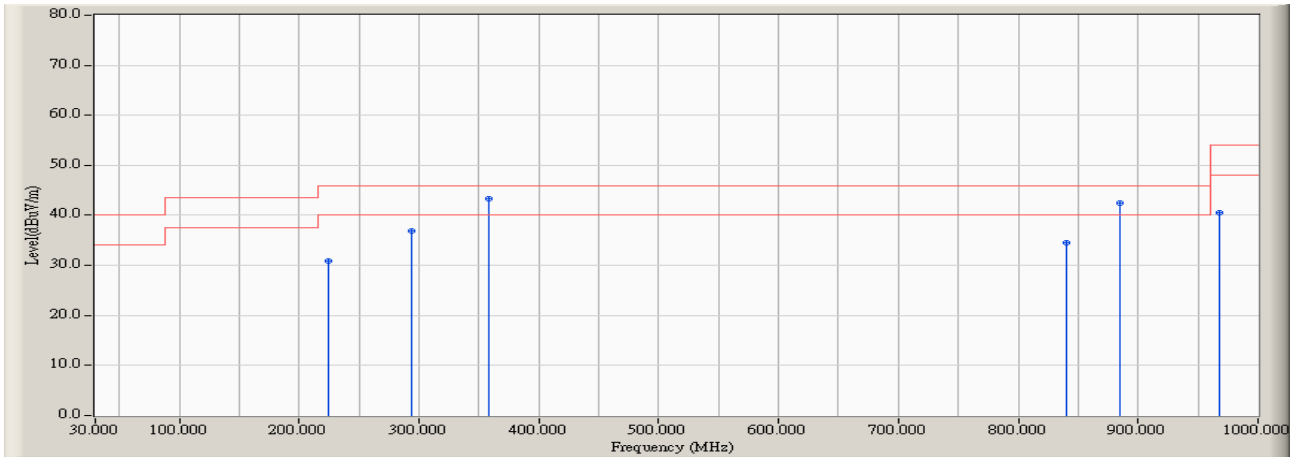
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4960.000	3.398	44.085	47.484	-26.516	74.000	PEAK
2	7440.000	11.214	36.716	47.930	-26.070	74.000	PEAK
3	* 9920.000	11.245	37.985	49.230	-24.770	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/26
 Test Mode : Mode 1: Transmit (2440 MHz)

Horizontal



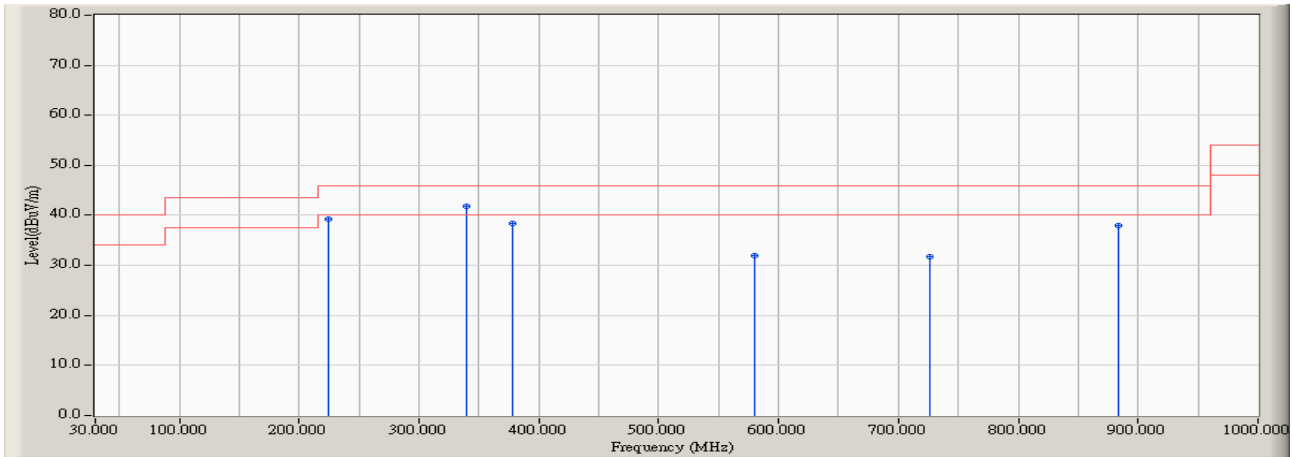
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	224.311	-7.291	38.216	30.925	-15.075	46.000	QUASPEAK
2	294.263	-5.136	42.097	36.961	-9.039	46.000	QUASPEAK
3	* 357.997	-1.187	44.503	43.317	-2.683	46.000	QUASPEAK
4	839.888	7.842	26.666	34.509	-11.491	46.000	QUASPEAK
5	884.968	7.797	34.673	42.470	-3.530	46.000	QUASPEAK
6	967.356	8.536	32.020	40.556	-13.444	54.000	QUASPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook PC
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Date : 2018/12/26
 Test Mode : Mode 1: Transmit (2440 MHz)

Vertical



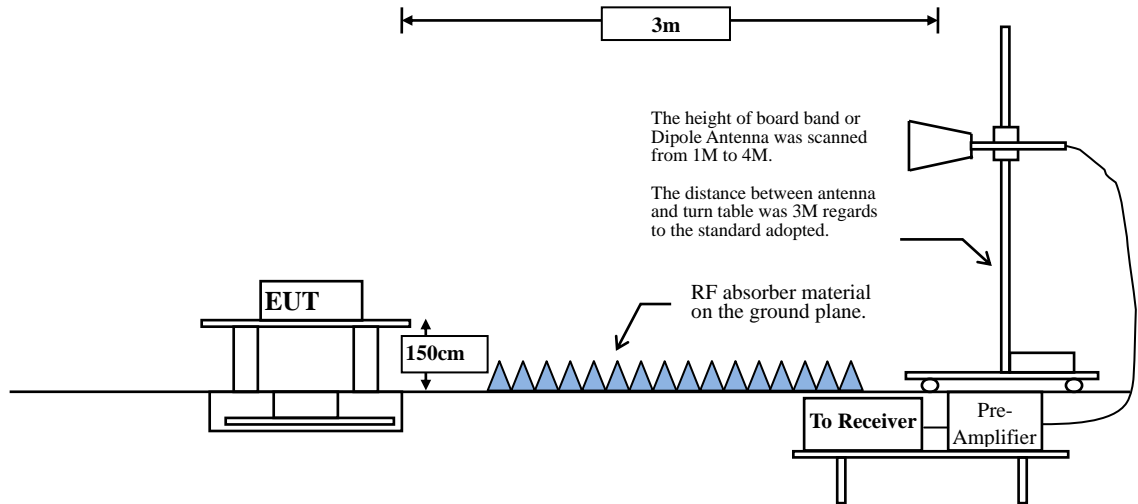
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	224.311	0.014	39.269	39.283	-6.717	46.000	QUASPEAK
2	* 339.343	-3.527	45.288	41.760	-4.240	46.000	QUASPEAK
3	378.205	-0.691	39.176	38.486	-7.514	46.000	QUASPEAK
4	580.288	3.375	28.536	31.911	-14.089	46.000	QUASPEAK
5	726.410	4.789	26.978	31.768	-14.232	46.000	QUASPEAK
6	883.413	8.461	29.537	37.998	-8.002	46.000	QUASPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

4. Band Edge

4.1. Test Setup



4.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 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. 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)).

4.3. Test Procedure

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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.4. Uncertainty

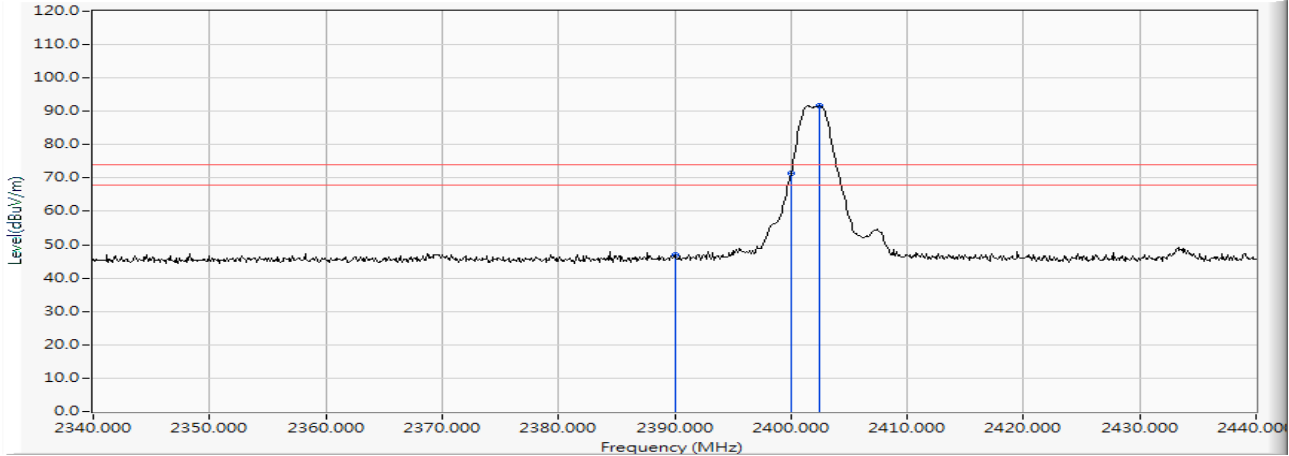
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Band Edge

Product : Notebook PC
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2402MHz)

Horizontal



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2390.000	-2.687	49.789	47.102	-26.898	74.000	PEAK
2	2400.000	-2.660	73.935	71.275	-2.725	74.000	PEAK
3	* 2402.500	-2.657	94.287	91.630	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. “ * ”, means this data is the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection.

Average Detector:

Frequency	Peak Measurement	Duty Cycle Factor	Measurement Level	Margin	Limit	Result
MHz	dBμV/m	dB	dBμV/m	dB	dBμV/m	Pass

Horizontal

Average Detector:

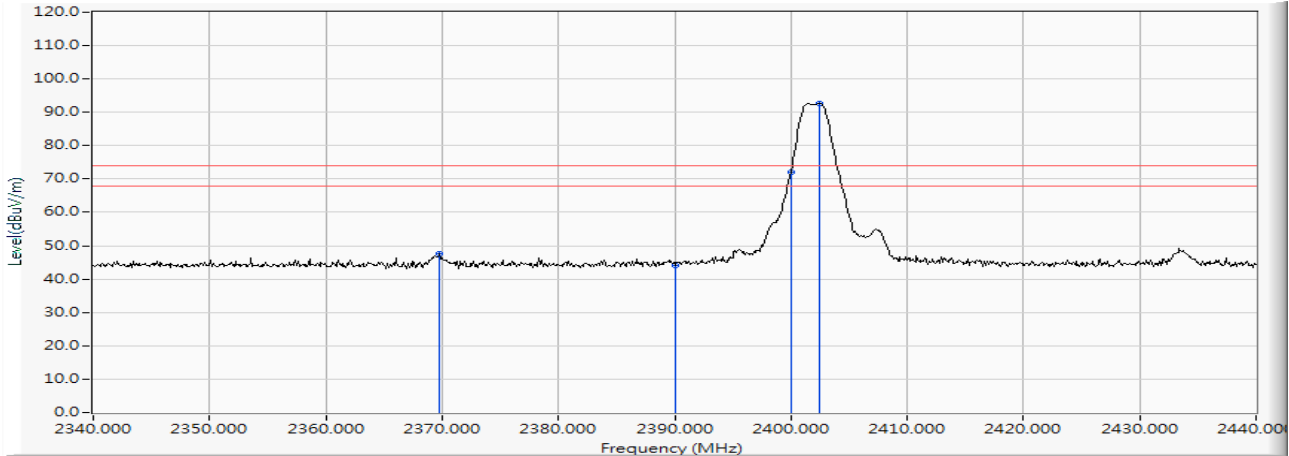
2400.000	71.275	-24.013	47.262	-6.738	54.000	Pass
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Note:

1. Average Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : Notebook PC
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2402MHz)

Vertical



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2369.800	-4.090	51.635	47.545	-26.455	74.000	PEAK
2	2390.000	-4.159	48.394	44.235	-29.765	74.000	PEAK
3	2400.000	-4.171	76.376	72.205	-1.795	74.000	PEAK
4	* 2402.500	-4.171	96.909	92.738	--	--	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. “ * ”, means this data is the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection.

Average Detector:

Frequency	Peak Measurement	Duty Cycle Factor	Measurement Level	Margin	Limit	Result
MHz	dBμV/m	dB	dBμV/m	dB	dBμV/m	Pass

Vertical

Average Detector:

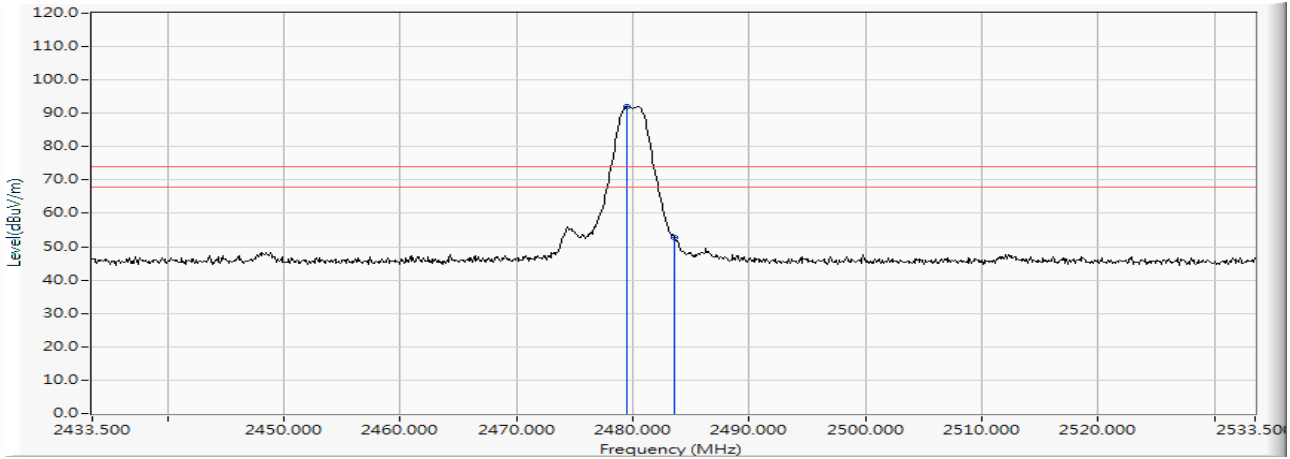
2400.000	72.205	-24.013	48.192	-5.808	54.000	Pass
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Note:

1. Average Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : Notebook PC
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2480MHz)

Horizontal



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.500	-2.605	94.558	91.953	--	--	PEAK
2		2483.500	-2.601	55.287	52.685	-21.315	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. “ * ”, means this data is the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection.

Average Detector:

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement Level (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Result Pass
2483.5	52.685	-24.013	28.672	-25.328	54.000	Pass

Horizontal

Average Detector:

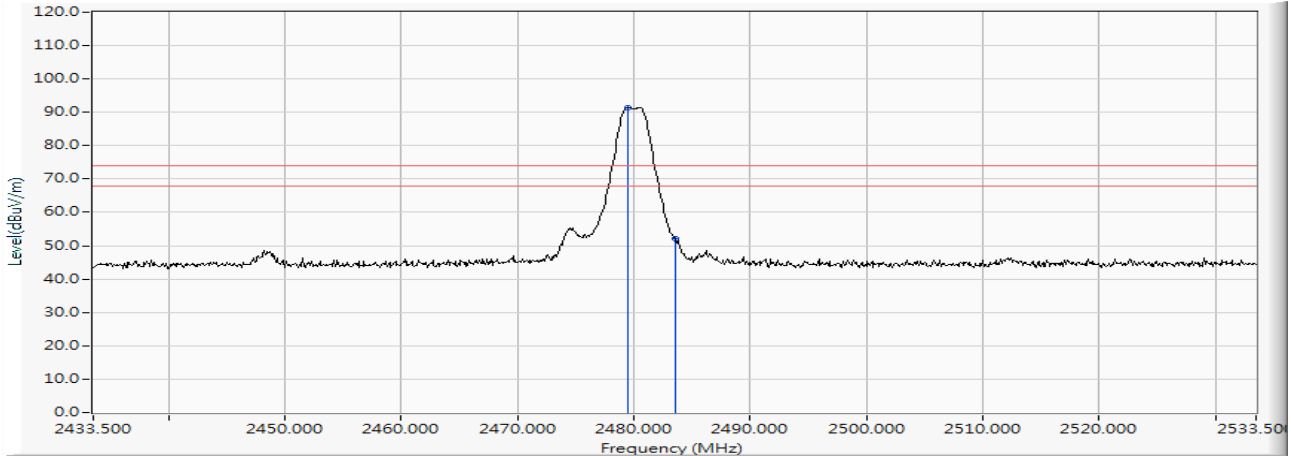
2483.5	52.685	-24.013	28.672	-25.328	54.000	Pass
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Note:

1. Average Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : Notebook PC
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Date : 2018/12/24
 Test Mode : Mode 1: Transmit (2480MHz)

Vertical



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.500	-3.979	95.503	91.524	--	--	PEAK
2		2483.500	-3.966	55.930	51.963	-22.037	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. “ * ”, means this data is the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection.

Average Detector:

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBμV/m	Margin dB	Limit dBμV/m	Result Pass
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Vertical

Average Detector:

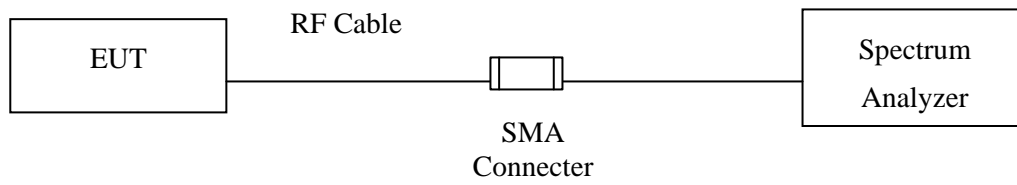
2483.5	51.963	-24.013	27.950	-26.050	54.000	Pass
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Note:

1. Average Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

5. Duty Cycle

5.1. Test Setup

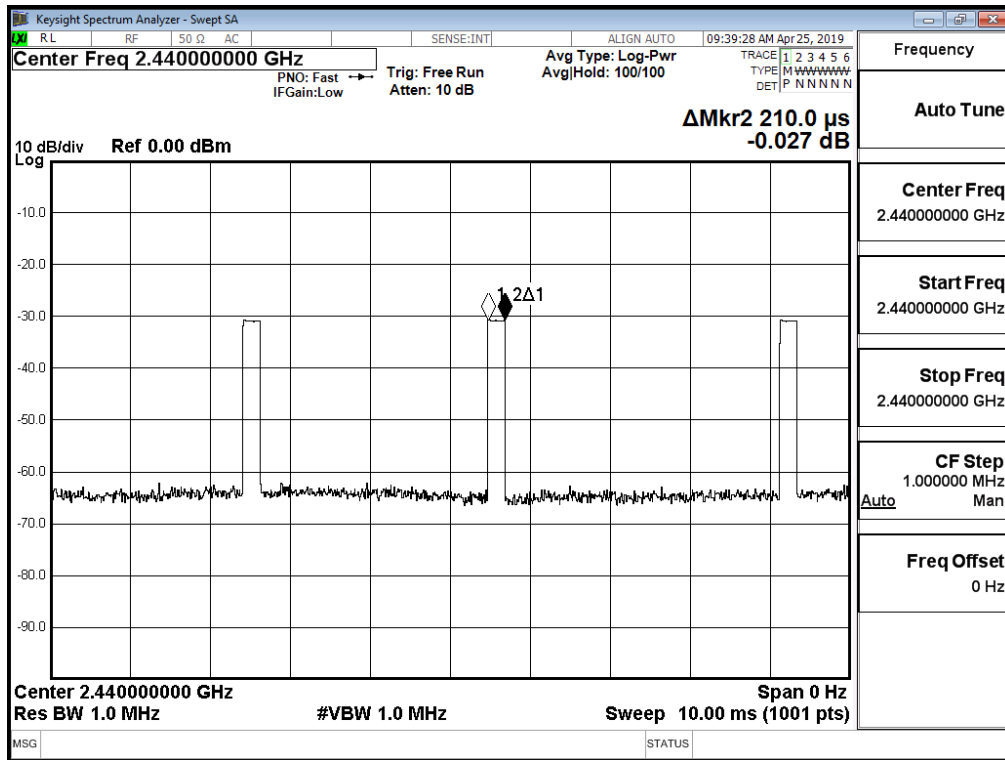


5.2. Uncertainty

$\pm 150\text{Hz}$

5.3. Test Result of Duty Cycle

Product : Notebook PC
 Test Item : Duty Cycle Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit



Time on of 100ms= 6.3 ms

Duty Cycle= 6.3ms / 100ms= 0.063

Duty Cycle correction factor= 20 LOG 0.063= -24.013 dB

Duty Cycle correction factor	-24.013	dB
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6. EMI Reduction Method During Compliance Testing

No modification was made during testing.