FCC Test Report

Product Name	DIGITAL CAMERA
Model No.	R04010
FCC ID.	BBP-R04010

Applicant	Ricoh Company Ltd
Address	2-7-1 Izumi Ebina Kanagawa, 243-0460 Japan.

Date of Receipt	Jun. 24, 2021
Issued Date	Sep. 08, 2021
Report No.	2161023R-E3032110108
Report Version	V1.0

Testing Laboratory
3023

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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The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
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 Report

Issued Date: Sep. 08, 2021
Report No.: 2161023R-E3032110108

Product Name	DIGITAL CAMERA
Applicant	Ricoh Company Ltd
Address	2-7-1 Izumi Ebina Kanagawa, 243-0460 Japan.
Manufacturer	Ricoh Company, Ltd.
Model No.	R04010
FCC ID.	BBP-R04010
EUT Rated Voltage	DC 5V by USB or DC 3.6V by Battery
EUT Test Voltage	DC 5V by USB
Trade Name	RICOH
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : April Chen

(Senior Project Specialist / April Chen)

Tested By : Bill Lin

(Senior Engineer / Bill Lin)

Approved By : Alan Chen

(Senior Engineer / Alan Chen)

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Appendix 1: EUT Test Photographs

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Revision History

Report No.	Version	Description	Issued Date
2161023R-E3032110108	V1.0	Initial issue of report.	Sep. 08, 2021

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	DIGITAL CAMERA
Trade Name	RICOH
Model No.	R04010
FCC ID.	BBP-R04010
Frequency Range	2402 – 2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) /π/4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
USB Cable	Trade Name:YiChenXing, M/N: YCX-A0020184A Shielded, 0.40m
Serial No.	A0M63P000070
FW version	0.89

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	LYNwave	ALX20M-222AAA-00(Main) ALX20M-222AAA-01(Aux)	PIFA Antenna	1.4 dBi for 2.4 GHz

Note: The antenna of EUT conforms to FCC 15.203.

Center Frequency of Each Channel:

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

Note:

1. The EUT is a DIGITAL CAMERA with built-in WLAN and Bluetooth transceiver, this report for Bluetooth V3.0 +EDR.
2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. These tests were conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
5. The test mode is based on the Bluetooth technology, while testing 1Mbps, 2Mbps and 3Mbps, the worst case is 1Mbps and 3Mbps, and only worse case data is recorded in this report.

Test Mode	Mode 1: Transmit - 1Mbps Mode 2: Transmit - 3Mbps

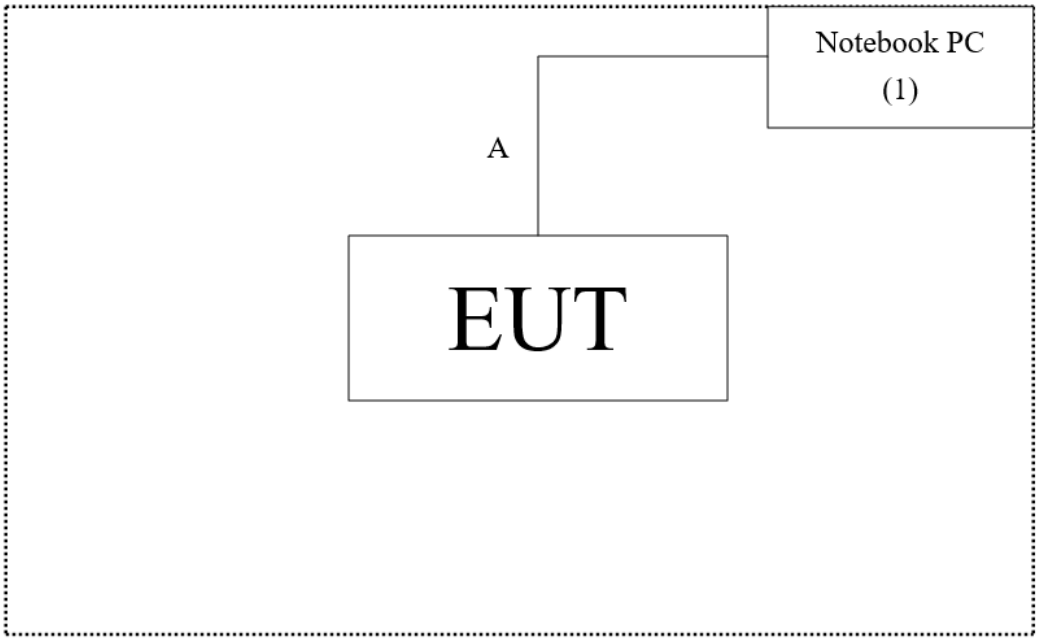
1.2. Tested System Details

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	Notebook PC	DELL	Latitude E5440	FS9TK32	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 0.4m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.3.
2. Execute software “Qualcomm ® Radio Control Toolkit Version 4.0.00172.0” on the Notebook PC.
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 (°C)	10~40 °C	25.1 °C
	Humidity (%RH)	10~90 %	61.3 %
Radiated Emission	Temperature (°C)	10~40 °C	25.5 °C
	Humidity (%RH)	10~90 %	62.3 %
Conductive	Temperature (°C)	10~40 °C	22.0 °C
	Humidity (%RH)	10~90 %	55.0 %

USA : FCC Registration Number: TW0033

Canada : IC Registration Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 26, Huaya 1st Rd., Guishan Dist.,
Taoyuan City 333411, Taiwan, R.O.C.
Phone number : 886-3-275-7255
Fax number : 866-3-327-5505
Email address : info.tw@dekra.com
Website : http://www.dekra.com.tw

1.6. List of Test Equipment

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2021.01.04	2022.01.03
X	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
X	Two-Line V-Network	R&S	ENV216	101307	2021.04.16	2022.04.15
X	Coaxial Cable	DEKRA	RG400_BNC	RF001	2021.05.24	2022.05.23

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 Testing System V2.0

For Conducted measurements /SH2

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Spectrum Analyzer	R&S	FSV30	103466	2020.12.28	2021.12.27
X	Power Meter	Anritsu	ML2496A	MY51000539	2021.06.07	2022.06.06
X	Power Sensor	Anritsu	MA2411B	MY59240002	2021.05.17	2022.05.16
X	Power Sensor	Anritsu	MA2411B	MY59240003	2021.05.17	2022.05.16

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.

For Radiated measurements / 966-3

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2021.04.14	2022.04.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-678	2020.09.04	2021.09.03
X	Horn Antenna	ETS-Lindgren	3117	00201259	2020.10.23	2021.10.22
X	Horn Antenna	Com-Power	AH-840	101087	2021.06.16	2022.06.15
X	Pre-Amplifier	EMCI	EMC001330	980302	2021.07.26	2022.07.25
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2021.02.24	2022.02.23
X	Pre-Amplifier	EMCI	EMC05820SE	980308	2020.09.18	2021.09.17
X	Pre-Amplifier	EMCI	EMC184045SE	980369	2021.04.27	2022.04.26
X	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
X	EMI Test Receiver	R&S	ESR7	102793	2020.12.17	2021.12.16
X	Spectrum Analyzer	R&S	FSV3044	101113	2021.02.03	2022.02.02
X	Coaxial Cable	SGH, EMCI	HA800 , SGH18	HY2103-001C	2021.03.03	2022.03.02
	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2021.06.25	2022.06.24

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 Testing System V2.0

1.7. Uncertainty

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

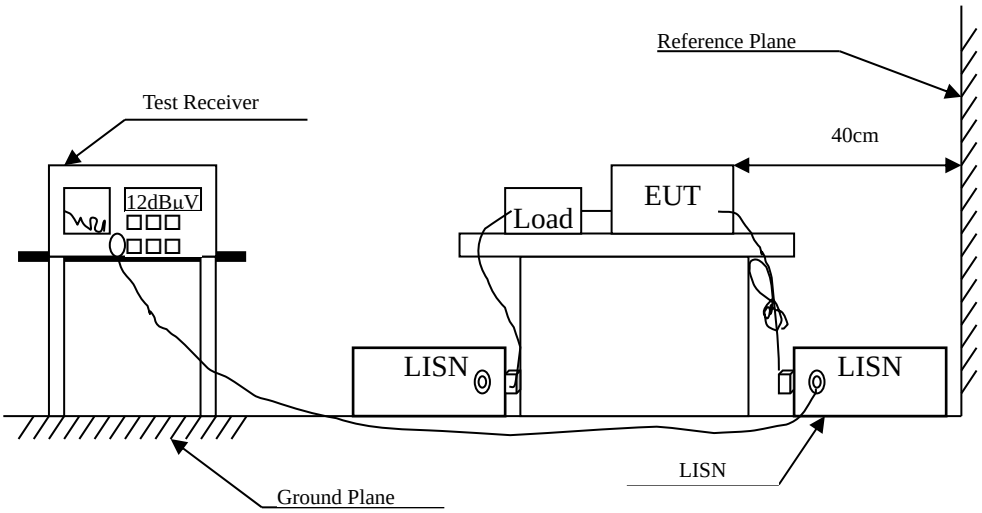
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

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	±3.42 dB	
Peak Power Output	±0.91 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
RF Antenna Conducted Test	±2.53 dB	
Band Edge	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
Channel Number	N/A	
Channel Separation	±682.83 Hz	
Dwell Time	±2.31 ms	
Occupied Bandwidth	±682.83 Hz	
Duty Cycle	±2.31 ms	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) 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.)

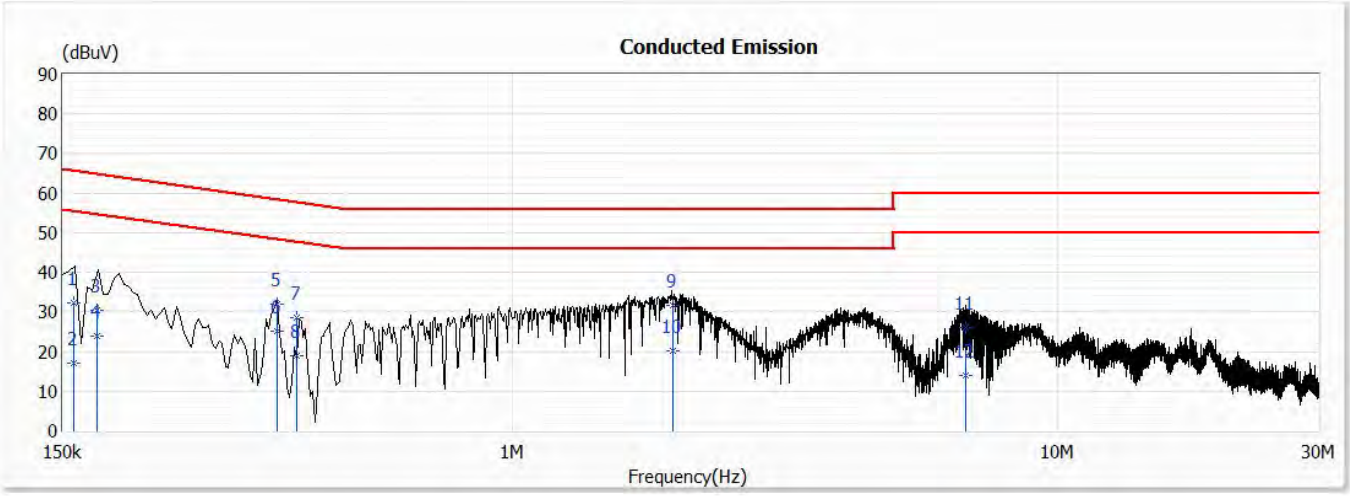
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

The EUT setup and the test procedure are according to ANSI C63.4, 2014 to comply with the requirements of FCC 47CFR Subpart C.

2.4. Test Result of Conducted Emission

Model No	R04010	Site	SH1
Test Voltage	AC 110V/60Hz	Test Date	2021/8/25
Test Mode	Mode 1: Transmit	Engineer	Jason Tuan
Phase	L1	Temperature (℃)	25.1
Test Condition	--	Humidity (%RH)	61.3
Note	BT 3M,2441MHz		

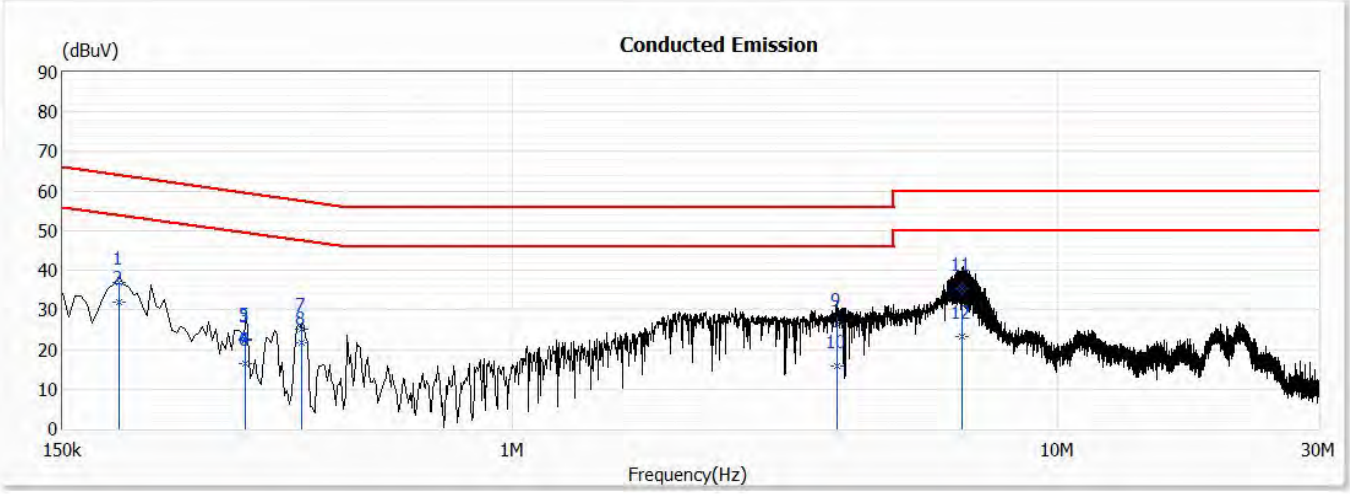


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.157	32.32	65.63	-33.31	22.62	9.70	QP
2	0.157	17.20	55.63	-38.43	7.50	9.70	AV
3	0.173	30.46	64.82	-34.36	20.76	9.70	QP
4	0.173	23.96	54.82	-30.86	14.26	9.70	AV
5	0.370	31.94	58.49	-26.55	22.24	9.70	QP
*6	0.370	25.09	48.49	-23.40	15.39	9.70	AV
7	0.403	28.59	57.78	-29.19	18.89	9.70	QP
8	0.403	18.91	47.78	-28.87	9.21	9.70	AV
9	1.964	31.71	56.00	-24.29	21.88	9.83	QP
10	1.964	20.18	46.00	-25.82	10.35	9.83	AV
11	6.770	26.11	60.00	-33.89	15.27	10.84	QP
12	6.770	13.95	50.00	-36.05	3.11	10.84	AV

Note:

1. " * " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor.
3. Margin = Emission Level – Limit.
4. Correct Factor = LISN insertion loss + Cable loss.

Model No	R04010	Site	SH1
Test Voltage	AC 110V/60Hz	Test Date	2021/8/25
Test Mode	Mode 1: Transmit	Engineer	Jason Tuan
Phase	N	Temperature (℃)	25.1
Test Condition	--	Humidity (%RH)	61.3
Note	BT 3M,2441MHz		



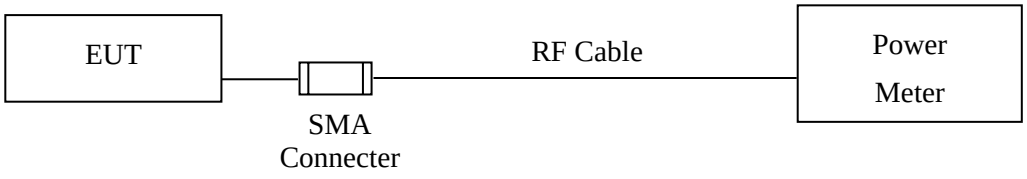
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.190	37.01	64.03	-27.02	27.30	9.71	QP
*2	0.190	31.86	54.03	-22.17	22.15	9.71	AV
3	0.324	22.50	59.61	-37.11	12.80	9.70	QP
4	0.324	16.58	49.61	-33.03	6.88	9.70	AV
5	0.324	22.59	59.61	-37.02	12.89	9.70	QP
6	0.324	16.53	49.61	-33.08	6.83	9.70	AV
7	0.411	25.07	57.63	-32.56	15.36	9.71	QP
8	0.411	21.71	47.63	-25.92	12.00	9.71	AV
9	3.940	26.36	56.00	-29.64	15.86	10.50	QP
10	3.940	15.80	46.00	-30.20	5.30	10.50	AV
11	6.675	35.46	60.00	-24.54	24.60	10.86	QP
12	6.675	23.32	50.00	-26.68	12.46	10.86	AV

Note:

1. " * " means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor.
3. Margin = Emission Level – Limit.
4. Correct Factor = LISN insertion loss + Cable loss.

3. Peak Power Output

3.1. Test Setup



3.2. Limit

The maximum peak power shall be less 1Watt.

3.3. Test Procedure

Tested according to FHSS test procedure of KDB 558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

3.4. Test Result of Peak Power Output

Product : DIGITAL CAMERA
Test Item : Peak Power Output
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2021/08/06

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402	0.47	1 Watt= 30 dBm	Pass
Channel 39	2441	-1.02	1 Watt= 30 dBm	Pass
Channel 78	2480	0.32	1 Watt= 30 dBm	Pass

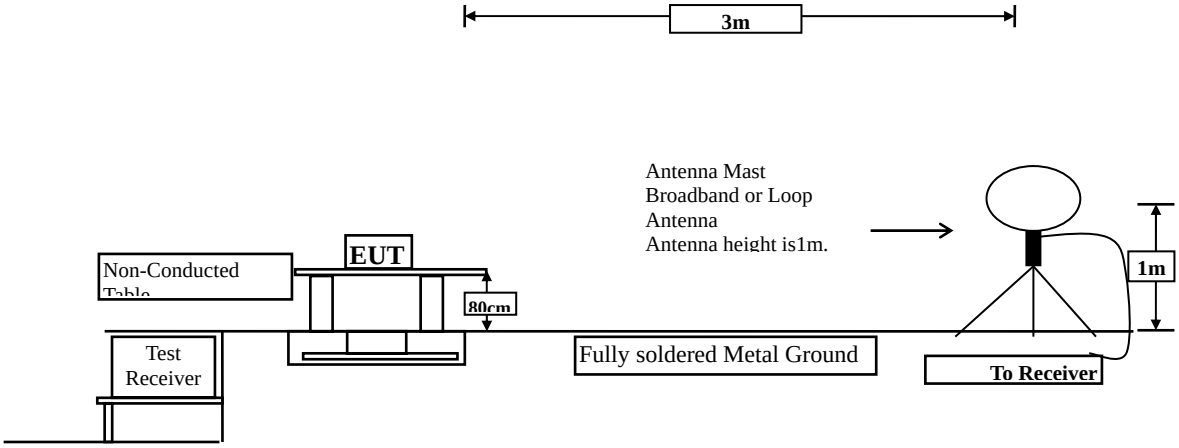
Product : DIGITAL CAMERA
Test Item : Peak Power Output
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2021/08/06

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402	-0.40	1 Watt= 30 dBm	Pass
Channel 39	2441	-2.17	1 Watt= 30 dBm	Pass
Channel 78	2480	-0.56	1 Watt= 30 dBm	Pass

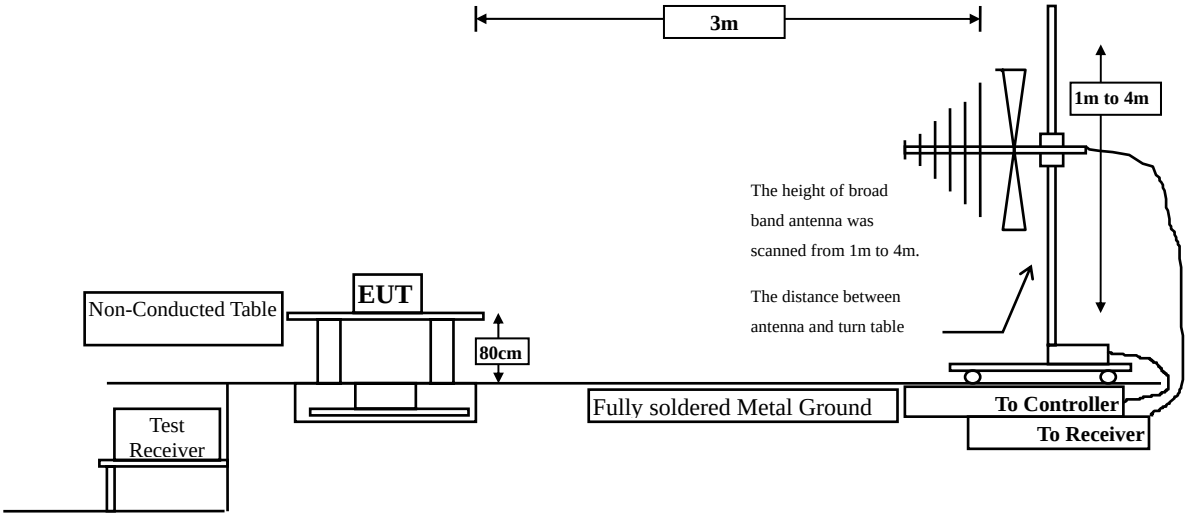
4. Radiated Emission

4.1. Test Setup

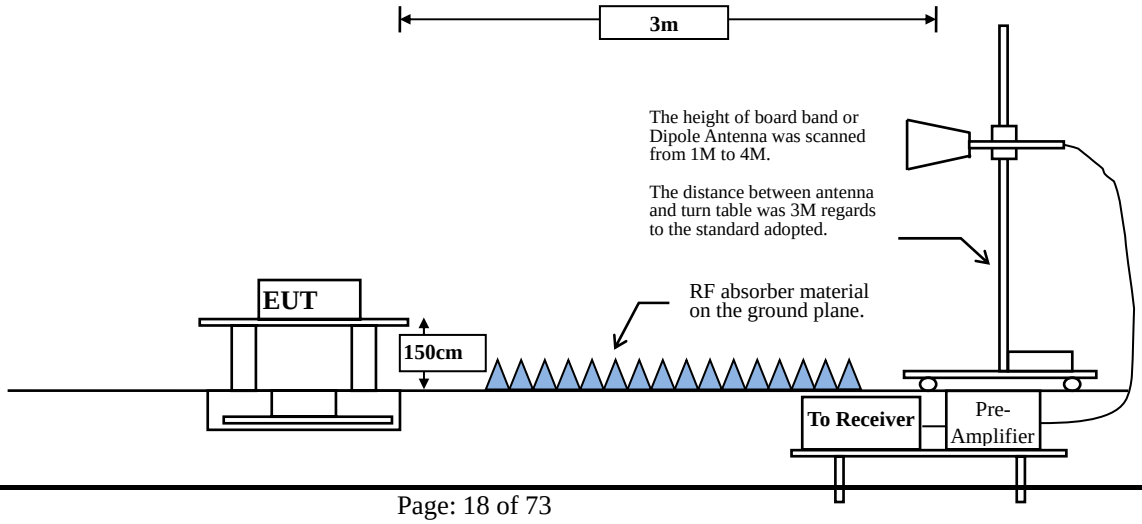
Radiated Emission Under 30MHz



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 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.

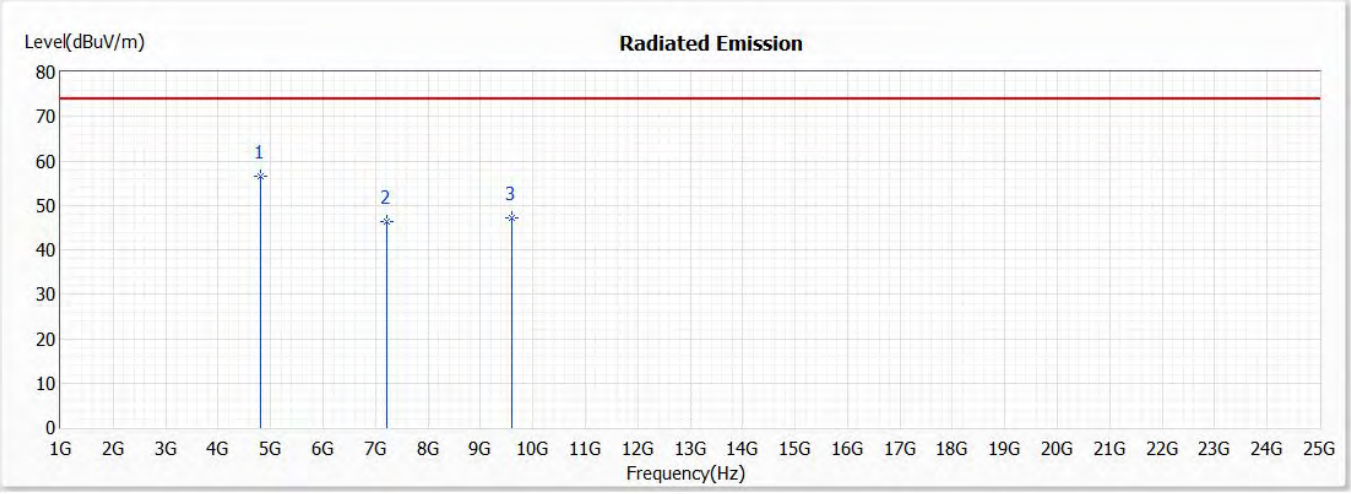
The measurement is divided into the Preliminary Measurement and the Final Measurement.

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.

4.4. Test Result of Radiated Emission

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 1Mbps,2.402GHz	Humidity (%RH)	62.3



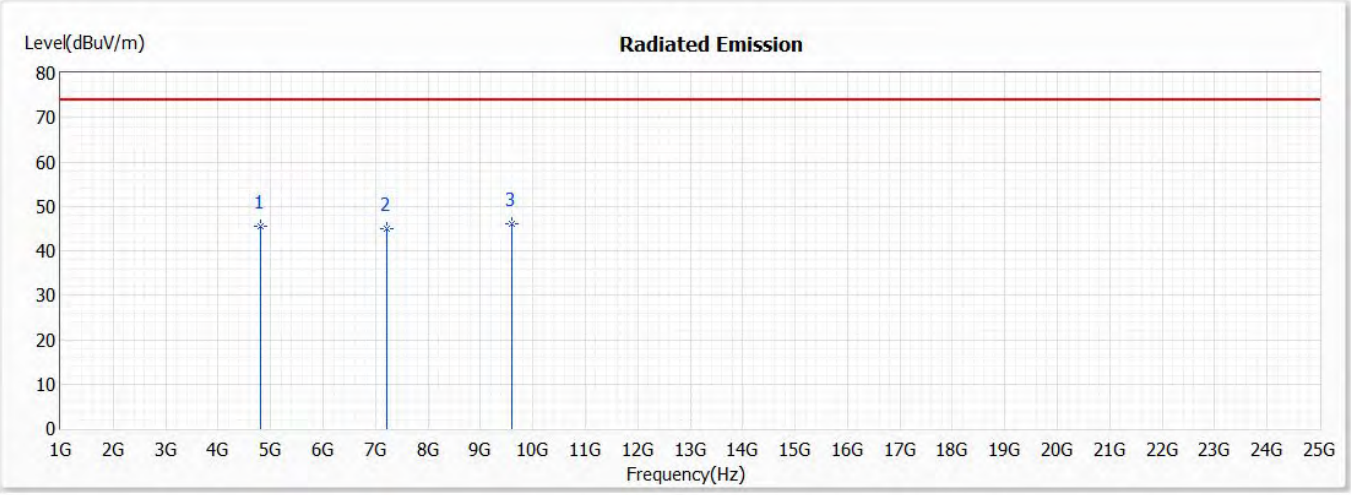
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	56.68	74.00	-17.32	56.19	0.49	PK
2	7206.000	46.23	74.00	-27.77	41.52	4.71	PK
3	9608.000	47.11	74.00	-26.89	40.26	6.85	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
00 (Average)	4804	56.68	-30.800	25.880	-28.120	54.000	Pass

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 1Mbps,2.402GHz	Humidity (%RH)	62.3

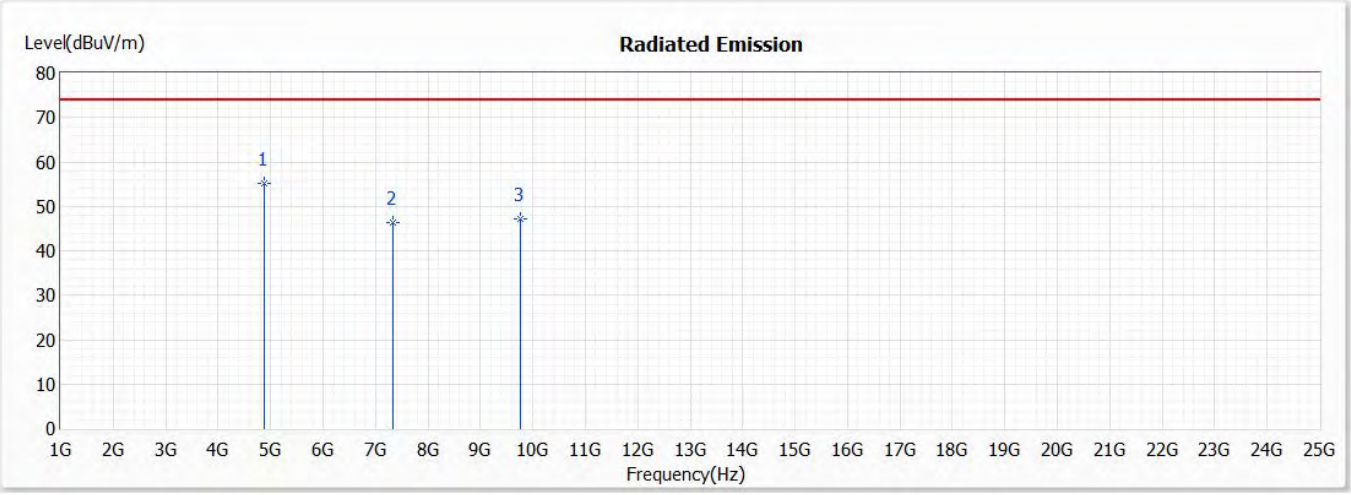


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4804.000	45.44	74.00	-28.56	44.95	0.49	PK
2	7206.000	45.03	74.00	-28.97	40.32	4.71	PK
* 3	9608.000	46.06	74.00	-27.94	39.21	6.85	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 1Mbps,2.441GHz	Humidity (%RH)	62.3



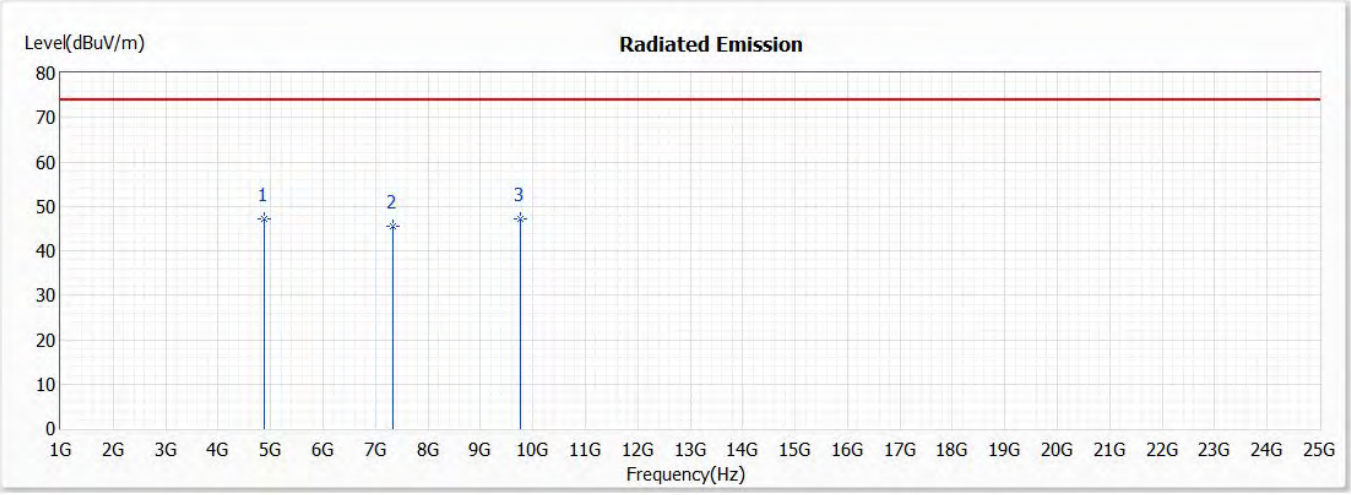
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4882.000	55.13	74.00	-18.87	54.53	0.60	PK
2	7323.000	46.44	74.00	-27.56	41.60	4.84	PK
3	9764.000	47.17	74.00	-26.83	39.94	7.23	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
78 (Average)	4882	55.13	-30.800	24.330	-29.670	54.000	Pass

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 1Mbps,2.441GHz	Humidity (%RH)	62.3

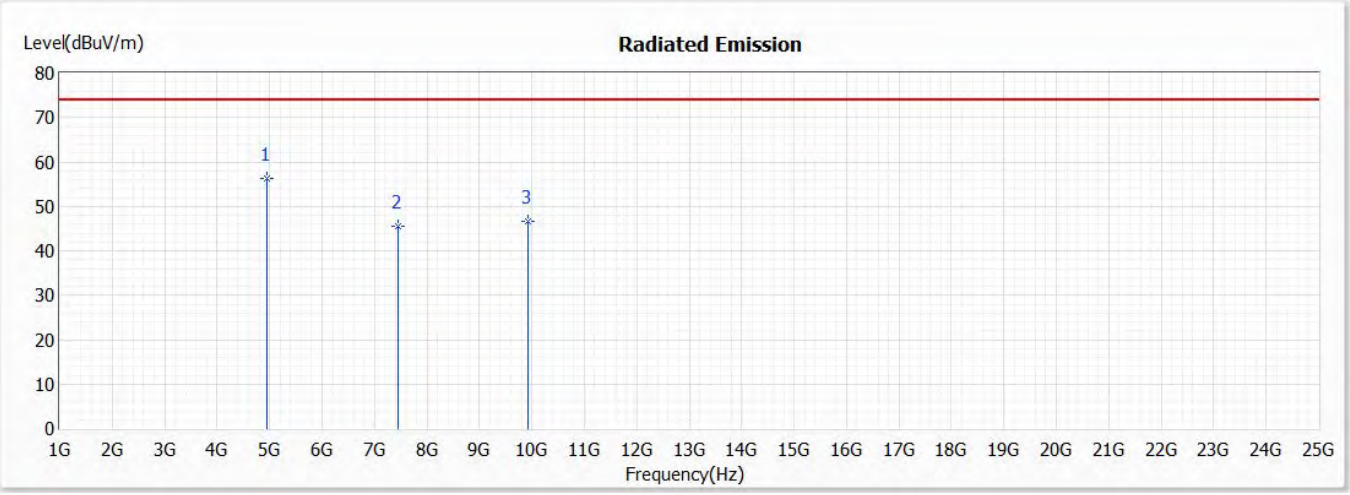


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4882.000	47.12	74.00	-26.88	46.52	0.60	PK
2	7323.000	45.57	74.00	-28.43	40.73	4.84	PK
* 3	9764.000	47.30	74.00	-26.70	40.07	7.23	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 1Mbps,2.48GHz	Humidity (%RH)	62.3



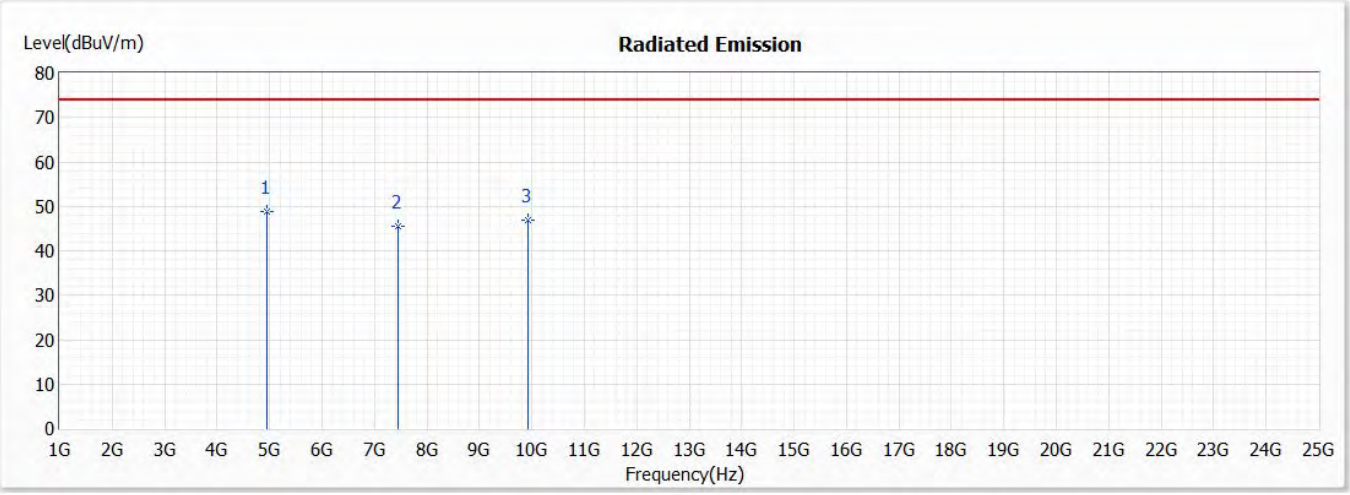
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4960.000	56.25	74.00	-17.75	55.55	0.70	PK
2	7440.000	45.50	74.00	-28.50	40.57	4.93	PK
3	9920.000	46.70	74.00	-27.30	39.30	7.40	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
78 (Average)	4960	56.25	-30.800	25.450	-28.550	54.000	Pass

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 1Mbps,2.48GHz	Humidity (%RH)	62.3

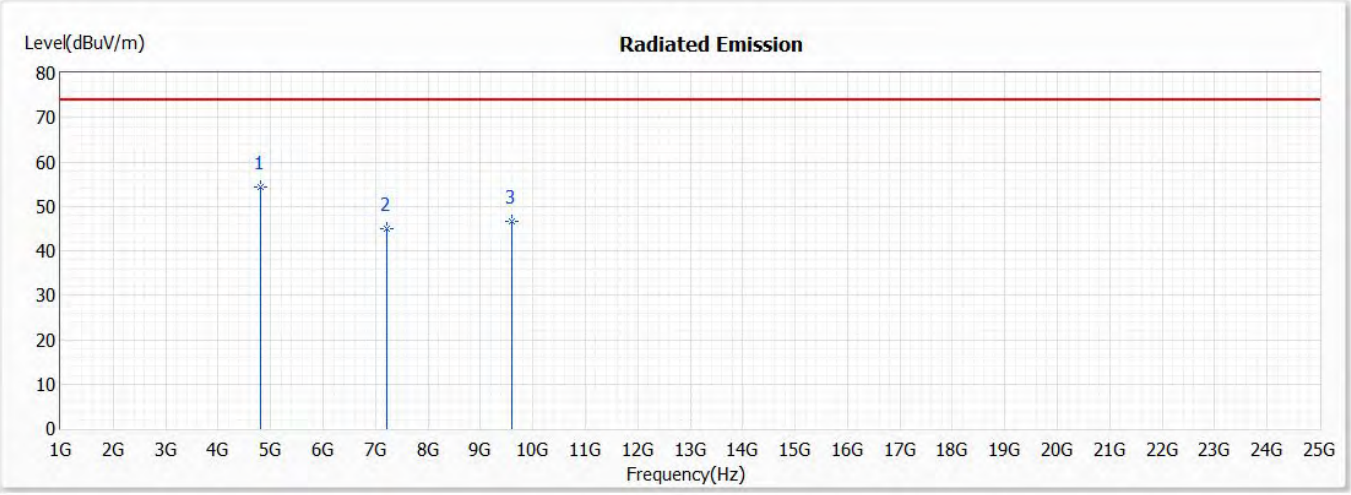


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4960.000	48.70	74.00	-25.30	48.00	0.70	PK
2	7440.000	45.39	74.00	-28.61	40.46	4.93	PK
3	9920.000	46.85	74.00	-27.15	39.45	7.40	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.402GHz	Humidity (%RH)	62.3



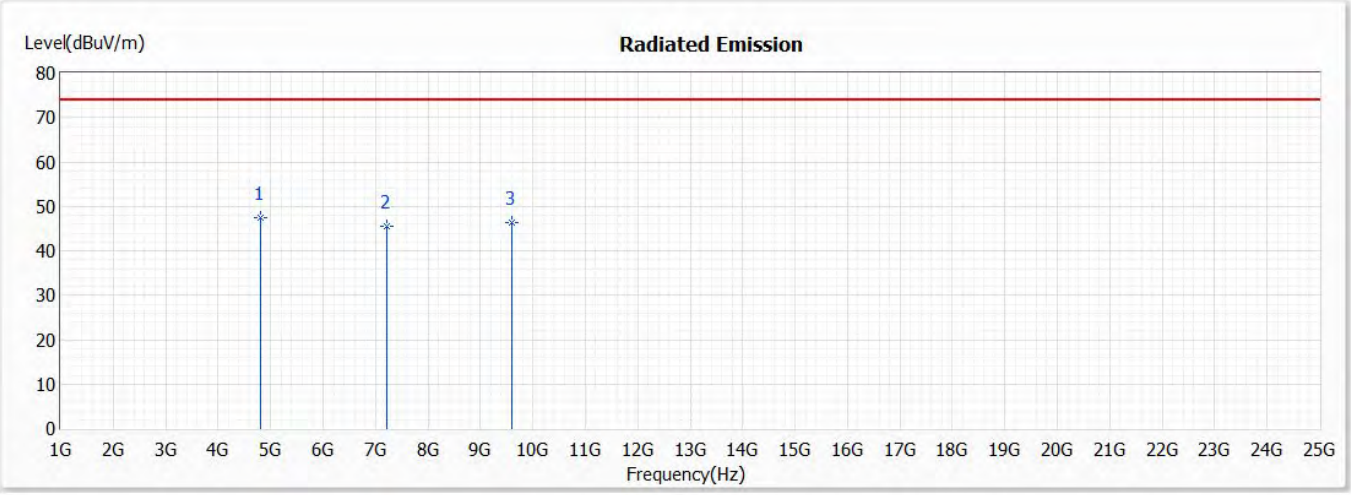
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	54.29	74.00	-19.71	53.80	0.49	PK
2	7206.000	44.97	74.00	-29.03	40.26	4.71	PK
3	9608.000	46.51	74.00	-27.49	39.66	6.85	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
00 (Average)	4804	54.29	-31.671	22.619	-31.381	54.000	Pass

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/7/30
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.402GHz	Humidity (%RH)	62.3

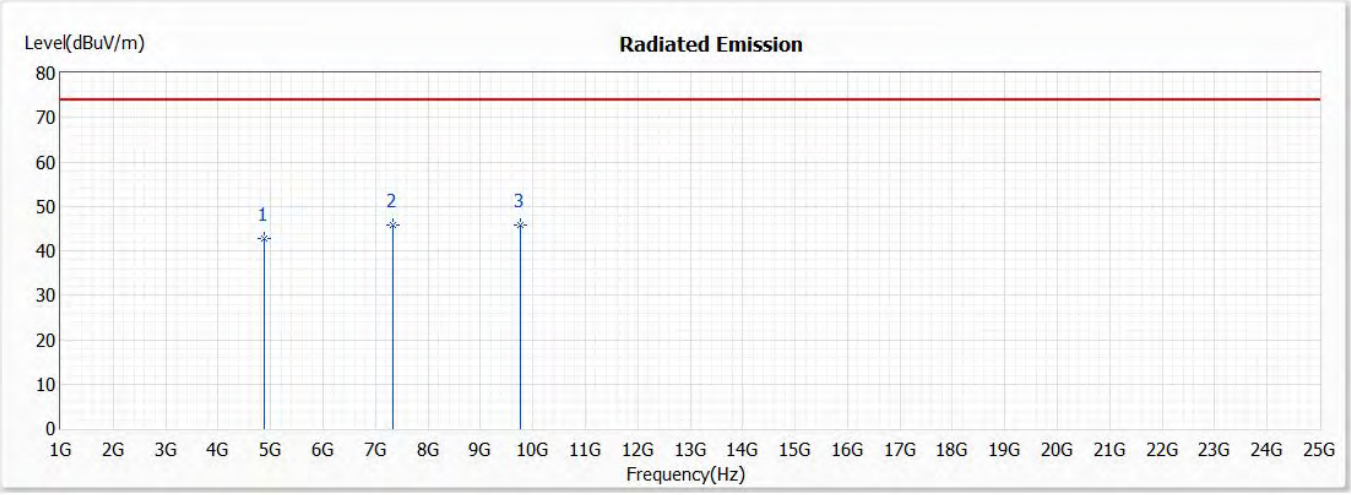


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	47.45	74.00	-26.55	46.96	0.49	PK
2	7206.000	45.49	74.00	-28.51	40.78	4.71	PK
3	9608.000	46.31	74.00	-27.69	39.46	6.85	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/8/2
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.441GHz	Humidity (%RH)	62.3

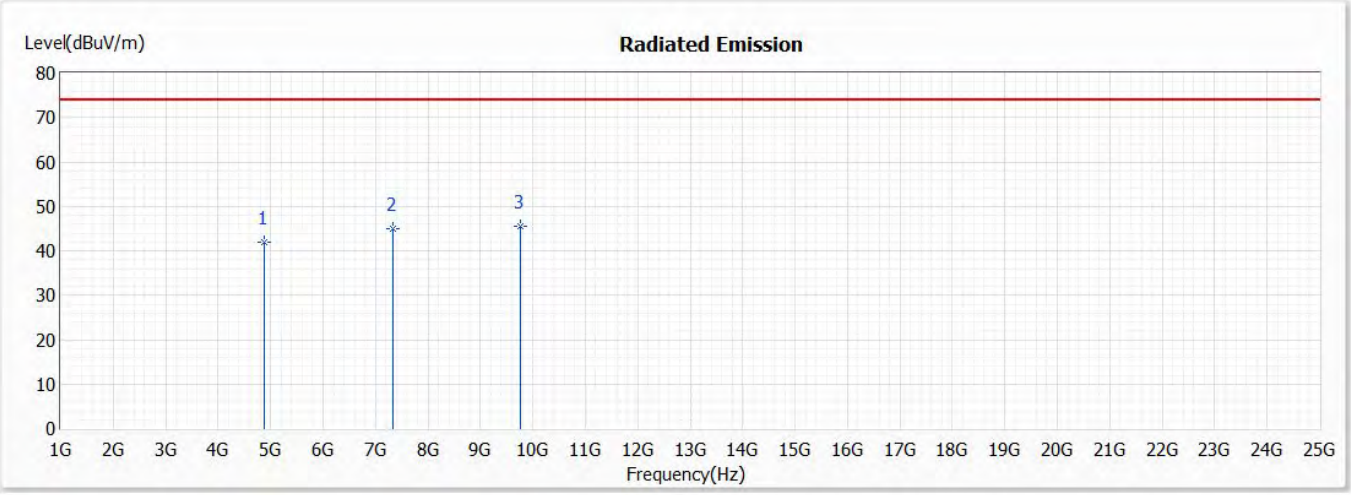


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4882.000	42.72	74.00	-31.28	42.12	0.60	PK
* 2	7323.000	45.76	74.00	-28.24	40.92	4.84	PK
3	9764.000	45.68	74.00	-28.32	38.45	7.23	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/8/2
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.441GHz	Humidity (%RH)	62.3

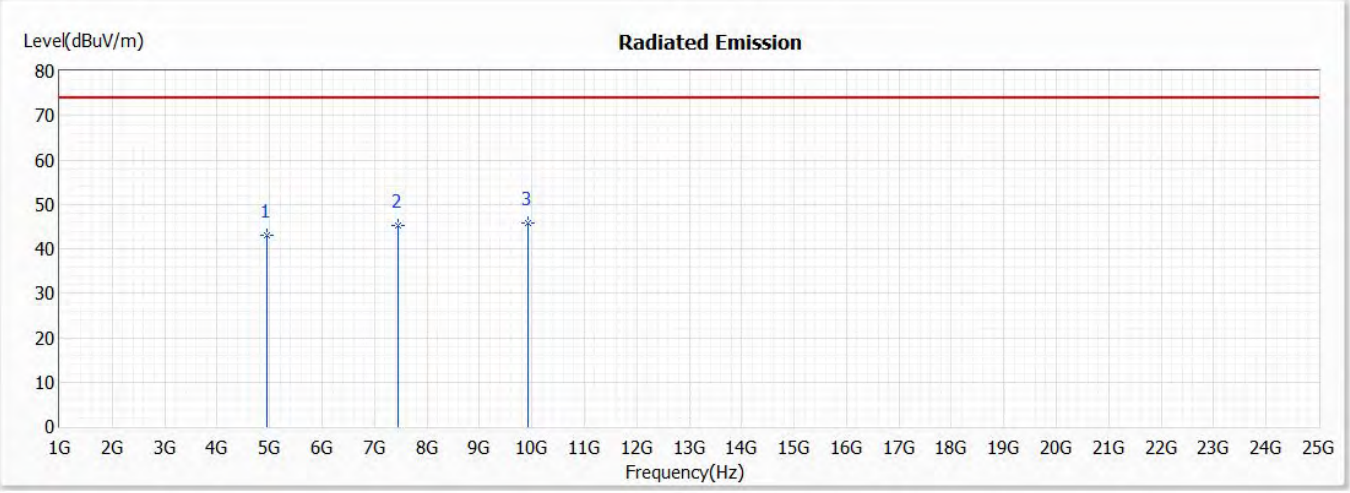


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4882.000	41.91	74.00	-32.09	41.31	0.60	PK
2	7323.000	44.92	74.00	-29.08	40.08	4.84	PK
* 3	9764.000	45.43	74.00	-28.57	38.20	7.23	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/8/2
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.48GHz	Humidity (%RH)	62.3

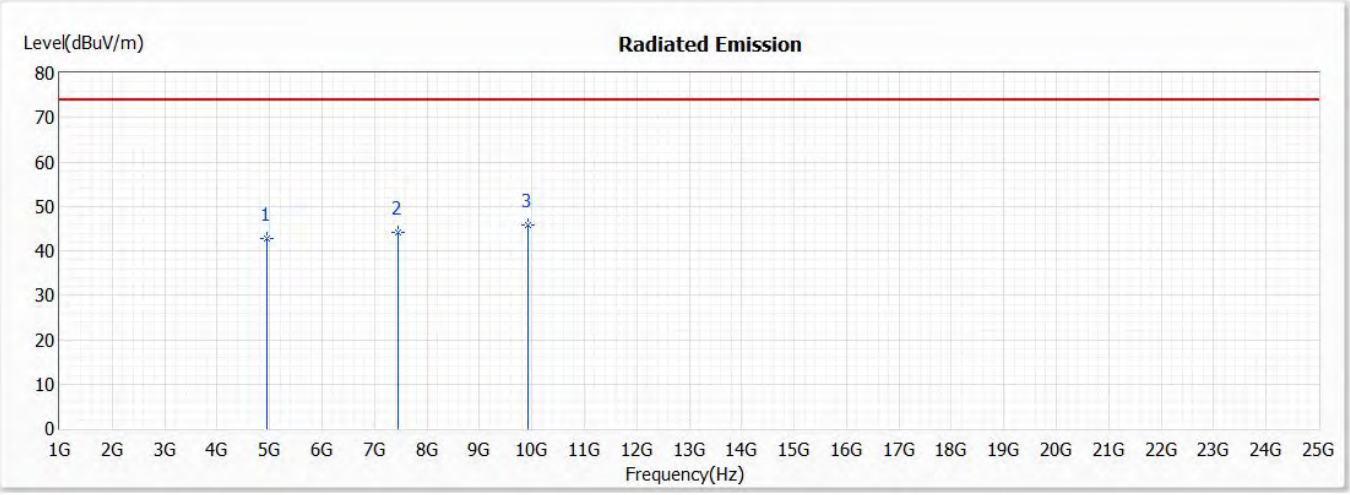


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4960.000	43.05	74.00	-30.95	42.35	0.70	PK
2	7440.000	45.21	74.00	-28.79	40.28	4.93	PK
* 3	9920.000	45.71	74.00	-28.29	38.31	7.40	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/8/2
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.48GHz	Humidity (%RH)	62.3

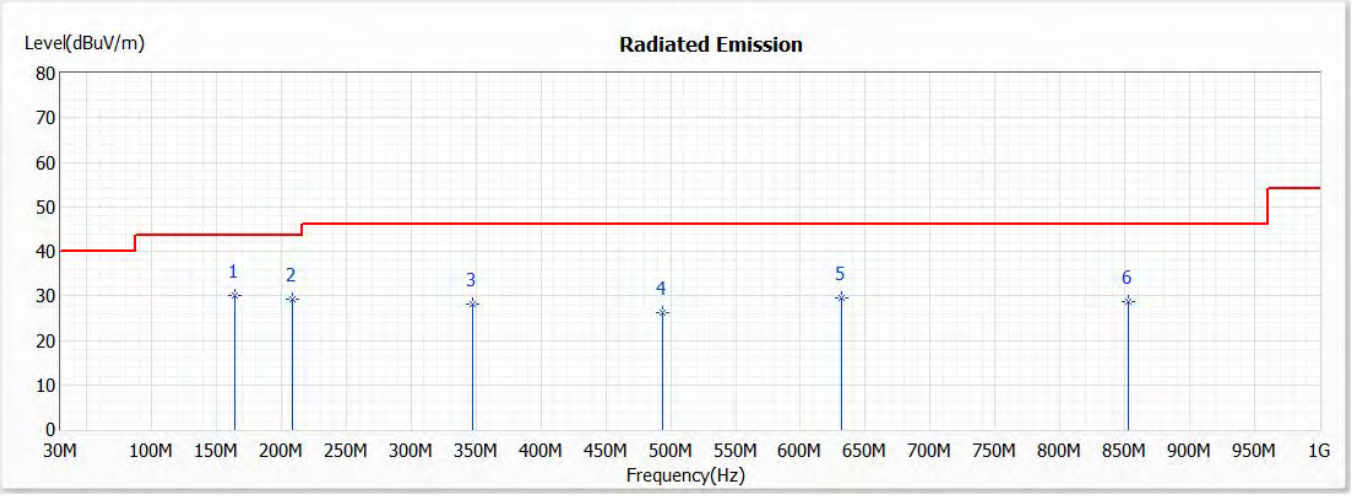


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4960.000	42.79	74.00	-31.21	42.09	0.70	PK
2	7440.000	44.23	74.00	-29.77	39.30	4.93	PK
* 3	9920.000	45.66	74.00	-28.34	38.26	7.40	PK

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/8/2
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Horizontal	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.441GHz	Humidity (%RH)	62.3

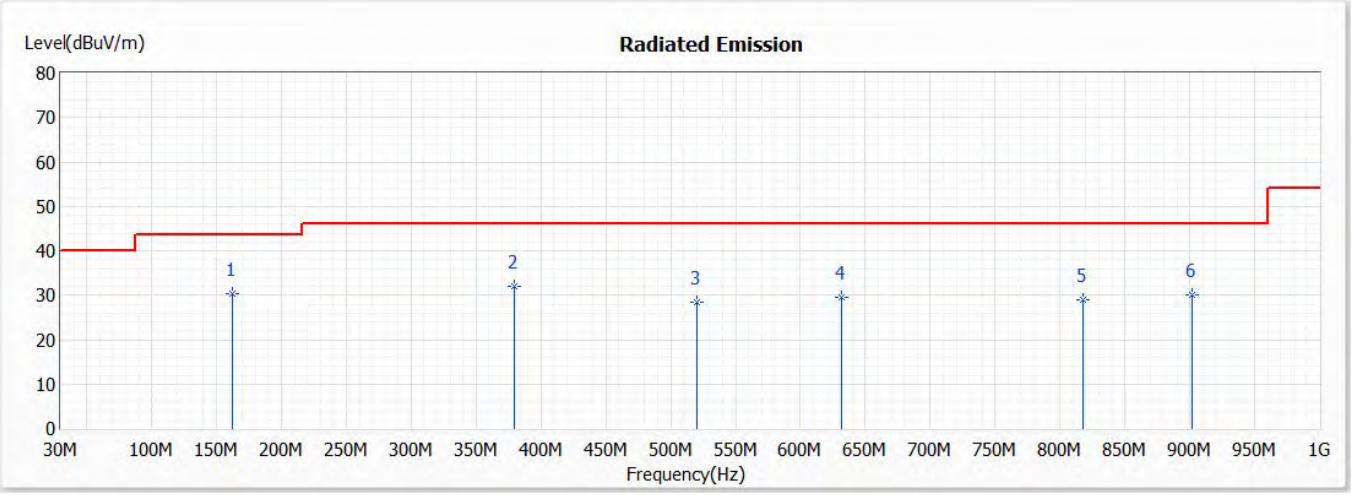


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	163.860	30.11	43.50	-13.39	40.60	-10.49	QP
2	208.480	29.25	43.50	-14.25	42.49	-13.24	QP
3	347.190	28.09	46.00	-17.91	36.71	-8.62	QP
4	493.660	26.31	46.00	-19.69	31.70	-5.39	QP
5	631.400	29.57	46.00	-16.43	32.40	-2.83	QP
6	852.560	28.79	46.00	-17.21	28.49	0.30	QP

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	R04010	Site	966-3
Test Voltage	AC 120 V / 60 Hz	Test Date	2021/8/2
Test Mode	Mode 1: Transmit	Engineer	Nick Chen
Polarity	Vertical	Temperature (℃)	25.5
Test Condition	BT 3Mbps,2.441GHz	Humidity (%RH)	62.3



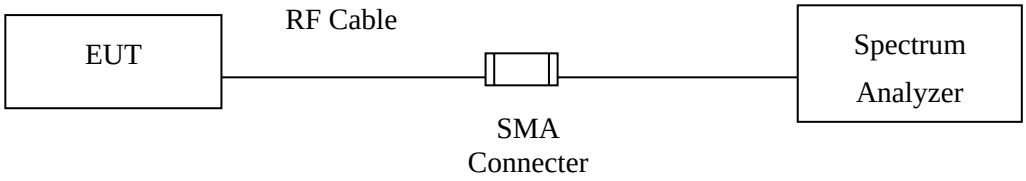
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	161.920	30.28	43.50	-13.22	40.79	-10.51	QP
2	379.200	31.93	46.00	-14.07	39.66	-7.73	QP
3	519.850	28.48	46.00	-17.52	33.20	-4.72	QP
4	631.400	29.57	46.00	-16.43	32.40	-2.83	QP
5	817.640	29.04	46.00	-16.96	29.21	-0.17	QP
6	902.030	30.15	46.00	-15.85	29.18	0.97	QP

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=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

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

Tested according to FHSS test procedure of KDB558074 section 9 b) for compliance to FCC 47CFR 15.247 requirements.

5.4. Test Result of RF Antenna Conducted Test

Product	:	DIGITAL CAMERA
Test Item	:	RF Antenna Conducted Test
Test Mode	:	Mode 1: Transmit - 1Mbps
Test Date	:	2021/08/06

Figure Channel 00:

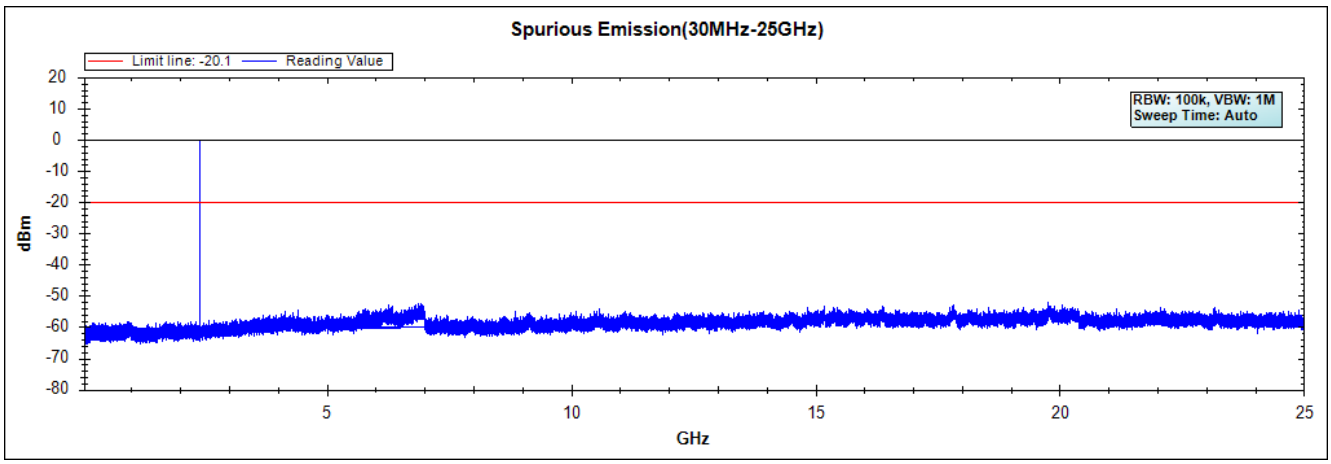


Figure Channel 39:

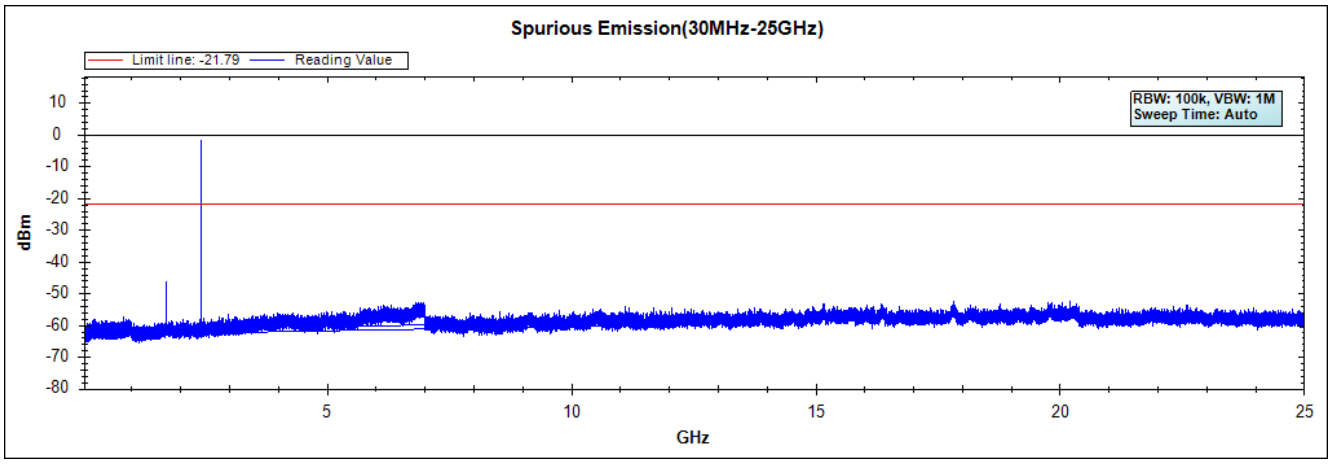
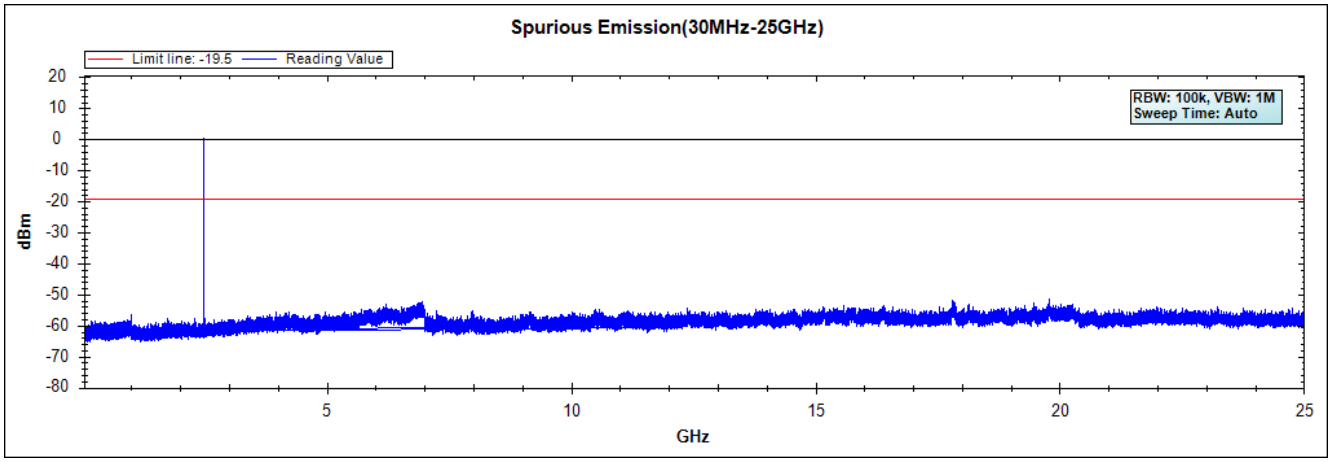


Figure Channel 78:



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

Product	:	DIGITAL CAMERA
Test Item	:	RF Antenna Conducted Test
Test Mode	:	Mode 2: Transmit - 3Mbps
Test Date	:	2021/08/06

Figure Channel 00:

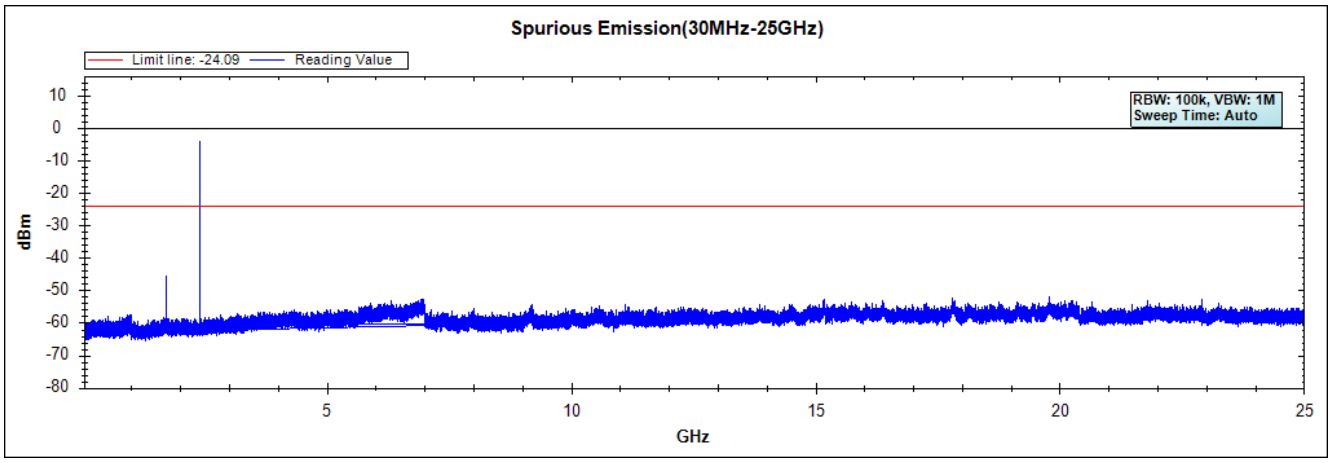


Figure Channel 39:

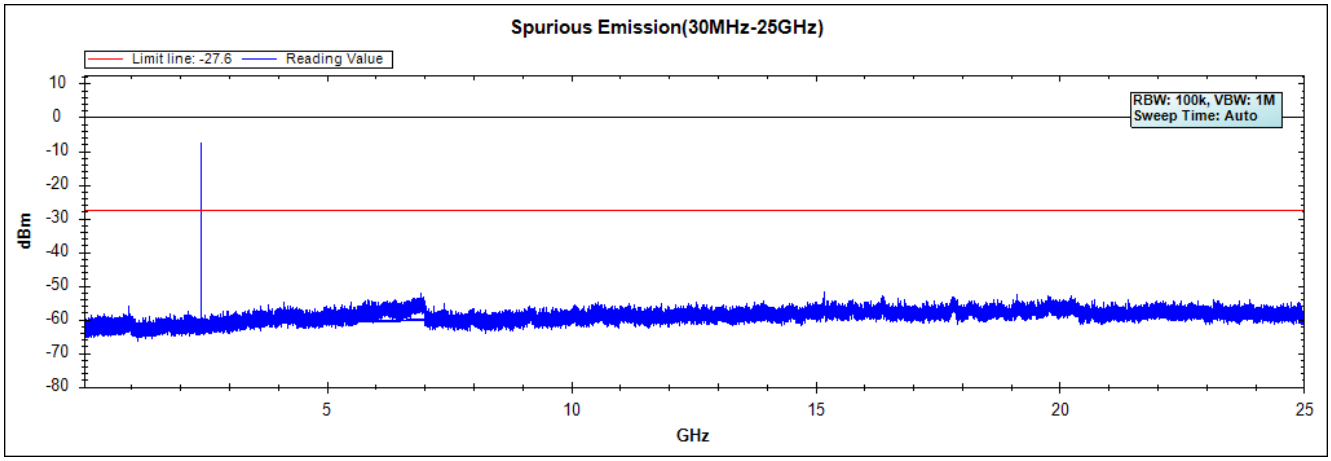
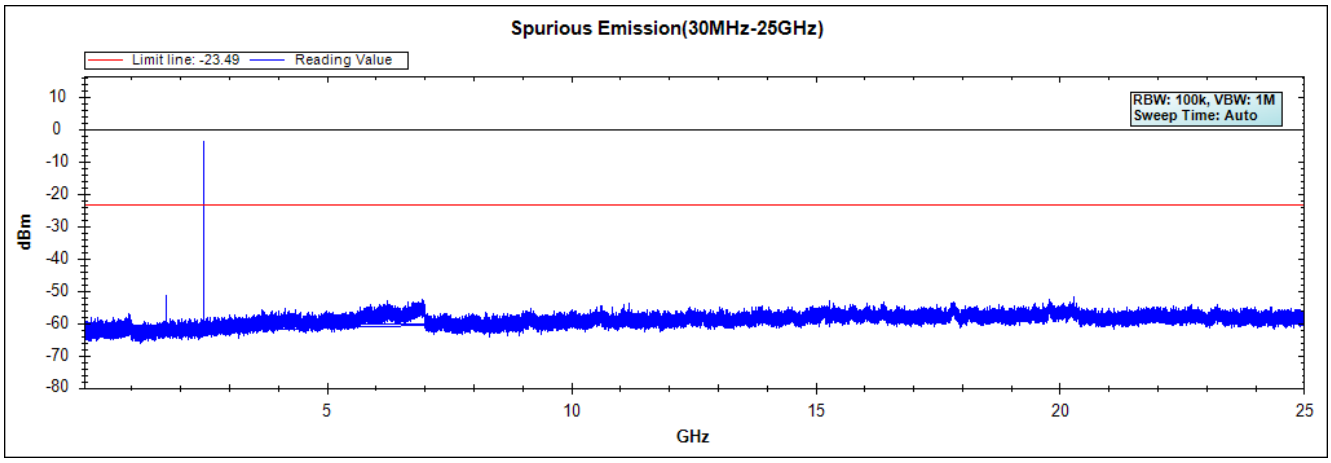


Figure Channel 78:

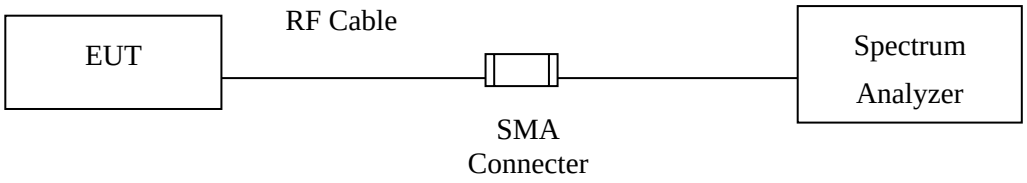


Note: The above test pattern is synthesized by multiple of the frequency range.

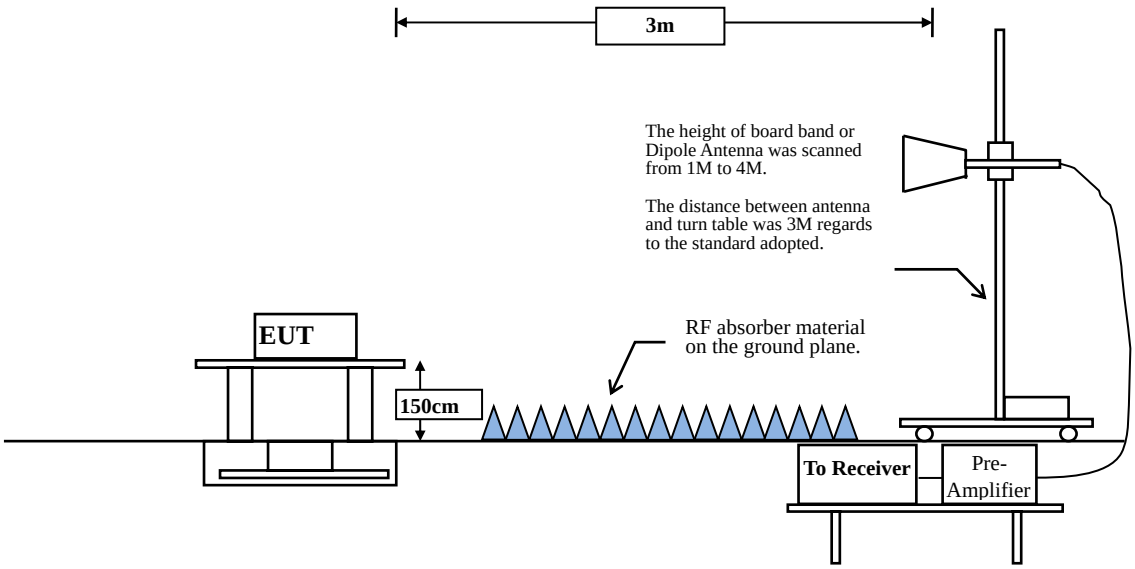
6. Band Edge

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)).

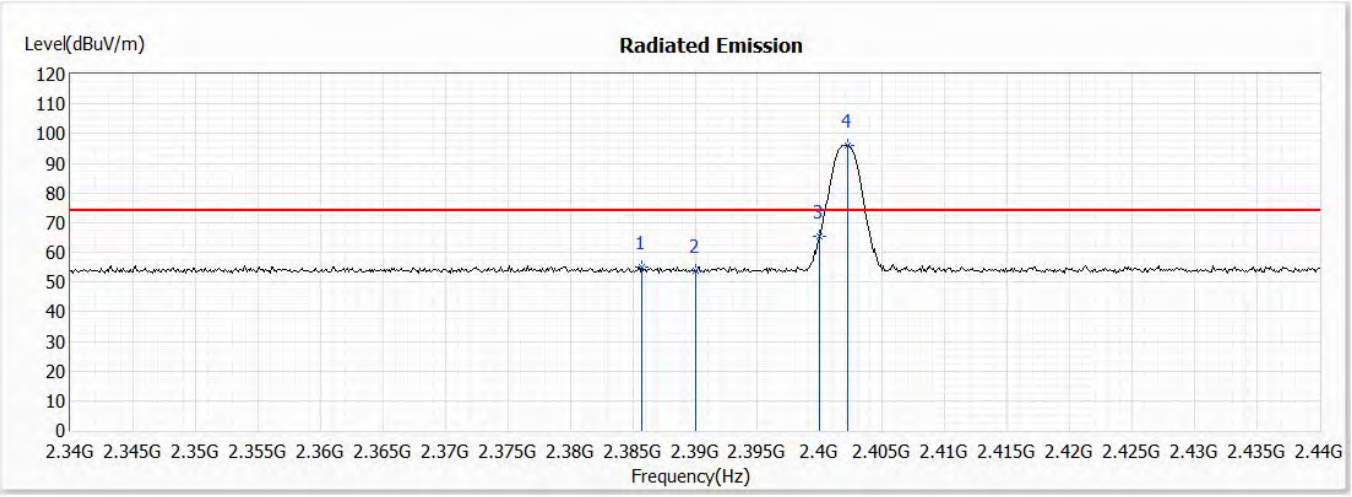
6.3. Test Procedure

The EUT 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.

6.4. Test Result of Band Edge

Product : DIGITAL CAMERA
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2402MHz)
Test Date : 2021/07/29

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2385.700	54.90	74.00	-19.10	41.72	13.18	PK
2	2390.000	53.61	74.00	-20.39	40.42	13.19	PK
3	2400.000	65.45	--	--	52.25	13.20	PK
4	2402.200	96.02	--	--	82.82	13.20	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

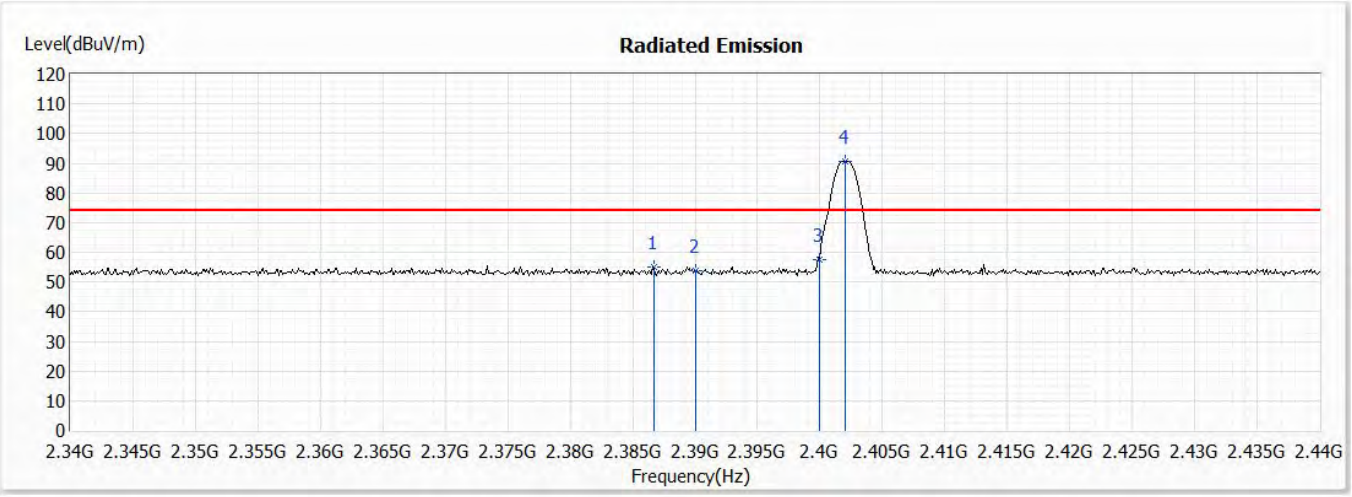
Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
00 (Average)	2385.7	54.9	-30.800	24.100	-29.900	54.000	Pass
00 (Average)	2390	53.61	-30.800	22.810	-31.190	54.000	Pass
00 (Average)	2400	65.45	-30.800	34.650	--	--	Pass
00 (Average)	2402.2	96.02	-30.800	65.220	--	--	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product	:	DIGITAL CAMERA
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - 1Mbps (2402MHz)
Test Date	:	2021/07/29

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2386.700	55.15	74.00	-18.85	41.96	13.19	PK
2	2390.000	53.79	74.00	-20.21	40.60	13.19	PK
3	2400.000	57.53	--	--	44.33	13.20	PK
4	2402.000	90.69	--	--	77.49	13.20	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

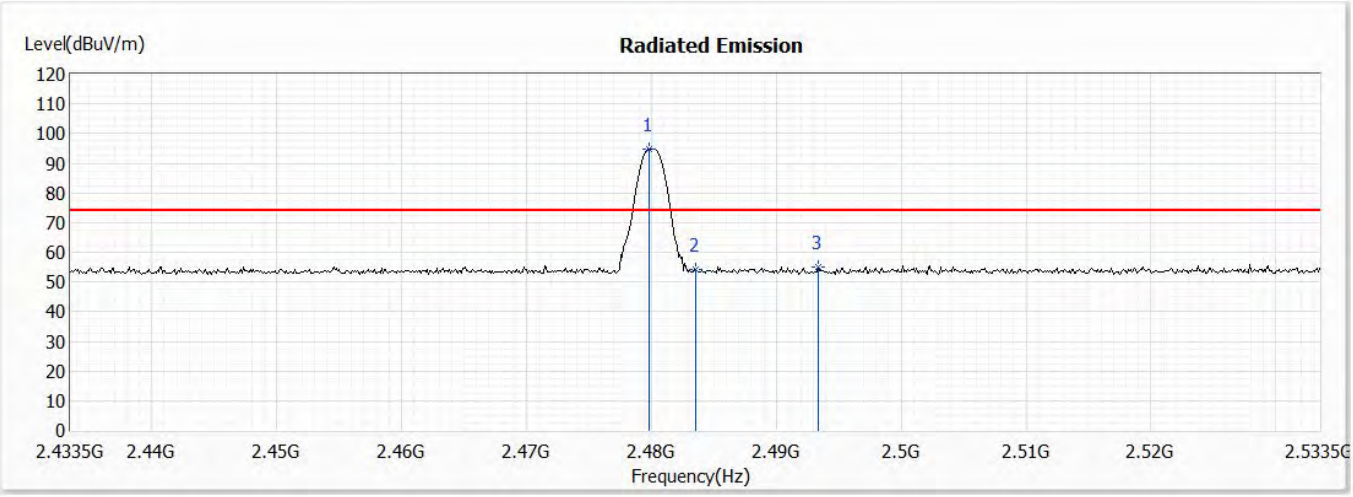
Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
00 (Average)	2386.7	55.15	-30.800	24.350	-29.650	54.000	Pass
00 (Average)	2390	53.79	-30.800	22.990	-31.010	54.000	Pass
00 (Average)	2400	57.53	-30.800	26.730	--	--	Pass
00 (Average)	2402	90.69	-30.800	59.890	--	--	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product	:	DIGITAL CAMERA
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - 1Mbps (2480MHz)
Test Date	:	2021/07/29

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2479.800	94.83	--	--	81.62	13.21	PK
2	2483.500	54.07	74.00	-19.93	40.86	13.21	PK
3	2493.400	55.05	74.00	-18.95	41.83	13.22	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

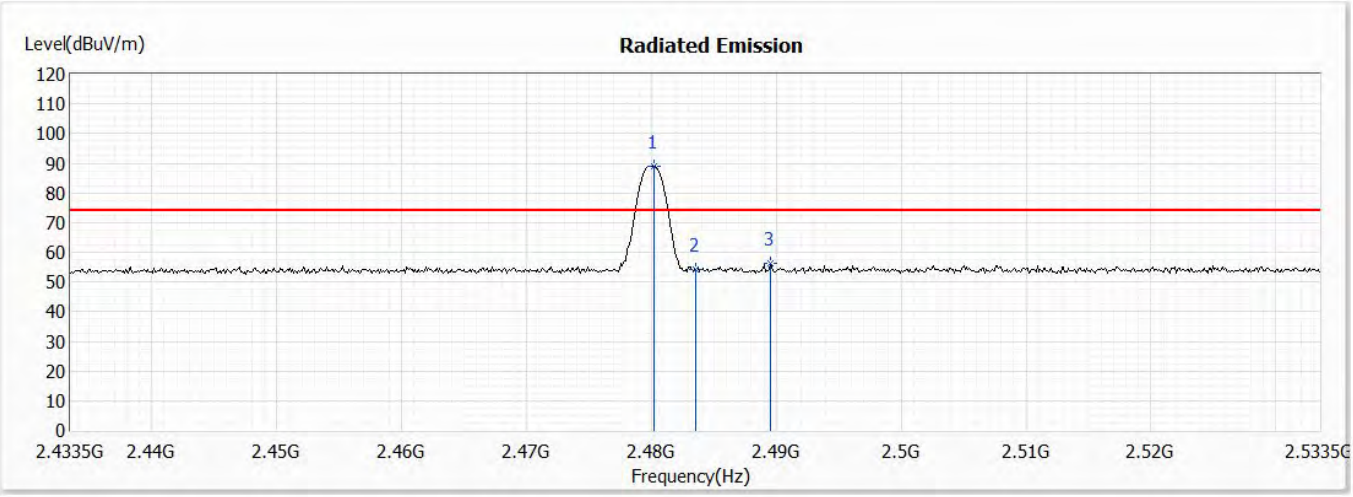
Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
78 (Average)	2479.8	94.83	-30.800	64.030	--	--	Pass
78 (Average)	2483.5	54.07	-30.800	23.270	-30.730	54.000	Pass
78 (Average)	2493.4	55.05	-30.800	24.250	-29.750	54.000	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product	:	DIGITAL CAMERA
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - 1Mbps (2480MHz)
Test Date	:	2021/07/29

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2480.200	89.04	--	--	75.83	13.21	PK
2	2483.500	54.11	74.00	-19.89	40.90	13.21	PK
3	2489.500	56.31	74.00	-17.69	43.09	13.22	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

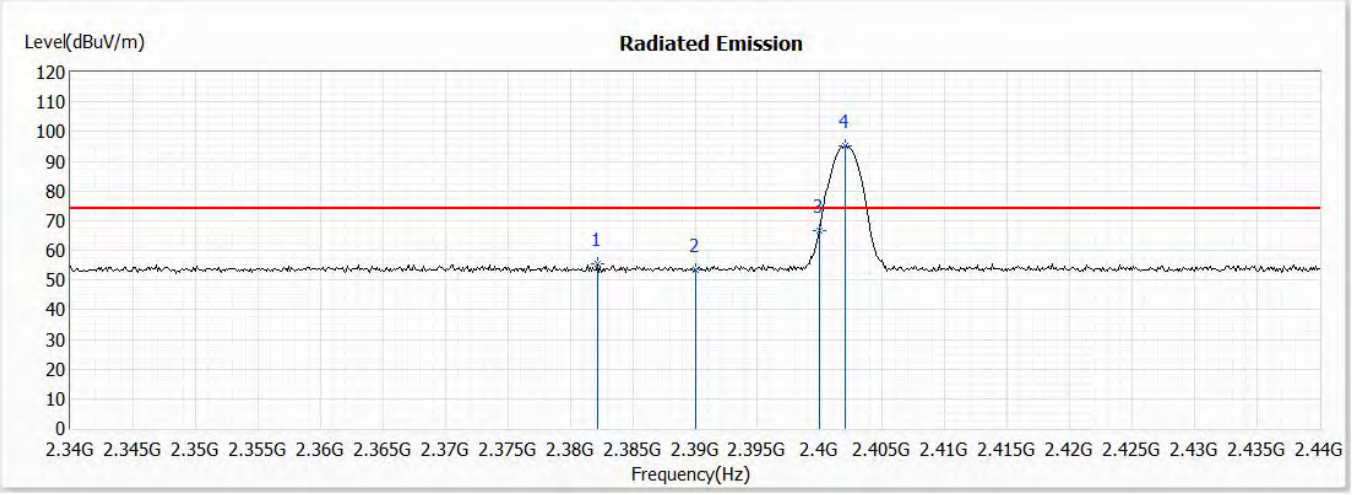
Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
78 (Average)	2480.2	89.04	-30.800	58.240	--	--	Pass
78 (Average)	2483.5	54.11	-30.800	23.310	-30.690	54.000	Pass
78 (Average)	2489.5	56.31	-30.800	25.510	-28.490	54.000	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product : DIGITAL CAMERA
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (2402MHz)
Test Date : 2021/07/29

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2382.200	55.32	74.00	-18.68	42.15	13.17	PK
2	2390.000	53.56	74.00	-20.44	40.37	13.19	PK
3	2400.000	66.78	--	--	53.58	13.20	PK
4	2402.000	95.00	--	--	81.80	13.20	PK

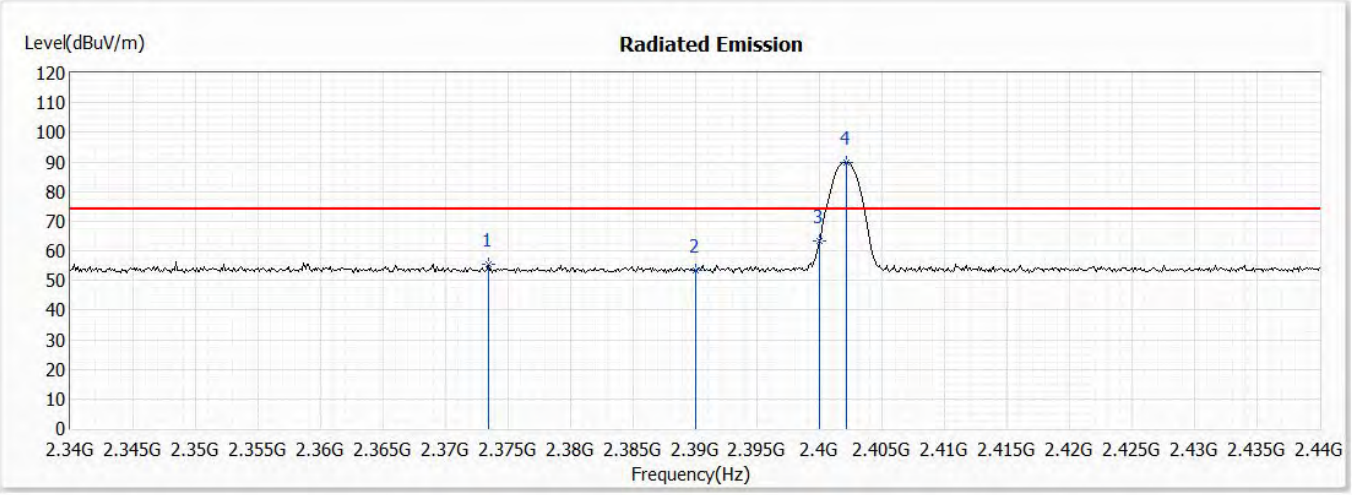
Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit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

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
00 (Average)	2382.2	55.32	-31.671	23.649	-30.351	54.000	Pass
00 (Average)	2390	53.56	-31.671	21.889	-32.111	54.000	Pass
00 (Average)	2400	66.78	-31.671	35.109	--	--	Pass
00 (Average)	2402	95	-31.671	63.329	--	--	Pass

Note:
1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product	:	DIGITAL CAMERA
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - 3Mbps (2402MHz)
Test Date	:	2021/07/29

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2373.500	55.64	74.00	-18.36	42.48	13.16	PK
2	2390.000	53.21	74.00	-20.79	40.02	13.19	PK
3	2400.000	63.51	--	--	50.31	13.20	PK
4	2402.100	89.97	--	--	76.77	13.20	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

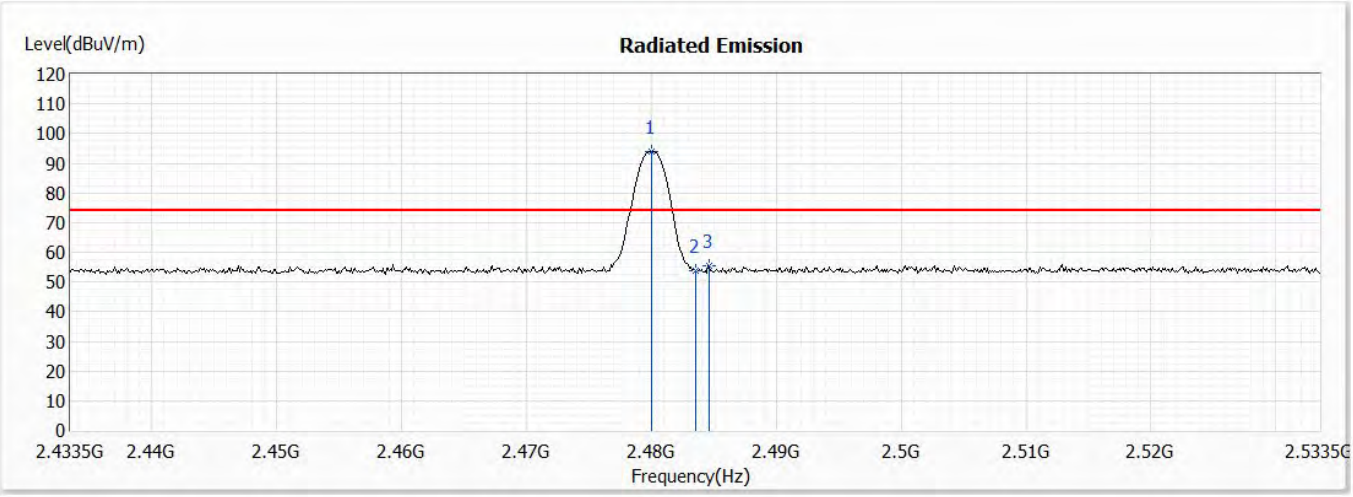
Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
00 (Average)	2373.5	55.64	-31.671	23.969	-30.031	54.000	Pass
00 (Average)	2390	53.21	-31.671	21.539	-32.461	54.000	Pass
00 (Average)	2400	63.51	-31.671	31.839	--	--	Pass
00 (Average)	2402.1	89.97	-31.671	58.299	--	--	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product	:	DIGITAL CAMERA
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - 3Mbps (2480MHz)
Test Date	:	2021/07/29

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2480.000	94.05	--	--	80.84	13.21	PK
2	2483.500	53.98	74.00	-20.02	40.77	13.21	PK
3	2484.600	55.50	74.00	-18.50	42.29	13.21	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

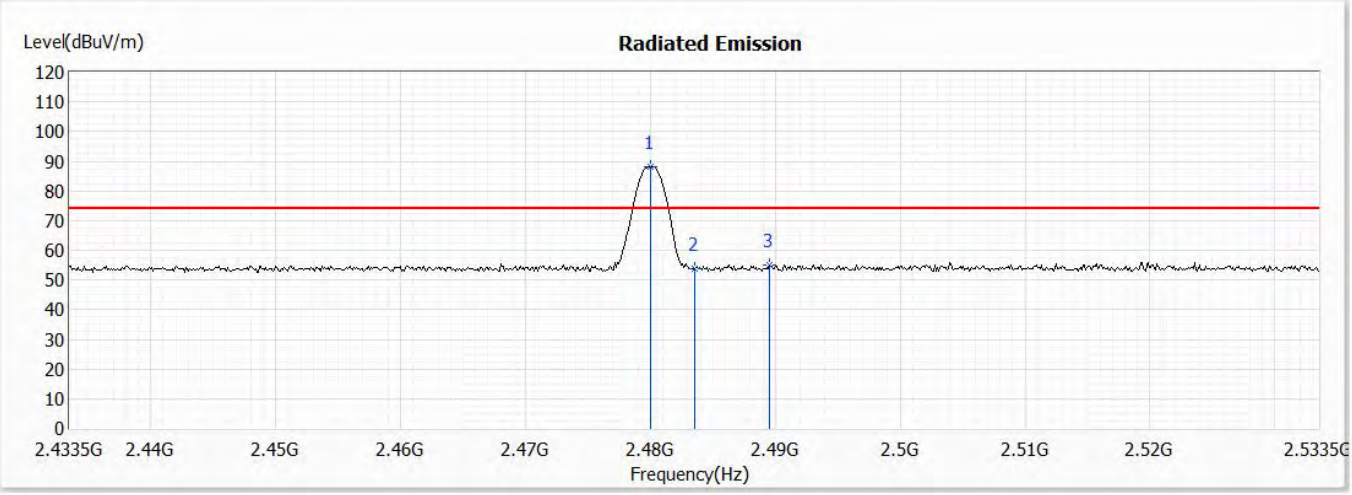
Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
78 (Average)	2480	94.05	-31.671	62.379	--	--	Pass
78 (Average)	2483.5	53.98	-31.671	22.309	-31.691	54.000	Pass
78 (Average)	2484.6	55.5	-31.671	23.829	-30.171	54.000	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product	:	DIGITAL CAMERA
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - 3Mbps (2480MHz)
Test Date	:	2021/07/29

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2480.000	88.31	--	--	75.10	13.21	PK
2	2483.500	54.00	74.00	-20.00	40.79	13.21	PK
3	2489.500	55.11	74.00	-18.89	41.89	13.22	PK

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. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Duty Cycle Factor (dB)	Average Measurement (dBm)	Margin (dB)	Average Limit (dBm)	Result
78 (Average)	2480	88.31	-31.671	56.639	--	--	Pass
78 (Average)	2483.5	54	-31.671	22.329	-31.671	54.000	Pass
78 (Average)	2489.5	55.11	-31.671	23.439	-30.561	54.000	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 15.

Product : DIGITAL CAMERA
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps(Hopping off)
Test Date : 2021/08/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel 00:

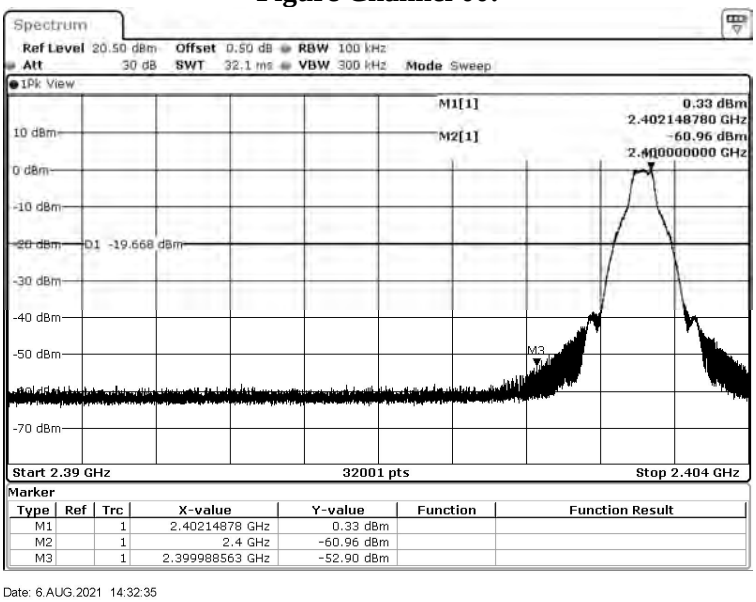
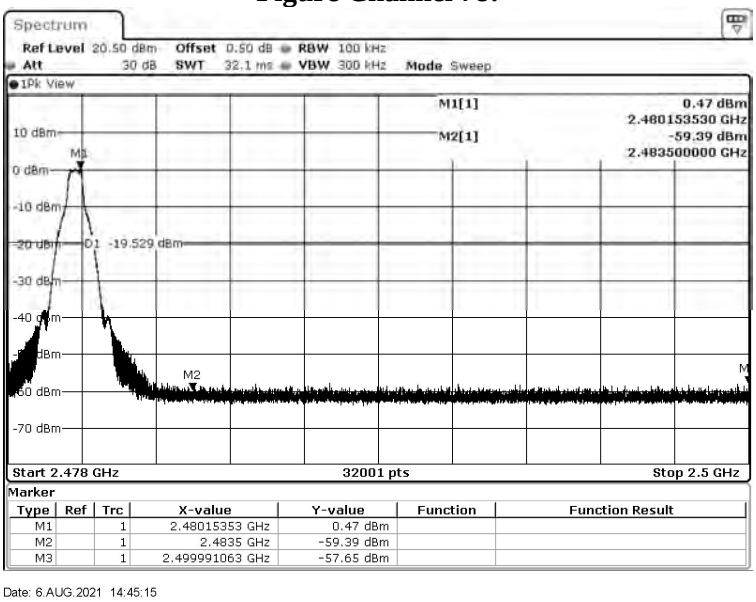


Figure Channel 78:



Product : DIGITAL CAMERA
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (Hopping off)
Test Date : 2021/08/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel 00:

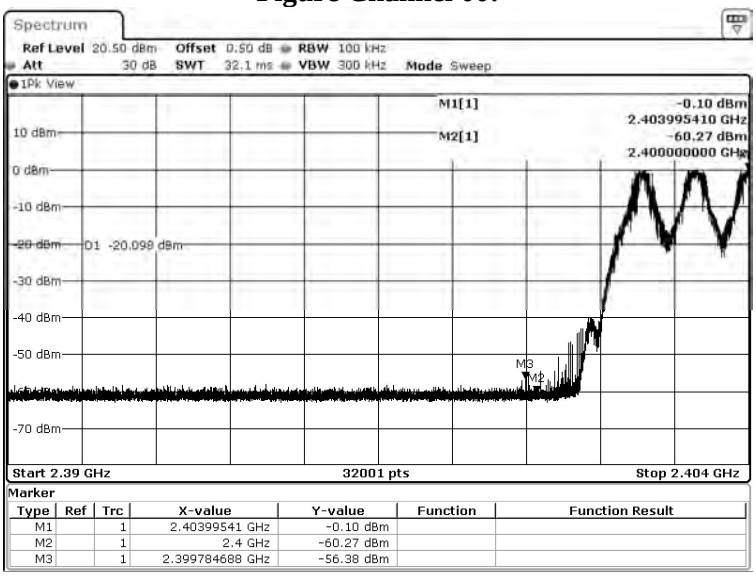
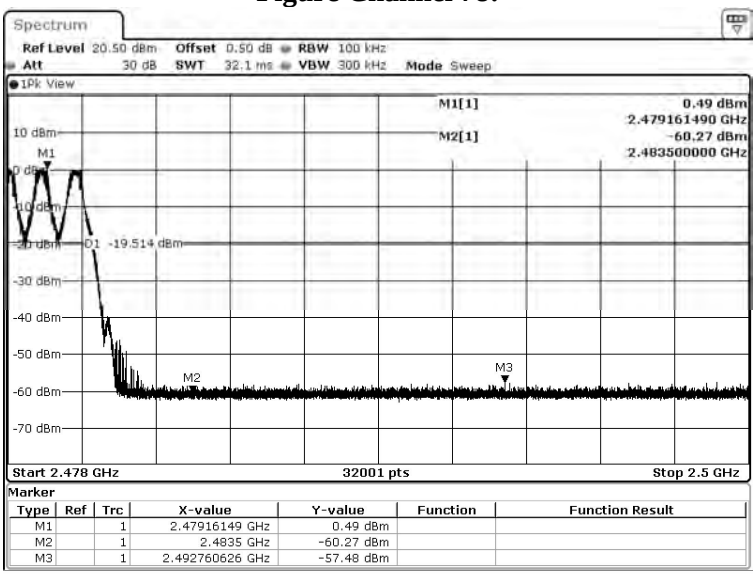


Figure Channel 78:



Product : DIGITAL CAMERA
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps(Hopping on)
Test Date : 2021/08/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel Hopping:

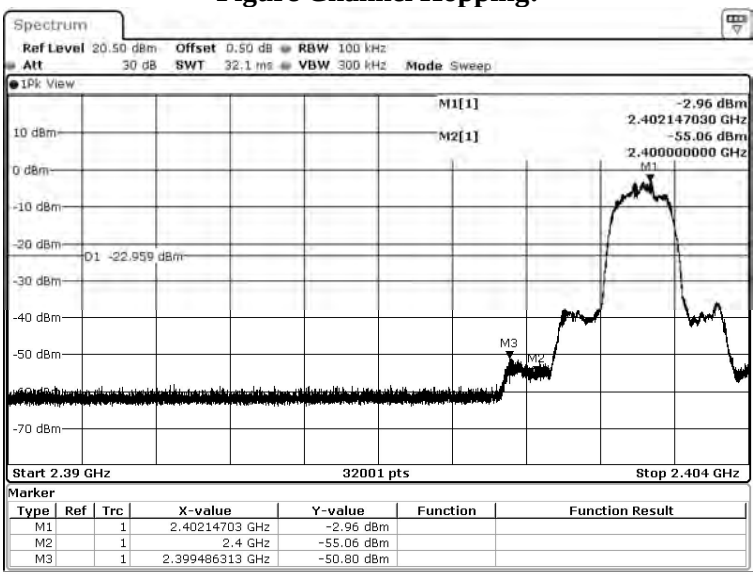
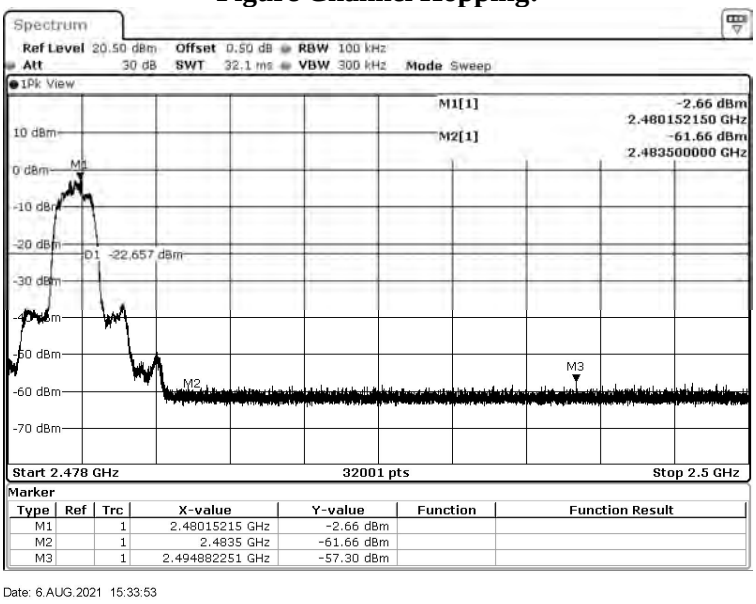


Figure Channel Hopping:



Product : DIGITAL CAMERA
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (Hopping on)
Test Date : 2021/08/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel Hopping:

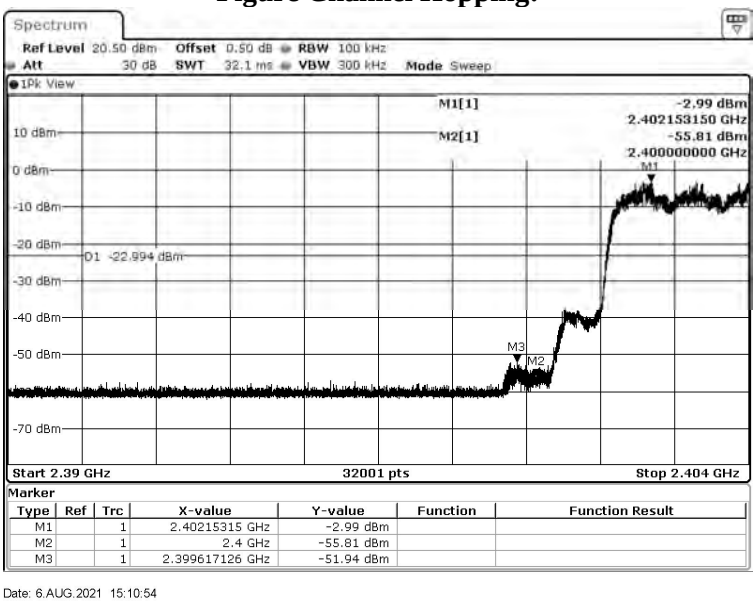
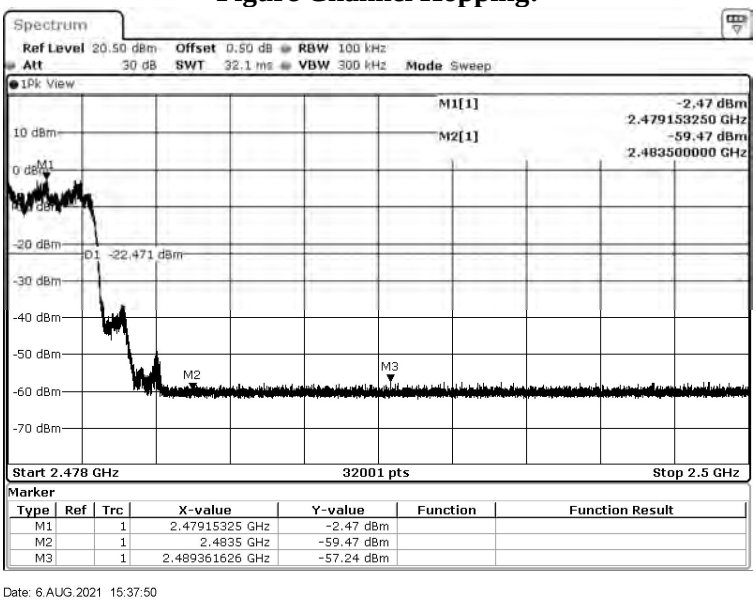
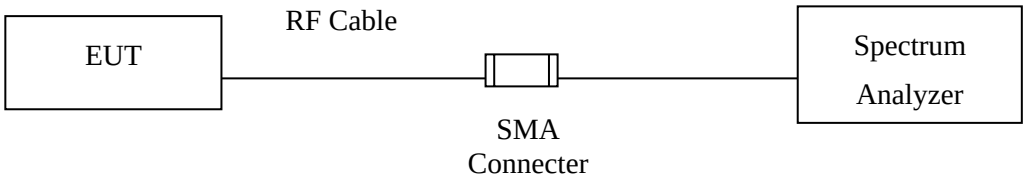


Figure Channel Hopping:



7. Channel Number

7.1. Test Setup



7.2. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

7.3. Test Procedure

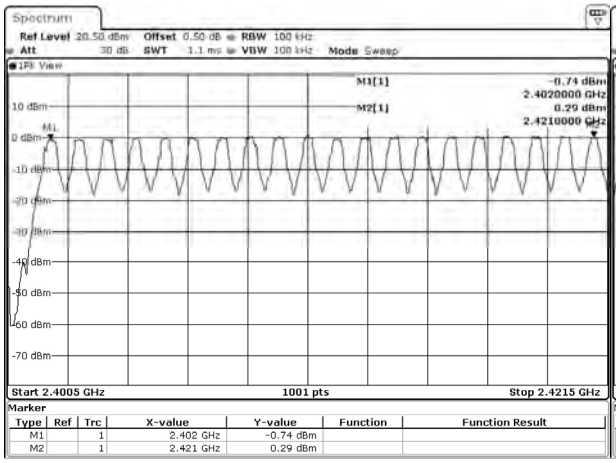
Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

7.4. Test Result of Channel Number

Product : DIGITAL CAMERA
Test Item : Channel Number
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2021/08/06

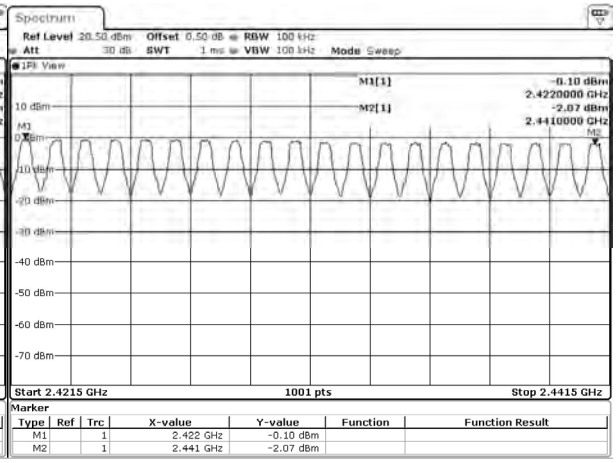
Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2421MHz



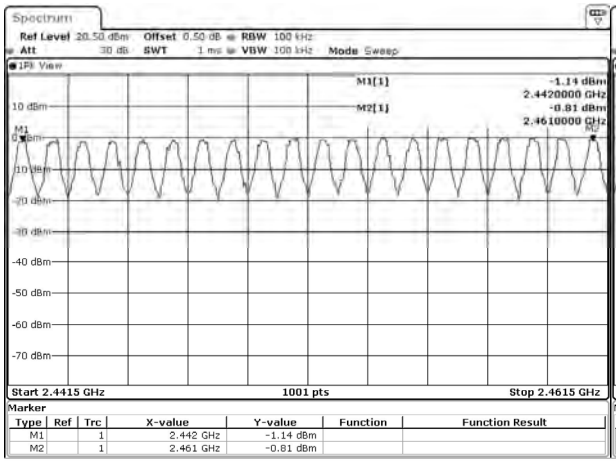
Date: 6.AUG.2021 14:49:30

2422-2441MHz



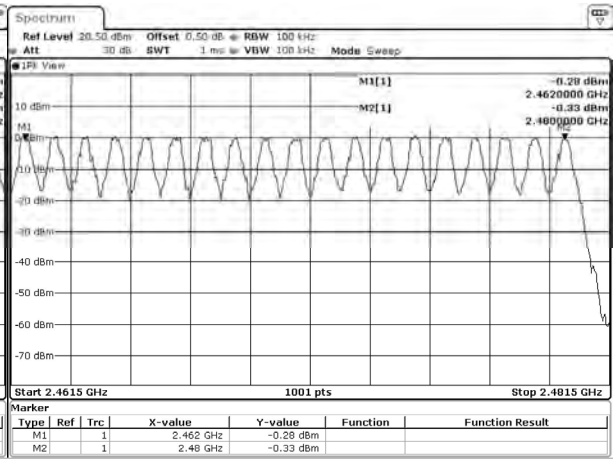
Date: 6.AUG.2021 14:51:01

2442-2461MHz



Date: 6.AUG.2021 14:51:40

2462-2480MHz

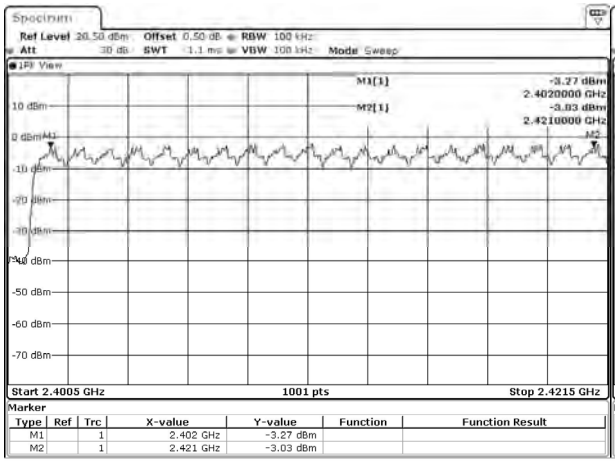


Date: 6.AUG.2021 14:52:13

Product : DIGITAL CAMERA
Test Item : Channel Number
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2021/08/06

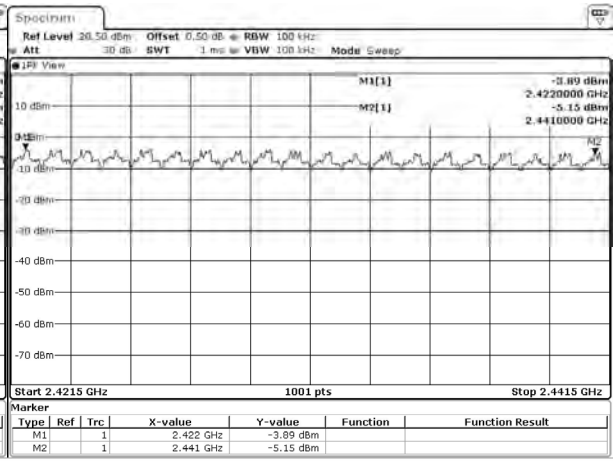
Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2421MHz



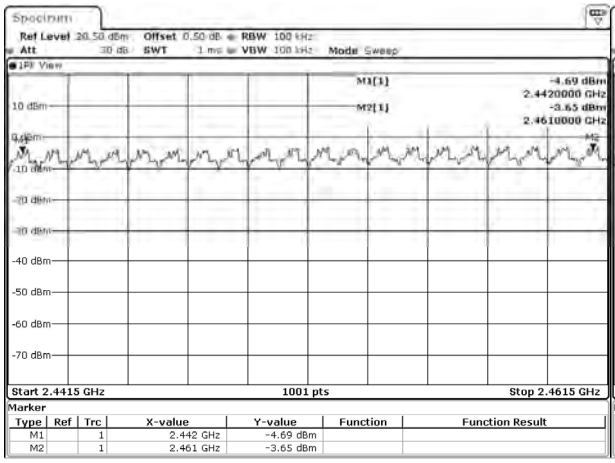
Date: 6.AUG.2021 15:42:10

2422-2441MHz



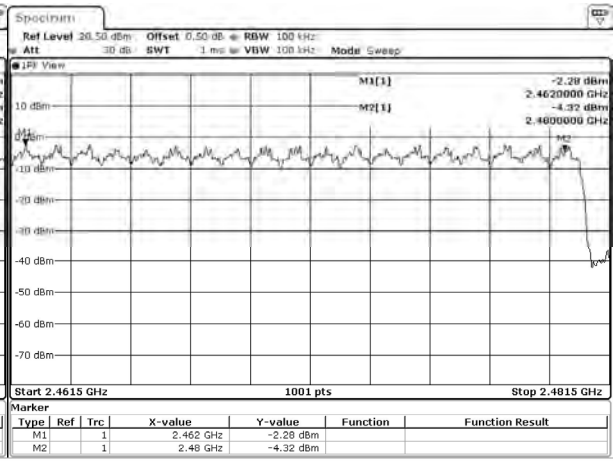
Date: 6.AUG.2021 15:48:20

2442-2461MHz



Date: 6.AUG.2021 15:56:11

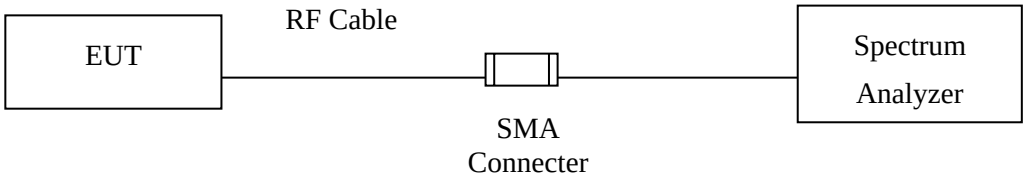
2462-2480MHz



Date: 6.AUG.2021 15:59:14

8. Channel Separation

8.1. Test Setup



8.2. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

8.3. Test Procedure

Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

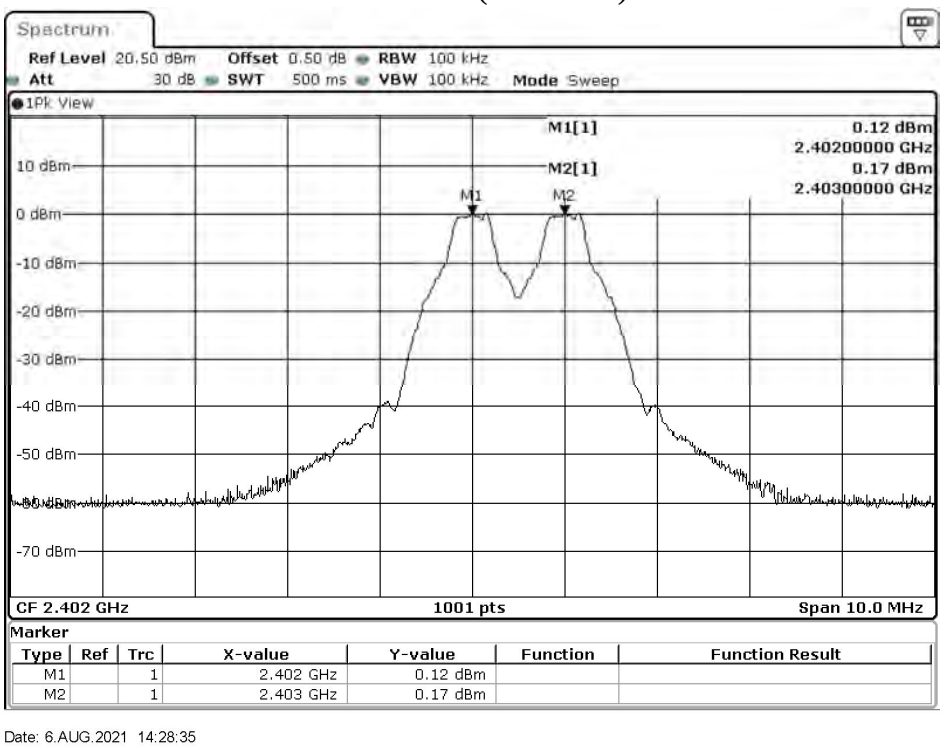
8.4. Test Result of Channel Separation

Product : DIGITAL CAMERA
Test Item : Channel Separation
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2021/08/06

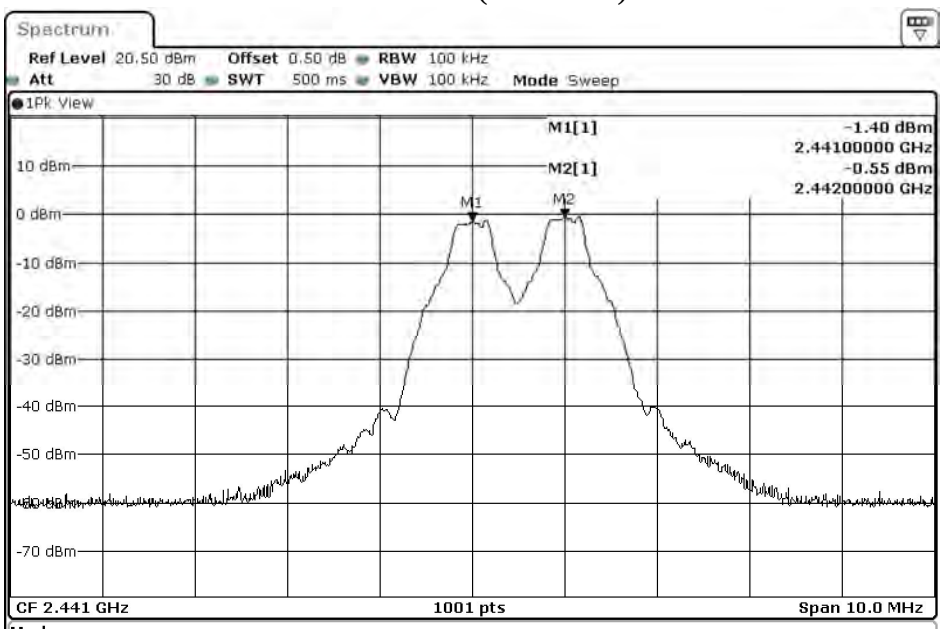
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	628.0	Pass
39	2441	1000	>25 kHz	628.0	Pass
78	2480	1000	>25 kHz	630.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

Channel 00 (2402MHz)



Channel 39 (2441MHz)

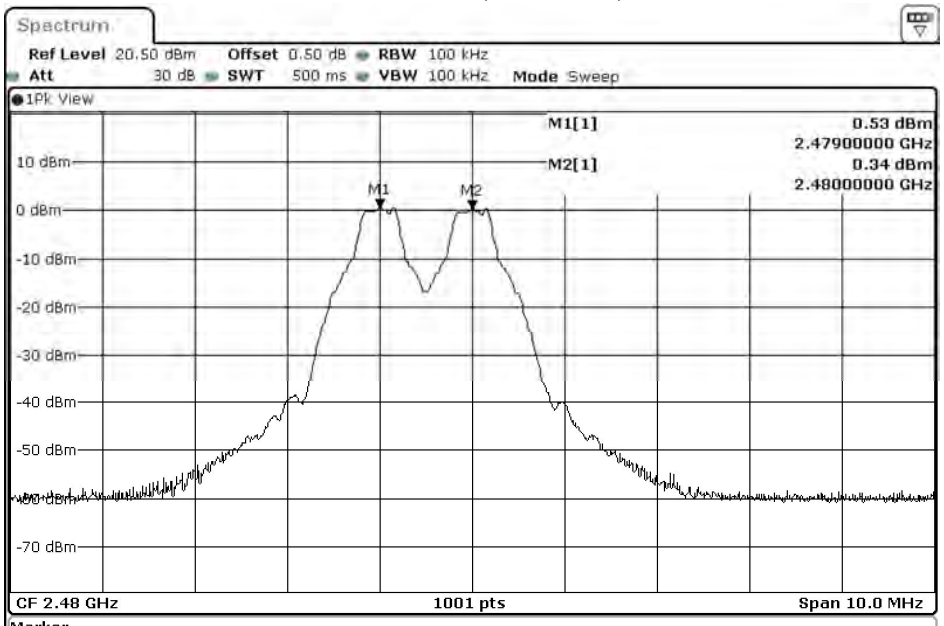


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.441 GHz	-1.40 dBm		
M2		1	2.442 GHz	-0.55 dBm		

Date: 6.AUG.2021 14:39:35

Channel 78 (2480MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479 GHz	0.53 dBm		
M2		1	2.48 GHz	0.34 dBm		

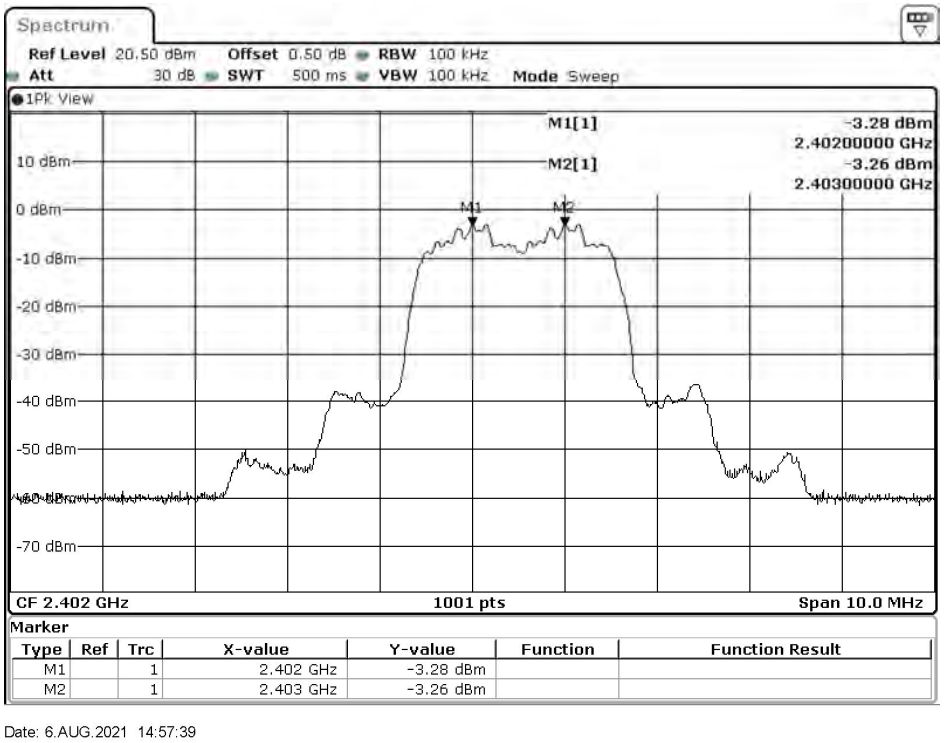
Date: 6.AUG.2021 14:44:30

Product : DIGITAL CAMERA
Test Item : Channel Separation
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2021/08/06

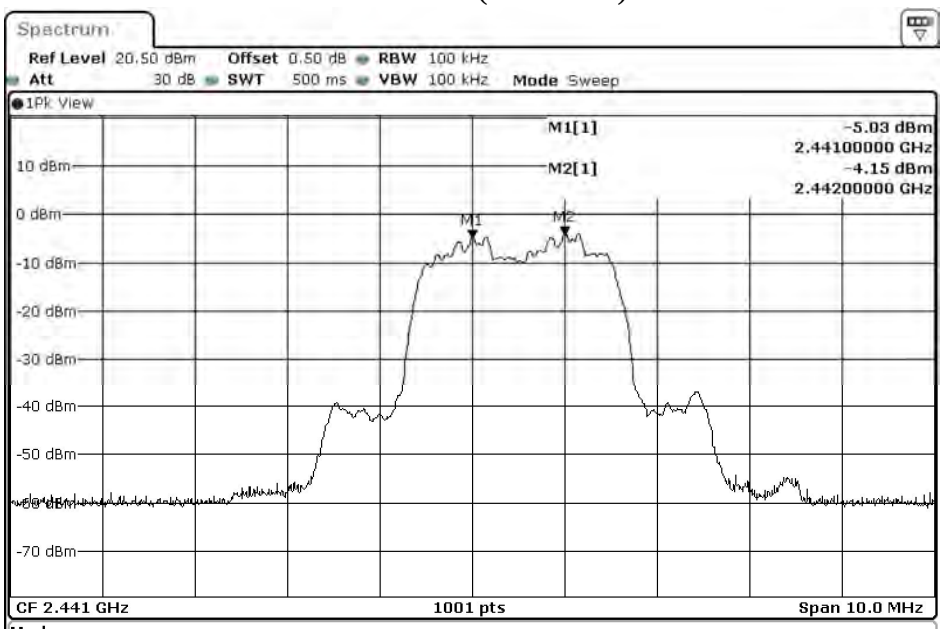
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	856.0	Pass
39	2441	1000	>25 kHz	856.0	Pass
78	2480	1000	>25 kHz	858.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

Channel 00 (2402MHz)



Channel 39 (2441MHz)

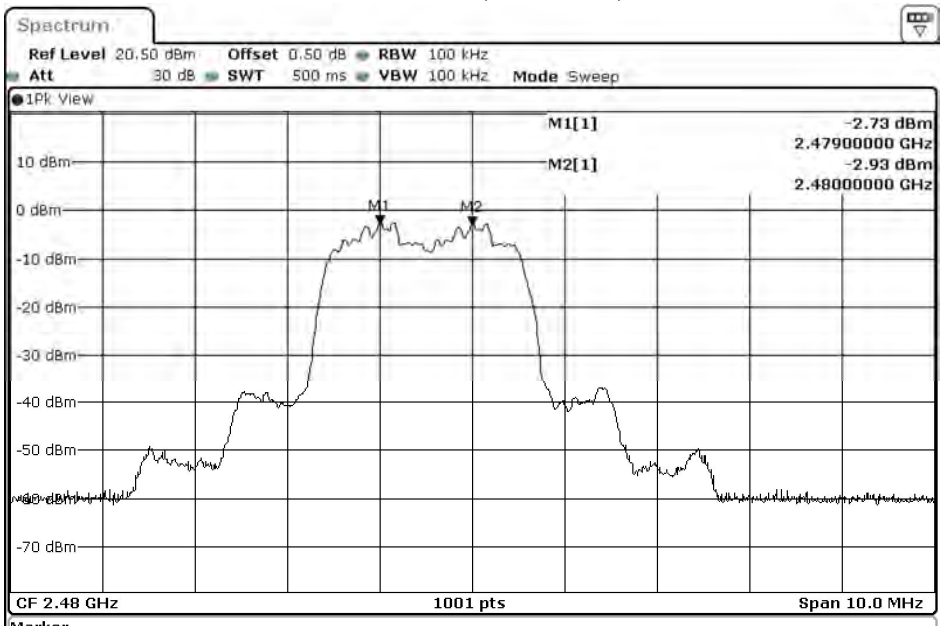


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.441 GHz	-5.03 dBm		
M2		1	2.442 GHz	-4.15 dBm		

Date: 6.AUG.2021 15:16:58

Channel 78 (2480MHz)



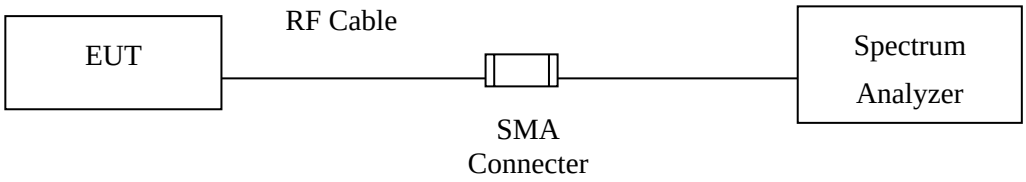
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479 GHz	-2.73 dBm		
M2		1	2.48 GHz	-2.93 dBm		

Date: 6.AUG.2021 15:27:46

9. Dwell Time

9.1. Test Setup



9.2. Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

9.3. Test Procedure

Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

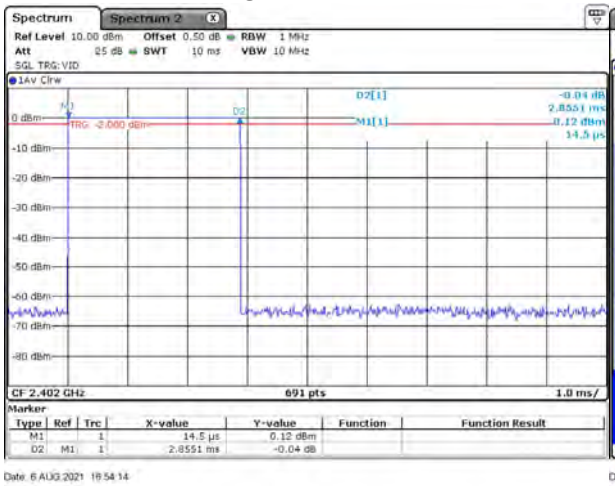
9.4. Test Result of Dwell Time

Product : DIGITAL CAMERA
Test Item : Dwell Time
Test Mode : Mode 1: Transmit - 1Mbps (Channel 00,39,78)
Test Date : 2021/08/06

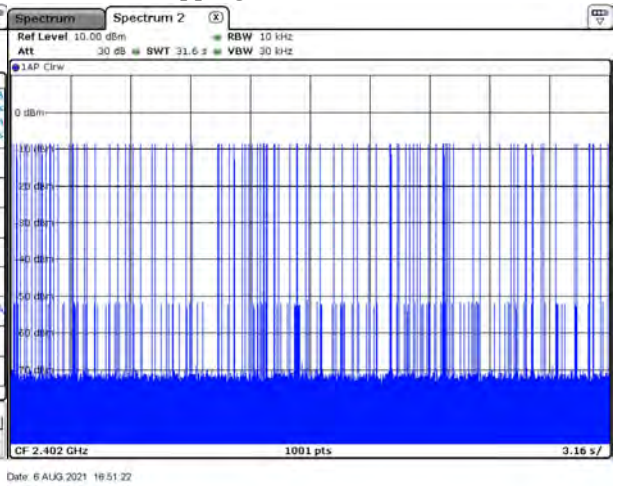
Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.855	99	31600	282.655	400	Pass
2441	2.869	94	31600	269.686	400	Pass
2480	2.869	104	31600	298.376	400	Pass

Dwell time = Time slot length (ms)*Hopping of Number

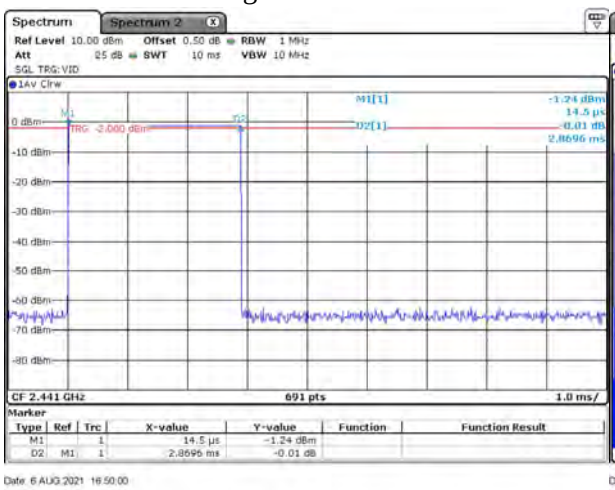
CH 00 Time slot length



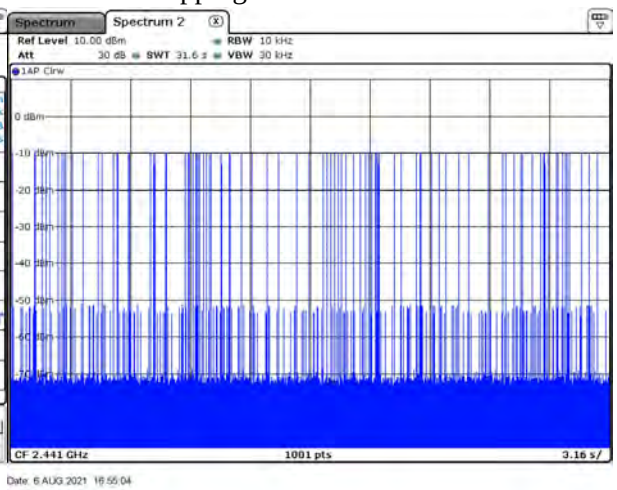
CH 00 Hopping of Number



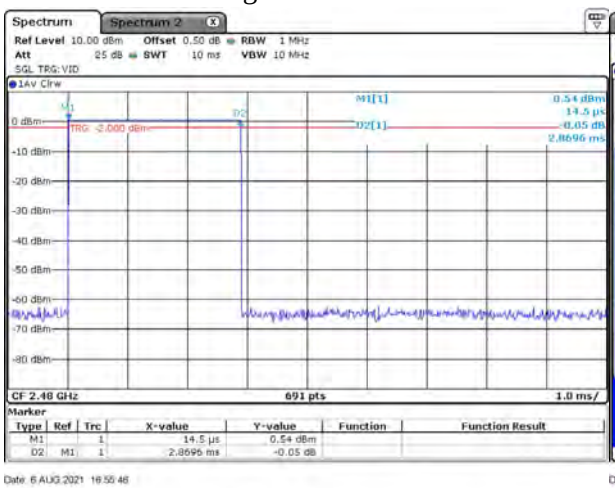
CH 39 Time slot length



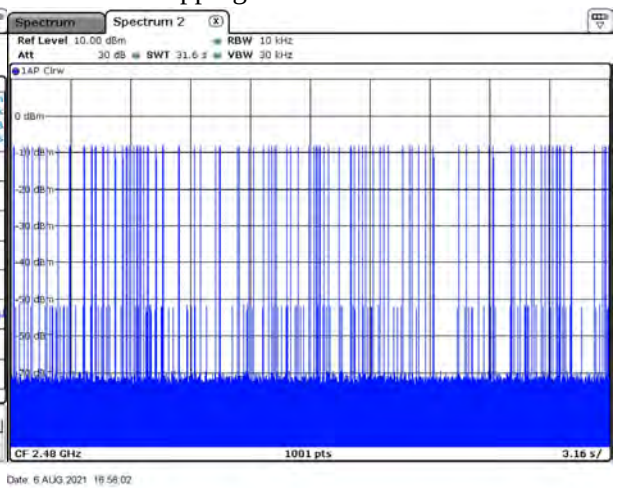
CH 39 Hopping of Number



CH 78 Time slot length



CH 78 Hopping of Number



Note:

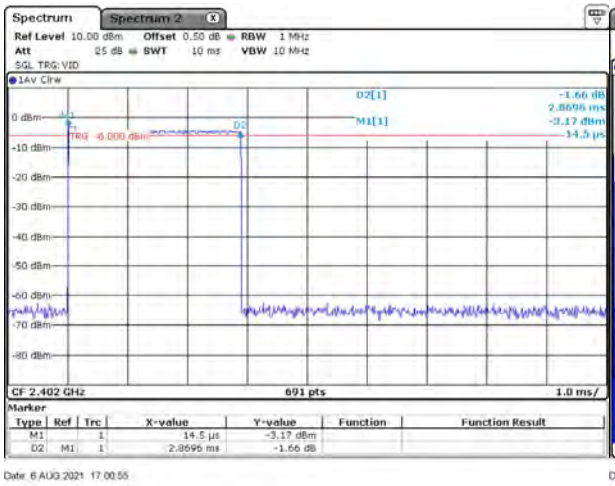
The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

Product : DIGITAL CAMERA
Test Item : Dwell Time
Test Mode : Mode 2: Transmit - 3Mbps (Channel 00,39,78)
Test Date : 2021/08/06

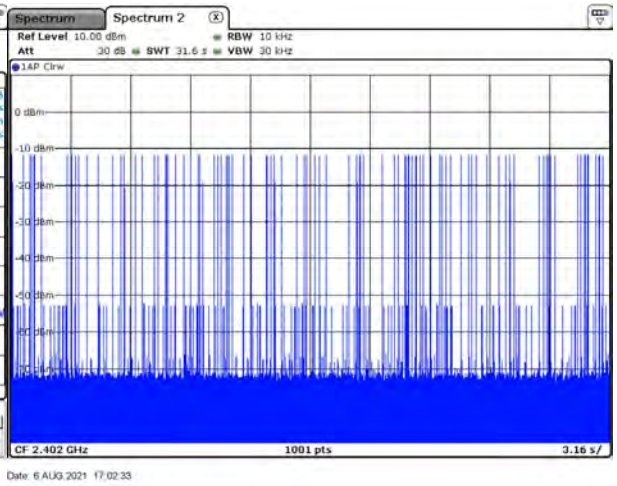
Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.869	96	31600	275.424	400	Pass
2441	2.869	101	31600	289.769	400	Pass
2480	2.869	97	31600	278.293	400	Pass

Dwell time = Time slot length (ms)*Hopping of Number

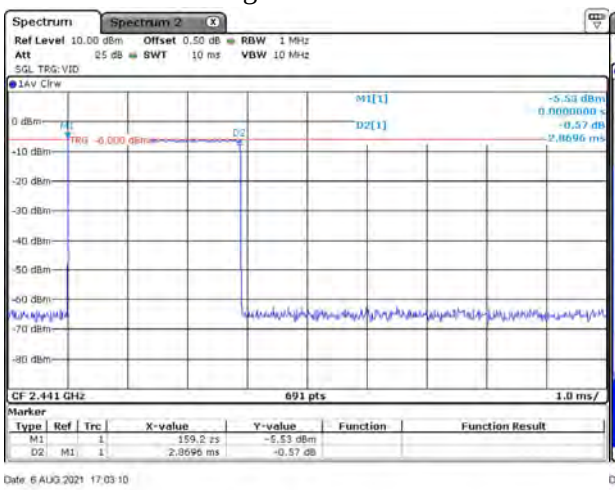
CH 00 Time slot length



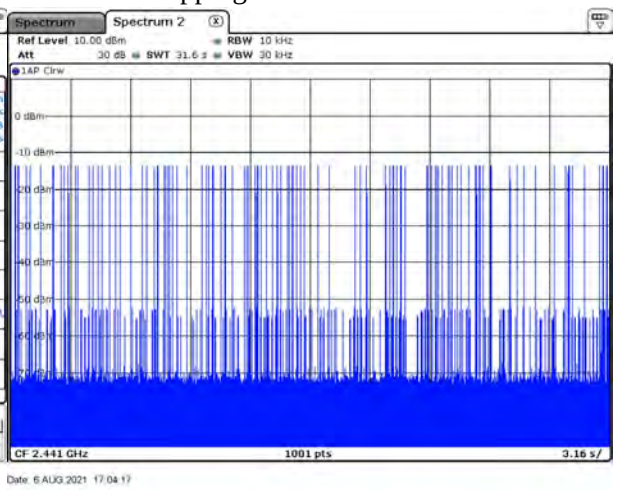
CH 00 Hopping of Number



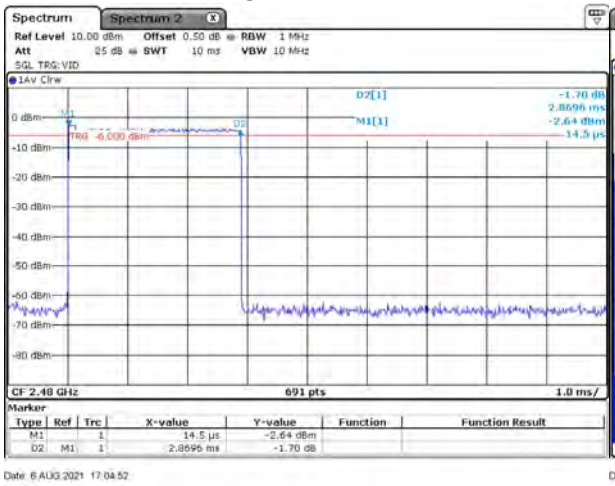
CH 39 Time slot length



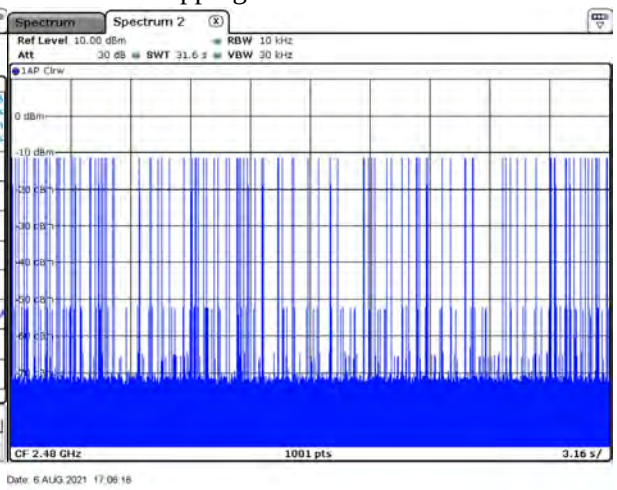
CH 39 Hopping of Number



CH 78 Time slot length



CH 78 Hopping of Number

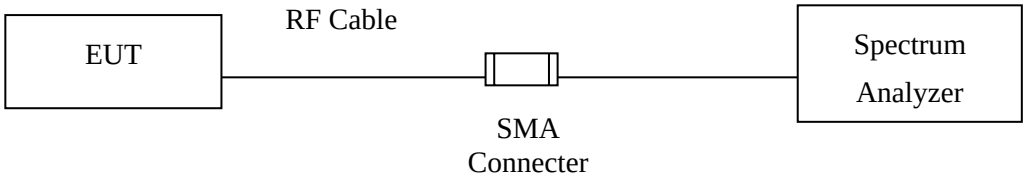


Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

10. Occupied Bandwidth

10.1. Test Setup



10.2. Limits

N/A

10.3. Test Procedure

Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

10.4. Test Result of Occupied Bandwidth

Product : DIGITAL CAMERA
Test Item : Occupied Bandwidth Data
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2021/08/06

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	942	--	NA
39	2441	942	--	NA
78	2480	945	--	NA

Figure Channel 00:

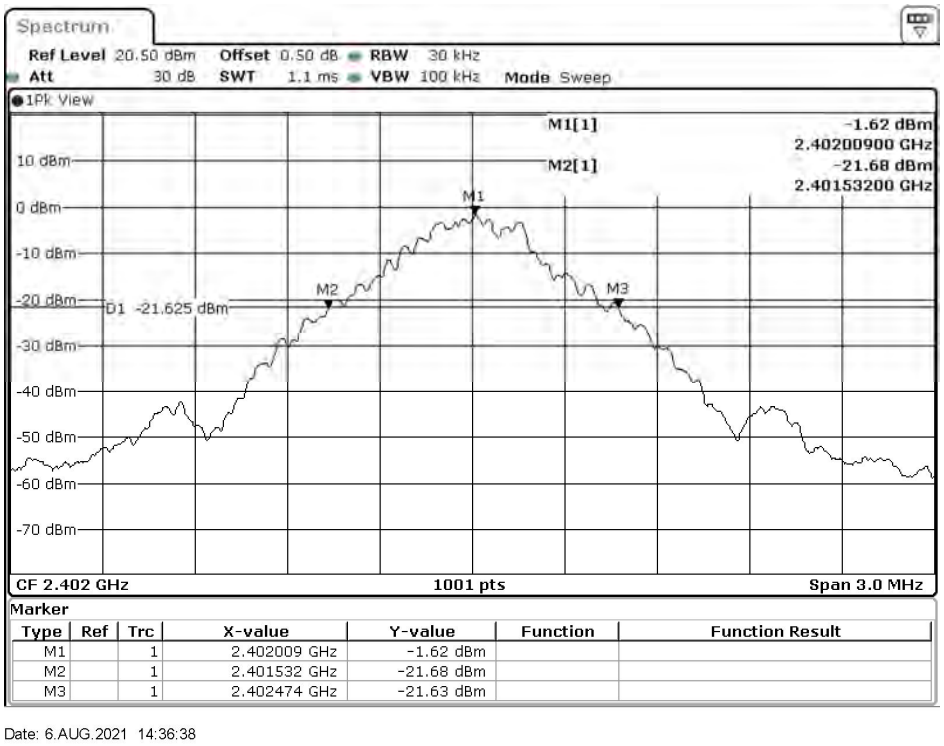
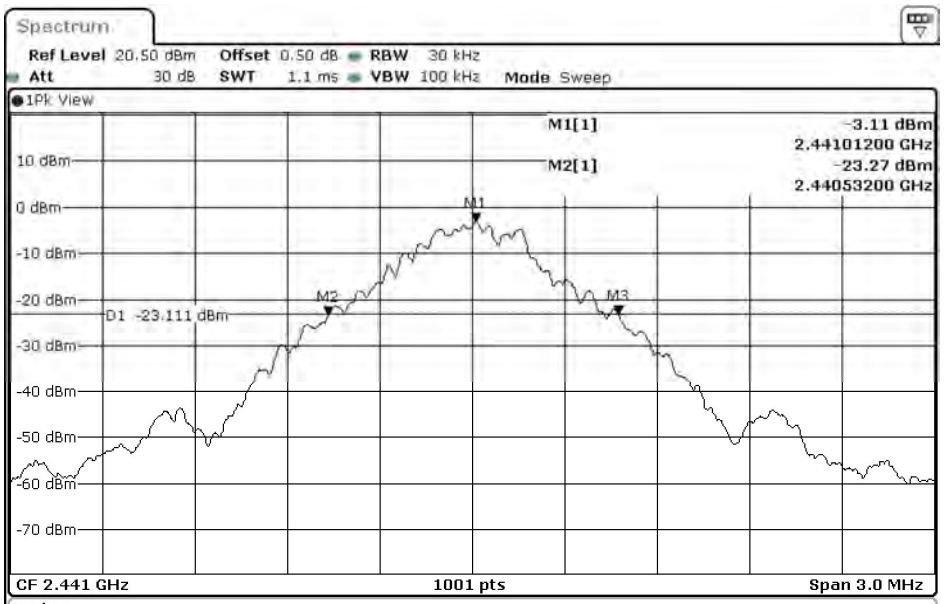


Figure Channel 39:

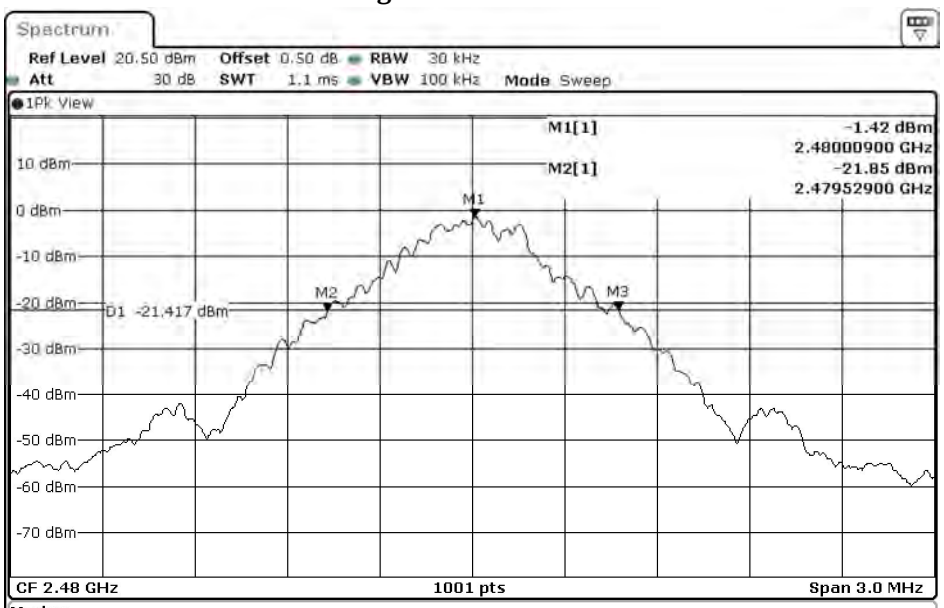


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.441012 GHz	-3.11 dBm		
M2		1	2.440532 GHz	-23.27 dBm		
M3		1	2.441474 GHz	-23.13 dBm		

Date: 6.AUG.2021 14:40:44

Figure Channel 78:



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.480009 GHz	-1.42 dBm		
M2		1	2.479529 GHz	-21.85 dBm		
M3		1	2.480474 GHz	-21.58 dBm		

Date: 6.AUG.2021 14:53:26

Product : DIGITAL CAMERA
Test Item : Occupied Bandwidth Data
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2021/08/06

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1284	--	NA
39	2441	1284	--	NA
78	2480	1287	--	NA

Figure Channel 00:

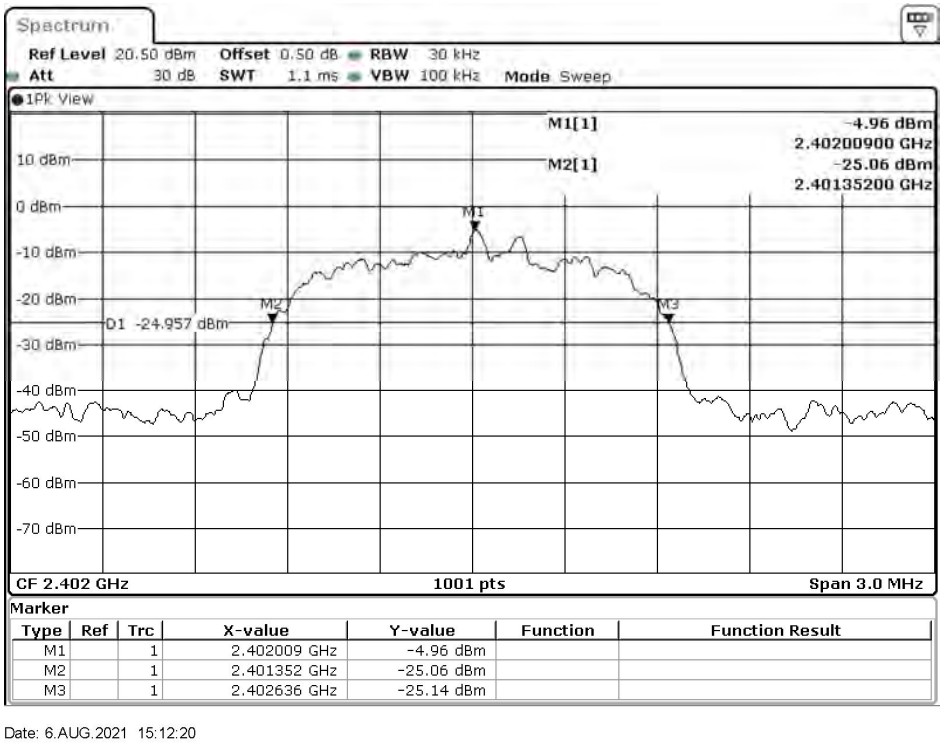
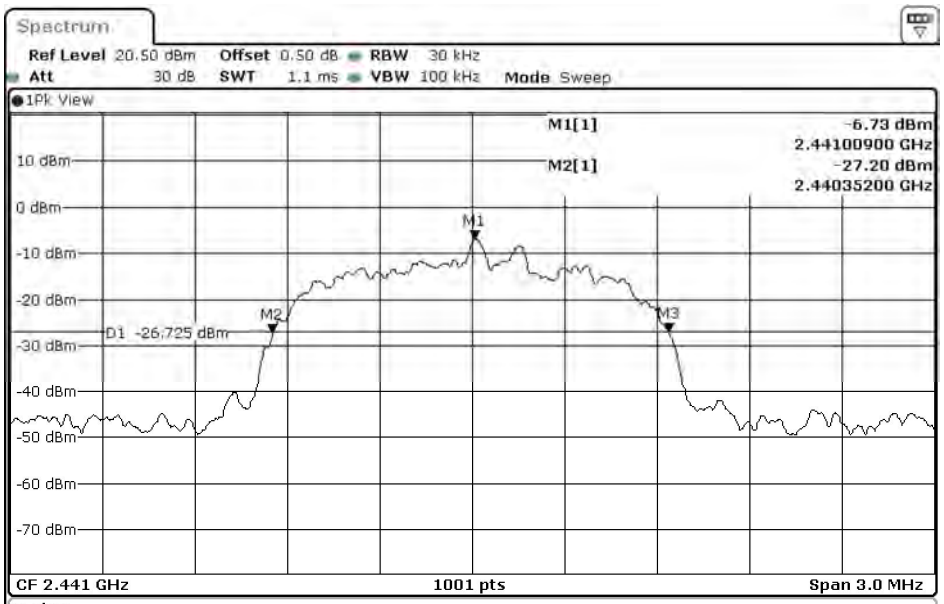


Figure Channel 39:

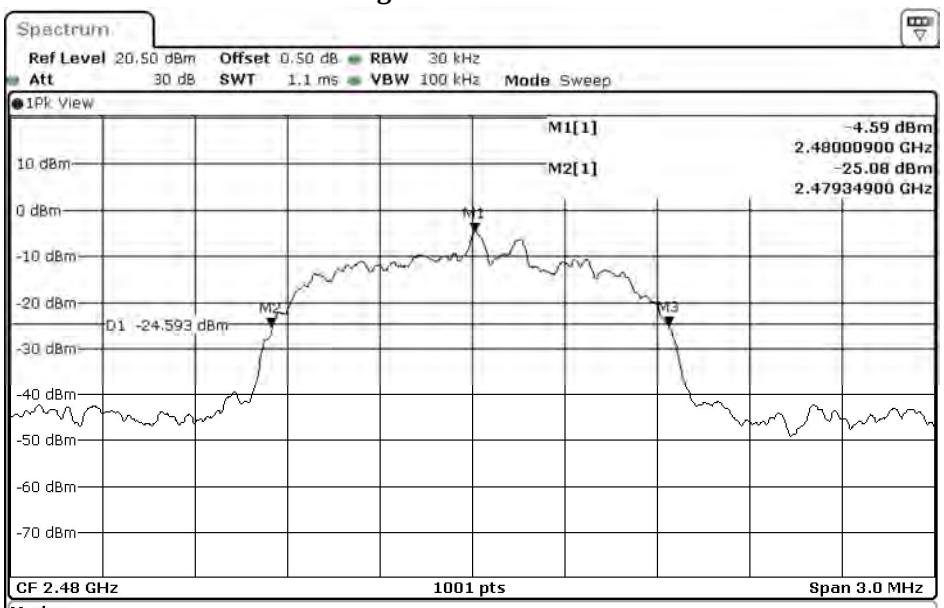


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.441009 GHz	-6.73 dBm		
M2		1	2.440352 GHz	-27.20 dBm		
M3		1	2.441636 GHz	-26.79 dBm		

Date: 6.AUG.2021 15:21:34

Figure Channel 78:



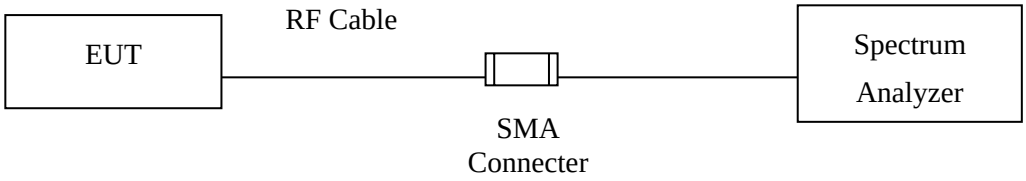
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.480009 GHz	-4.59 dBm		
M2		1	2.479349 GHz	-25.08 dBm		
M3		1	2.480636 GHz	-24.82 dBm		

Date: 6.AUG.2021 16:00:23

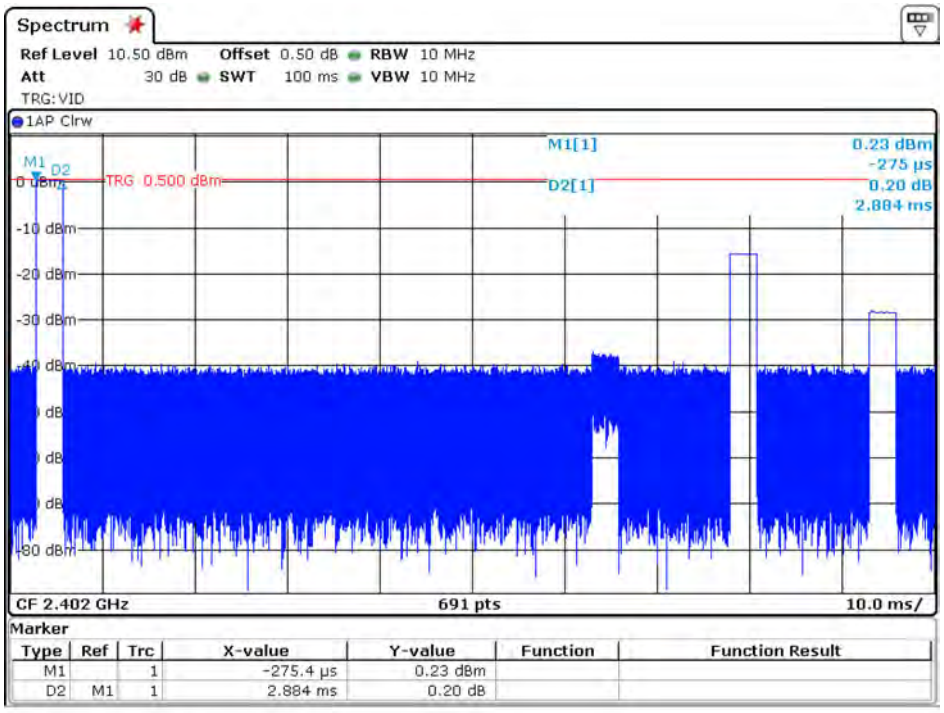
11. Duty Cycle

11.1. Test Setup



11.2. Test Result of Duty Cycle

Product : DIGITAL CAMERA
Test Item : Duty Cycle Data
Test Mode : Mode 1: Transmit - 1Mbps



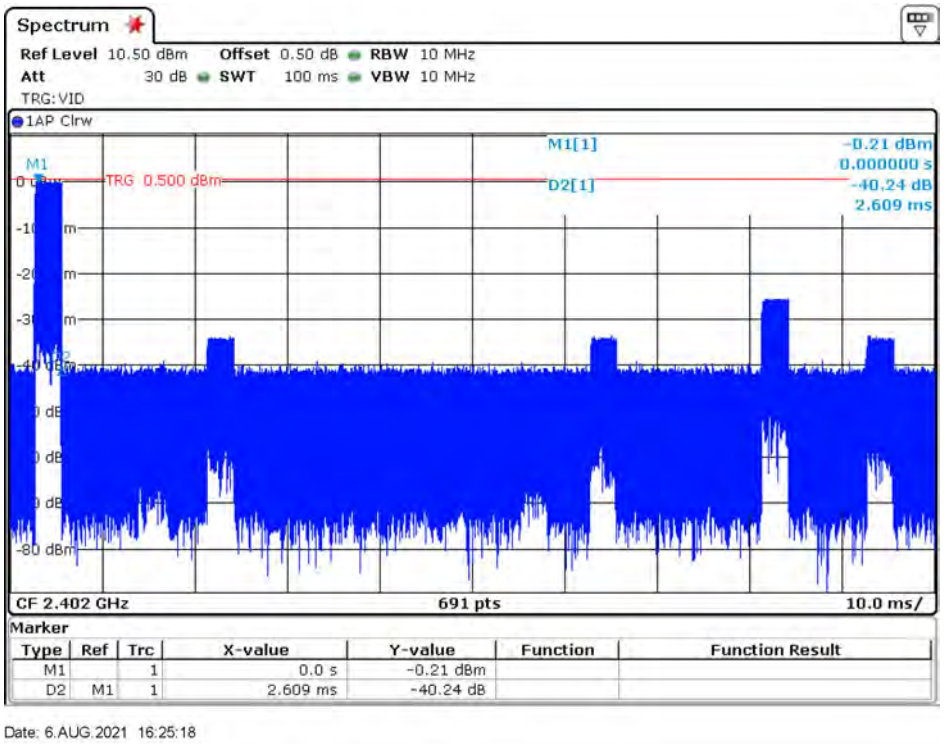
Time on of 100ms= 2.884ms

Duty Cycle= 2.884ms / 100ms= 0.02884

Duty Cycle correction factor= 20 LOG 0.02884= -30.800 dB

Duty Cycle correction factor	**-30.800**	**dB**

Product : DIGITAL CAMERA
Test Item : Duty Cycle Data
Test Mode : Mode 2: Transmit - 3Mbps



Time on of 100ms= 2.609ms

Duty Cycle= 2.609ms / 100ms= 0.0609

Duty Cycle correction factor= 20 LOG 0.0609= -31.671 dB

Duty Cycle correction factor	**-31.671**	**dB**

12. EMI Reduction Method During Compliance Testing

No modification was made during testing.