

# FCC Test Report

Product Name	Digital Camera
Model No.	N1721
FCC ID.	CGJ1155EB

Applicant	NIKON CORPORATION
Address	Shinagawa Intercity Tower C, 2-15-3, Konan Minato-ku, Tokyo 108-6290 Japan

Date of Receipt	Mar. 28, 2018
Issued Date	Apr. 23, 2018
Report No.	1830420R-RFUSP04V00-C
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: Apr. 23, 2018

Report No.: 1830420R-RFUSP04V00-C



Product Name	Digital Camera
Applicant	NIKON CORPORATION
Address	Shinagawa Intercity Tower C, 2-15-3, Konan Minato-ku, Tokyo 108-6290 Japan
Manufacturer	NIKON CORPORATION
Model No.	N1721
FCC ID.	CGJ1155EB
EUT Rated Voltage	DC3.7V by Battery
EUT Test Voltage	AC 120 V / 60 Hz(Adapter) or DC3.7V by Battery
Trade Name	Nikon
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v04
Test Result	Complied

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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Digital Camera
Trade Name	Nikon
Model No.	N1721
FCC ID.	CGJ1155EB
Frequency Range	2402 – 2480MHz
Channel Number	V4.1: 40CH
Type of Modulation	V4.1: GFSK(1Mbps)
Antenna Type	Chip Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
USB Cable	Shielded, 0.8m, with one ferrite core bonded.
Power Adapter	MFR: MITSUMI, M/N: EH-73P Input: AC 100-240V~50/60Hz 0.14A-0.08A Output: DC 5V $\overline{=}$ 1.5A

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	YAGEO	ANT3216LL11R2400A	Chip Antenna	-1.44dBi for 2.4 GHz

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

## Center Frequency of Each Channel: (For V4.1)

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 Digital Camera with a built-in WLAN 、Bluetooth V3.0, V2.1+EDR,V4.1 transceiver, this report for Bluetooth V4.1.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit - BLE (GFSK) Mode 2: Charger Mode
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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:

#### TX Mode

Product	Manufacturer	Model No.	Serial No.	Power Cord
1   Notebook PC	DELL	Latitude E5440	HG26TZ1	Non-Shielded, 0.8m
2   SD Card 2GB	Transcend	TS2GSDC	205380-8144	N/A
3   LED Monitor	ViewSonic	VX2257-mhd	UFY163502150	Non-Shielded, 1.8m

#### TX Mode

Signal Cable Type	Signal cable Description
A   USB Cable	Non-shielded, 0.8m, with one ferrite core bonded.
B   Signal Cable	Non-shielded, 1.0m

#### Charger Mode

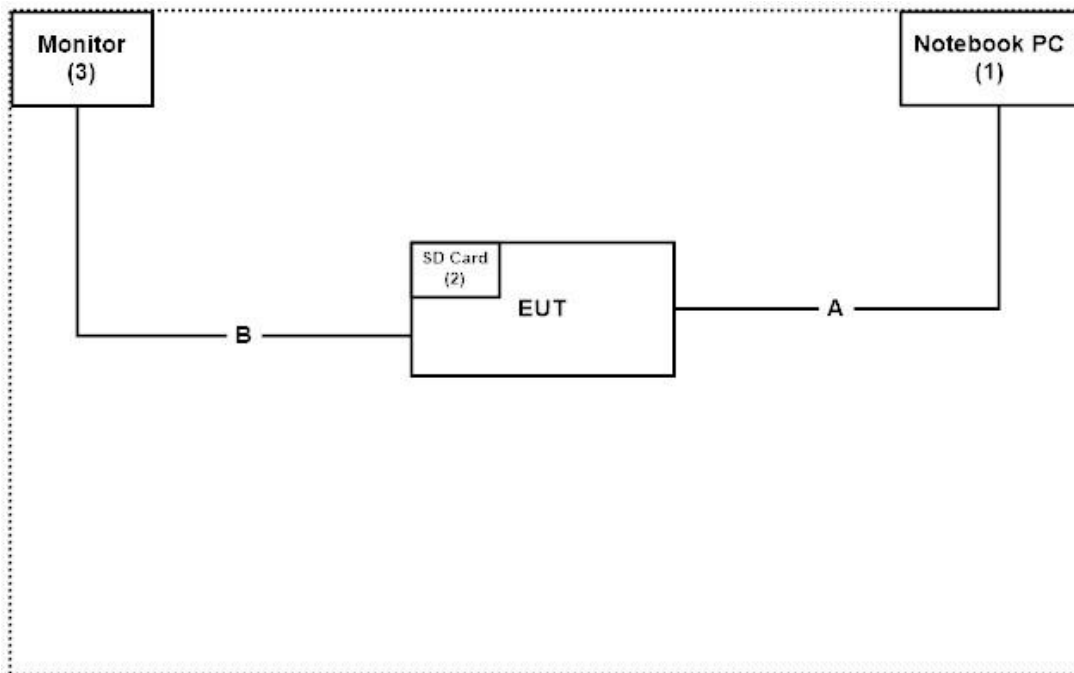
Product	Manufacturer	Model No.	Serial No.	Power Cord
1   LED Monitor	ViewSonic	VX2257-mhd	UFY163502150	Non-Shielded, 1.8m
2   SD Card 2GB	Transcend	TS2GSDC	205380-8144	N/A

#### Charger Mode

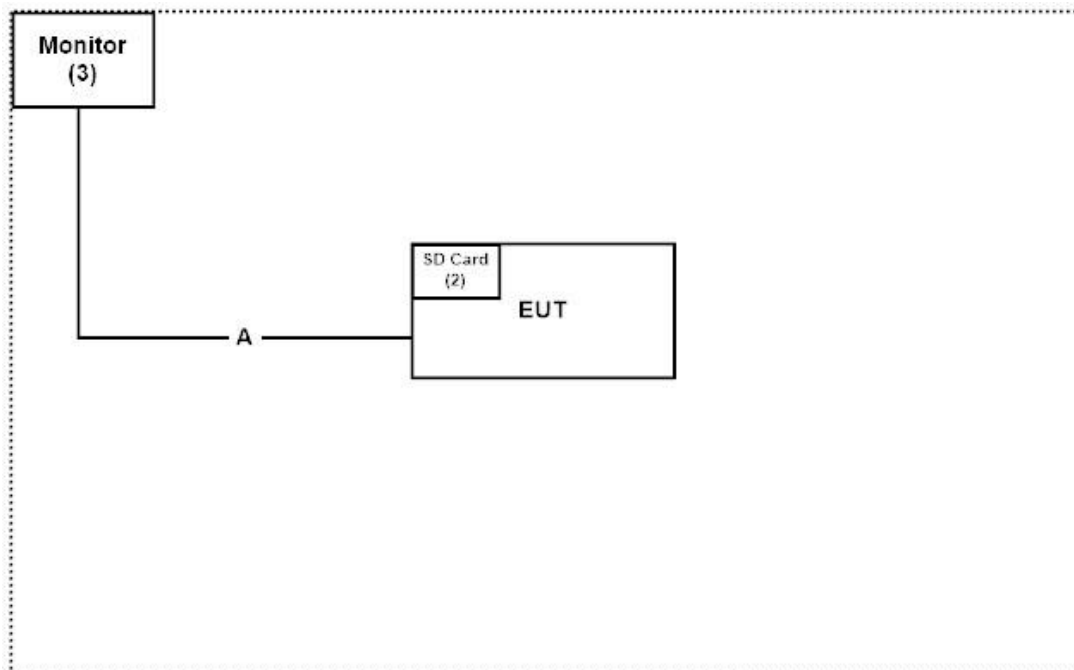
Signal Cable Type	Signal cable Description
A   HDMI Cable	Non-shielded, 1.0m

### 1.4. Configuration of Tested System

#### TX Mode



#### Charger Mode



## **1.5. EUT Exercise Software**

1. Setup the EUT as shown in Section 1.4.
2. Execute software "Sample Project 01.05.20060915" 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.



## 1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
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>

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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	2018/2/12	2019/2/11
X	Spectrum Analyzer	Agilent	N9010A	MY48030495	2017/10/13	2018/10/12
X	Power Meter	Anritsu	ML2495A	6K00003357	2017/8/7	2018/8/6
X	Pulse power sensor	Anritsu	MA2411B	0846193	2017/8/7	2018/8/6
X	EMI Test Receiver	R&S	ESCS 30	100369	2017/11/7	2018/11/6
X	LISN	R&S	ESH3-Z5	836679/017	2018/2/9	2019/2/8
X	LISN	R&S	ENV216	100097	2018/2/9	2019/2/8
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2017/6/22	2018/6/21

### For Radiated measurements /Site3/CB8

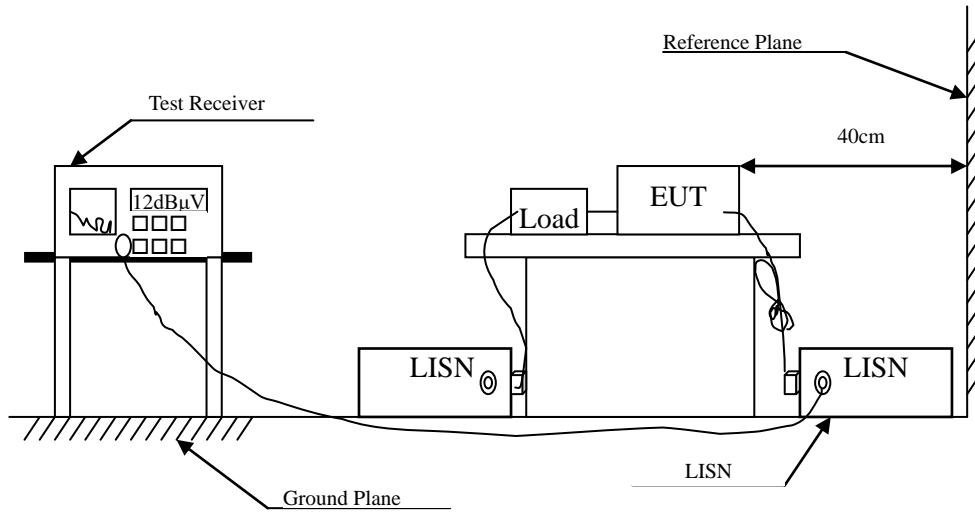
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2018/3/12	2019/3/11
X	Loop Antenna	Teseq	HLA6121	37133	2017/10/13	2018/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2017/06/25	2018/06/24
X	Coaxial Cable	DEKRA	RG 214	LC003-RG	2017/06/15	2018/06/14
X	Pre-Amplifier	Jet-Power	JPA-10M1G33	170101000330	2017/07/19	2018/07/18
X	Coaxial Cable	QuieTek	SF-106	LC035/37/41-	2017/6/21	2018/6/20
X	Horn Antenna	ETS-Lindgren	3117	00135205	2017/04/28	2018/04/27
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2017/02/24	2018/02/23
	Amplifier + Cable	EMCI	EMC184045SE	980370	2018/03/21	2019/03/20
	Horn Antenna	Com-Power	AH-840	101043	2018/01/09	2019/01/08
X	Filter	MicroTRON	BRM50701	019	2017/11/21	2018/11/20
	Filter	Microwave Circuits	N0257881	36681	2018/1/22	2019/1/21

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 : QuieTek EMI 2.0 V2.1.113

## 2. Conducted Emission

### 2.1. Test Setup



## 2.2. Limits

<b>FCC Part 15 Subpart C Paragraph 15.207 (dB<math>\mu</math>V) Limit</b>		
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 investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

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

## 2.4. Uncertainty

$\pm 2.26$  dB

## 2.5. Test Result of Conducted Emission

Product : Digital Camera  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Date : 2018/04/10  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.170	9.676	38.160	47.837	-17.592	65.429
0.502	9.691	29.820	39.511	-16.489	56.000
0.560	9.695	28.760	38.455	-17.545	56.000
4.252	9.876	21.880	31.756	-24.244	56.000
9.259	9.974	24.000	33.974	-26.026	60.000
27.017	10.126	17.680	27.806	-32.194	60.000
<b>Average</b>					
0.170	9.676	30.080	39.757	-15.672	55.429
0.502	9.691	13.750	23.441	-22.559	46.000
0.560	9.695	17.250	26.945	-19.055	46.000
4.252	9.876	9.910	19.786	-26.214	46.000
9.259	9.974	19.470	29.444	-20.556	50.000
27.017	10.126	10.730	20.856	-29.144	50.000

### Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Digital Camera  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Date : 2018/04/10  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.173	9.670	35.420	45.090	-20.253	65.343
0.341	9.671	32.420	42.091	-18.452	60.543
0.463	9.679	30.160	39.839	-17.218	57.057
0.705	9.696	23.800	33.496	-22.504	56.000
3.373	9.846	21.820	31.666	-24.334	56.000
9.259	9.994	19.300	29.294	-30.706	60.000
<b>Average</b>					
0.173	9.670	31.950	41.620	-13.723	55.343
0.341	9.671	19.630	29.301	-21.242	50.543
0.463	9.679	26.750	36.429	-10.628	47.057
0.705	9.696	10.290	19.986	-26.014	46.000
3.373	9.846	13.890	23.736	-22.264	46.000
9.259	9.994	13.310	23.304	-26.696	50.000

## Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Digital Camera  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Date : 2018/04/10  
 Test Mode : Mode 2: Charger Mode

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>Line 1</b>					
<b>Quasi-Peak</b>					
0.408	9.685	36.960	46.645	-11.984	58.629
0.509	9.692	38.600	48.292	-7.708	56.000
1.134	9.742	34.920	44.662	-11.338	56.000
1.400	9.759	37.000	46.759	-9.241	56.000
2.541	9.828	37.860	47.688	-8.312	56.000
8.494	9.967	36.060	46.027	-13.973	60.000
<b>Average</b>					
0.408	9.685	28.360	38.045	-10.584	48.629
0.509	9.692	25.340	35.032	-10.968	46.000
1.134	9.742	21.840	31.582	-14.418	46.000
1.400	9.759	33.280	43.039	-2.961	46.000
2.541	9.828	23.970	33.798	-12.202	46.000
8.494	9.967	34.110	44.077	-5.923	50.000

Note:

4. All Reading Levels are Quasi-Peak and average value.
5. “” means the worst emission level.
6. Measurement Level = Reading Level + Correct Factor

Product : Digital Camera  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Date : 2018/04/10  
 Test Mode : Mode 2: Charger Mode

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>Line 2</b>					
<b>Quasi-Peak</b>					
0.298	9.671	25.380	35.052	-26.719	61.771
0.498	9.681	36.320	46.001	-10.056	56.057
0.685	9.693	32.300	41.993	-14.007	56.000
1.744	9.780	34.640	44.420	-11.580	56.000
2.572	9.818	40.400	50.218	-5.782	56.000
8.490	9.977	40.000	49.977	-10.023	60.000
<b>Average</b>					
0.298	9.671	18.170	27.842	-23.929	51.771
0.498	9.681	31.280	40.961	-5.096	46.057
0.685	9.693	23.740	33.433	-12.567	46.000
1.744	9.780	22.660	32.440	-13.560	46.000
2.572	9.818	32.580	42.398	-3.602	46.000
8.490	9.977	33.410	43.387	-6.613	50.000

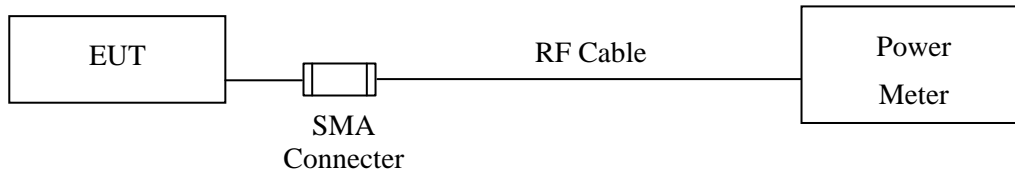
## Note:

4. All Reading Levels are Quasi-Peak and average value.
5. “” means the worst emission level.
6. Measurement Level = Reading Level + Correct Factor



### 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 DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

#### 3.4. Uncertainty

$\pm 1.19$  dB

### 3.5. Test Result of Peak Power Output

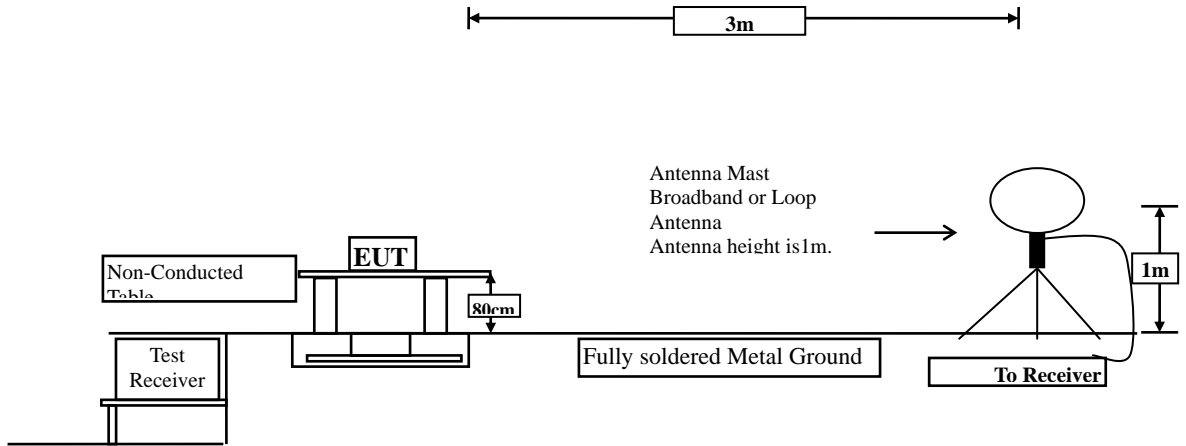
Product : Digital Camera  
Test Item : Peak Power Output  
Test Site : No.3 OATS  
Test date : 2018/03/30  
Test Mode : Mode 1: Transmit - BLE (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	4.43	1 Watt= 30 dBm	Pass
Channel 19	2440.00	4.55	1 Watt= 30 dBm	Pass
Channel 39	2480.00	4.82	1 Watt= 30 dBm	Pass

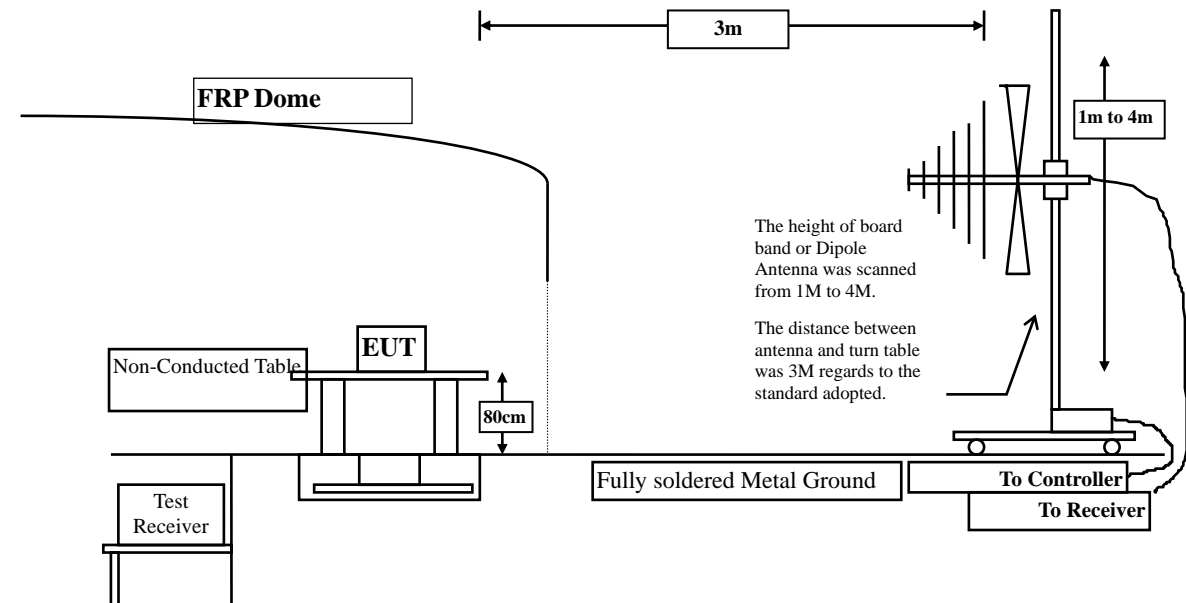
#### 4. Radiated Emission

##### 4.1. Test Setup

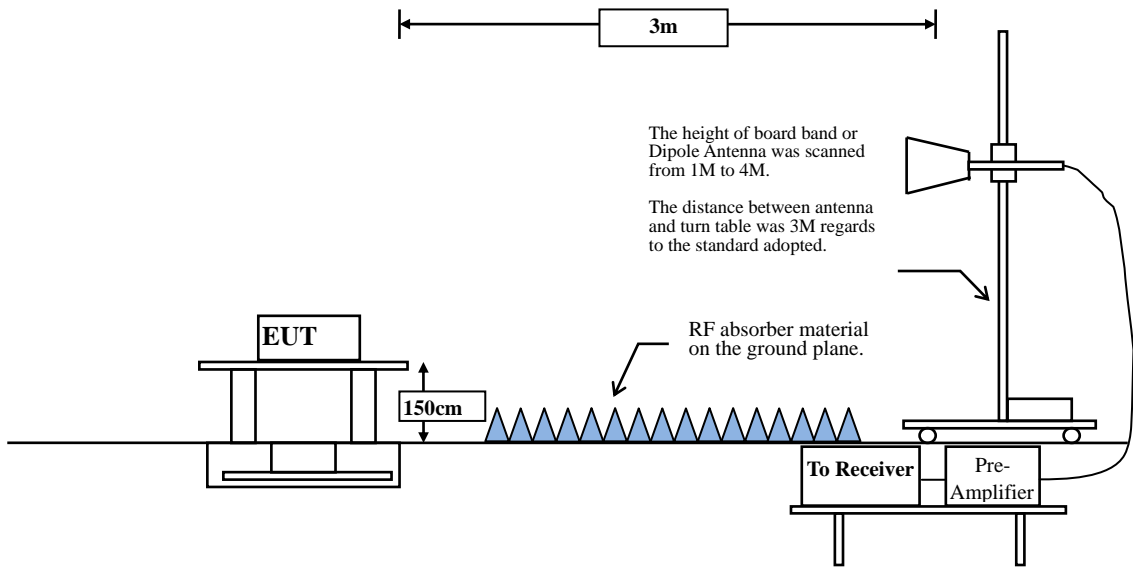
Under 30MHz



Below 1GHz



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.

<b>FCC Part 15 Subpart C Paragraph 15.209 Limits</b>		
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 (dB $\mu$ V) = 20 log RF Voltage (uV)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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

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

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

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

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

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

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

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

The 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.

### RBW and VBW Parameter setting:

According to KDB 558074 section 12.2.4. Peak power measurement procedure

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$ .

**Table 1 —RBW as a function of frequency**

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

According to KDB 558074 section 12.2.5. Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq 98\%$

$VBW \geq 1/T$ , when duty cycle  $< 98\%$

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

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE	62.50	0.4000	2500	3k

Note: Duty Cycle Refer to Section 9

## 4.4. Uncertainty

$\pm 4.08$  dB above 1GHz

$\pm 4.22$  dB below 1GHz

#### 4.5. Test Result of Radiated Emission

Product : Digital Camera  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test date : 2018/04/11  
 Test Mode : Mode 1: Transmit - BLE (GFSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	-9.896	47.870	37.974	-36.026	74.000
7206.000	-5.013	47.540	42.527	-31.473	74.000
9608.000	-1.472	44.940	43.469	-30.531	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	-6.585	49.870	43.285	-30.715	74.000
7206.000	-4.144	47.170	43.026	-30.974	74.000
9608.000	-1.472	45.057	43.586	-30.414	74.000
<b>Average Detector:</b>					
--					

Note:

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



Product : Digital Camera  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test date : 2018/04/11  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4880.000	-10.307	47.550	37.243	-36.757	74.000
7320.000	-3.857	46.510	42.653	-31.347	74.000
9760.000	-2.579	44.330	41.752	-32.248	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4880.000	-7.579	47.570	39.991	-34.009	74.000
7320.000	-2.987	46.970	43.983	-30.017	74.000
9760.000	-2.107	44.900	42.793	-31.207	74.000
<b>Average Detector:</b>					
--					

## Note:

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

Product : Digital Camera  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test date : 2018/04/11  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	-10.666	47.670	37.005	-36.995	74.000
7440.000	-3.631	45.680	42.049	-31.951	74.000
9920.000	-2.397	47.050	44.653	-29.347	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	-7.869	46.920	39.052	-34.948	74.000
7440.000	-2.772	45.410	42.638	-31.362	74.000
9920.000	-1.895	46.440	44.545	-29.455	74.000
<b>Average Detector:</b>					
--					

## Note:

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

Product : Digital Camera  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test date : 2018/04/18  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

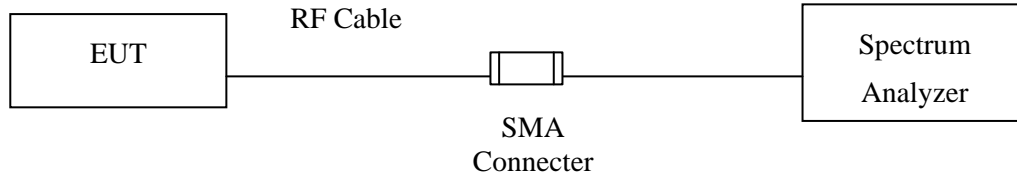
Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
45.545	-3.817	39.549	35.731	-4.269	40.000
121.715	-9.600	37.769	28.169	-15.331	43.500
432.612	1.773	34.506	36.279	-9.721	46.000
575.625	5.905	26.685	32.590	-13.410	46.000
793.253	7.677	27.769	35.445	-10.555	46.000
864.760	7.748	25.891	33.639	-12.361	46.000
<b>Vertical</b>					
47.099	-9.186	41.150	31.964	-8.036	40.000
214.984	-0.085	26.566	26.481	-17.019	43.500
504.119	1.218	29.892	31.109	-14.891	46.000
575.625	3.065	25.391	28.456	-17.544	46.000
793.253	5.805	22.989	28.794	-17.206	46.000
936.266	9.030	22.980	32.010	-13.990	46.000

## Note:

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

## 5. RF Antenna Conducted Test

### 5.1. Test Setup



### 5.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### 5.3. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

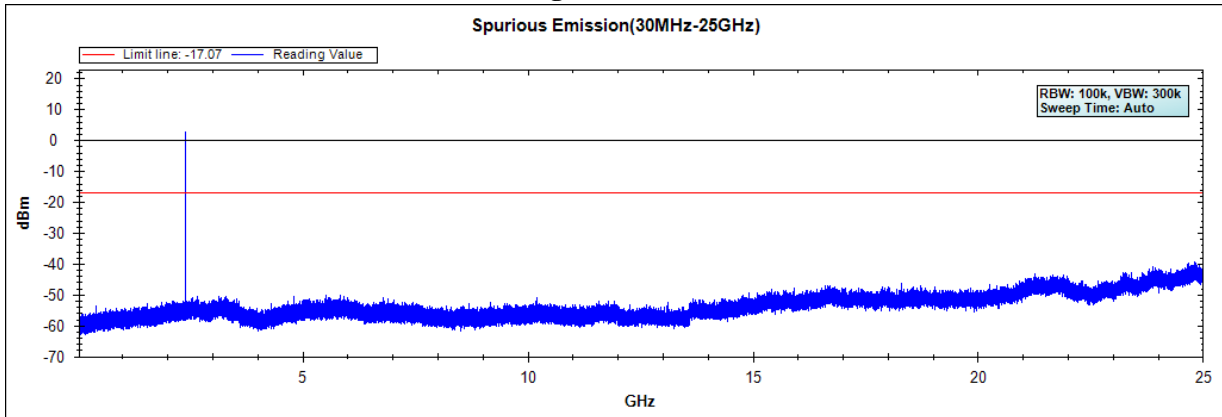
### 5.4. Uncertainty

$\pm 1.20\text{dB}$

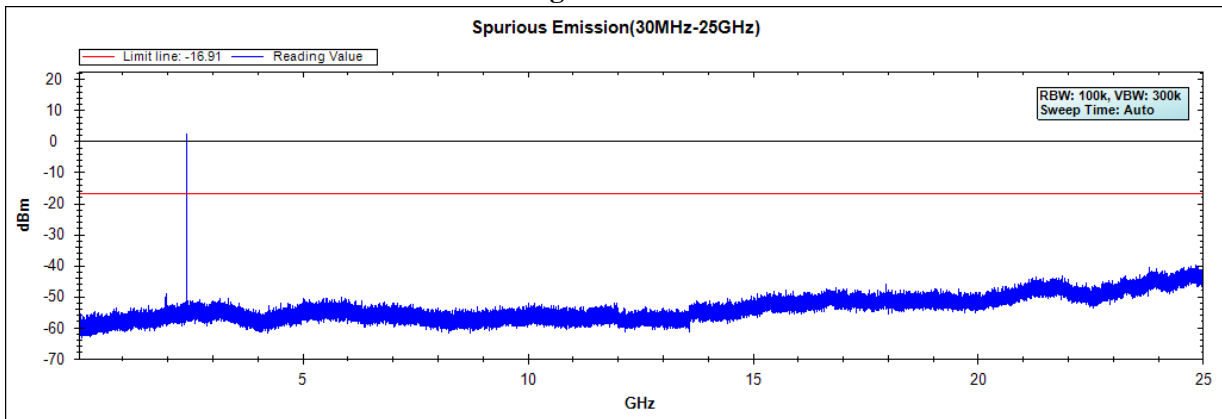
### 5.5. Test Result of RF Antenna Conducted Test

Product : Digital Camera  
Test Item : RF Antenna Conducted Test  
Test Site : No.3 OATS  
Test date : 2018/03/30  
Test Mode : Mode 1: Transmit - BLE (GFSK)

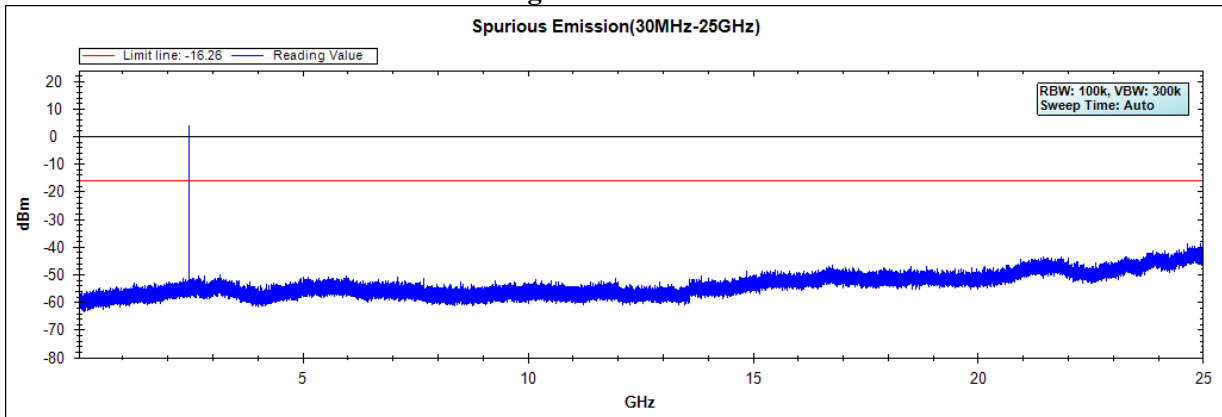
**Figure Channel 00:**



**Figure Channel 19:**



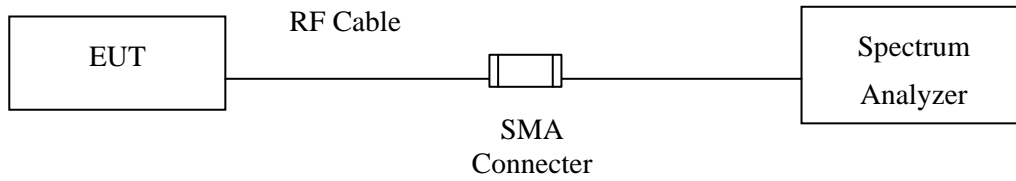
**Figure Channel 39:**



## 6. Band Edge

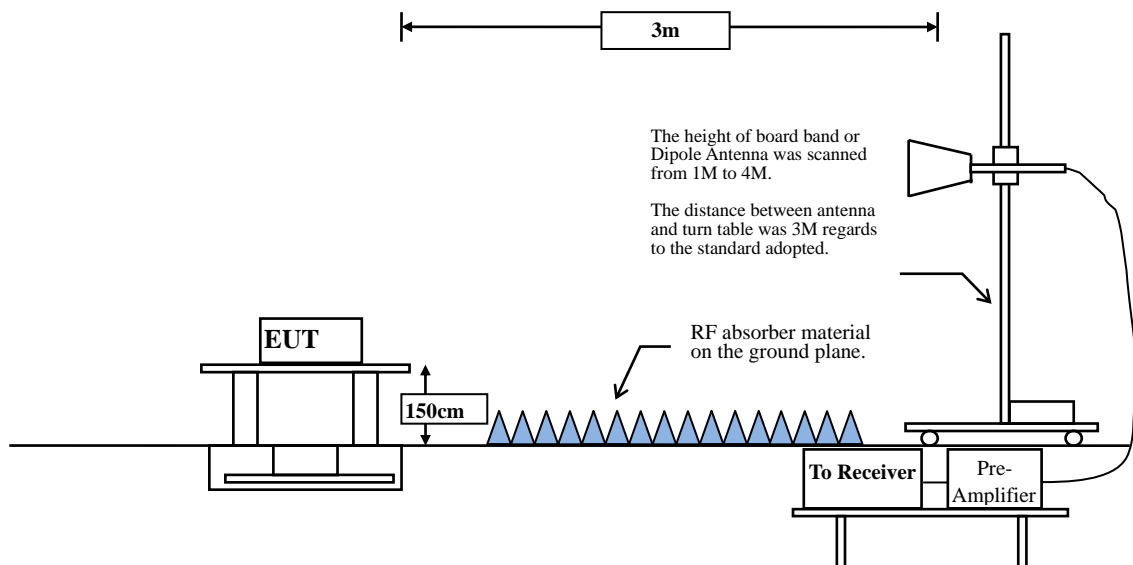
### 6.1. Test Setup

#### RF Conducted Measurement



#### RF Radiated Measurement:

Above 1GHz



## 6.2. Limit

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

## 6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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

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

**RBW and VBW Parameter setting:**

According to KDB 558074 section 12.2.4. Peak power measurement procedure

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$ .

**Table 1 —RBW as a function of frequency**

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

According to KDB 558074 section 12.2.5. Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq 98 \%$

$VBW \geq 1/T$ , when duty cycle  $< 98 \%$

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

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE	63.22	0.3986	2509	3k

Note: Duty Cycle Refer to Section 9

**6.4. Uncertainty**

$\pm 4.08$  dB above 1GHz

$\pm 4.22$  dB below 1GHz



### 6.5. Test Result of Band Edge

Product : Digital Camera  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test date : 2018/03/29  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

#### RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
00 (Peak)	2375.900	-2.750	48.866	46.117	74.00	54.00	Pass
00 (Peak)	2390.000	-2.687	46.956	44.269	74.00	54.00	Pass
00 (Peak)	2400.000	-2.660	68.281	65.621	74.00	54.00	Pass
00 (Peak)	2401.700	-2.658	97.303	94.645	--	--	--
00 (Average)	2390.000	-2.687	36.358	33.671	74.00	54.00	Pass
00 (Average)	2400.000	-2.660	52.690	50.030	74.00	54.00	Pass
00 (Average)	2402.000	-2.657	93.159	90.502	--	--	--

Figure Channel 00: Horizontal (Peak)

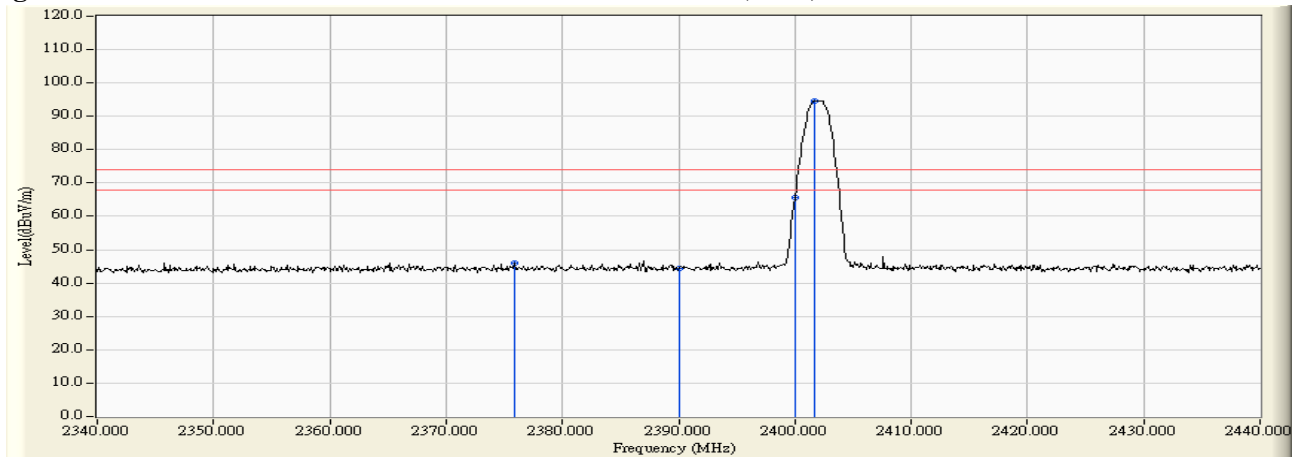
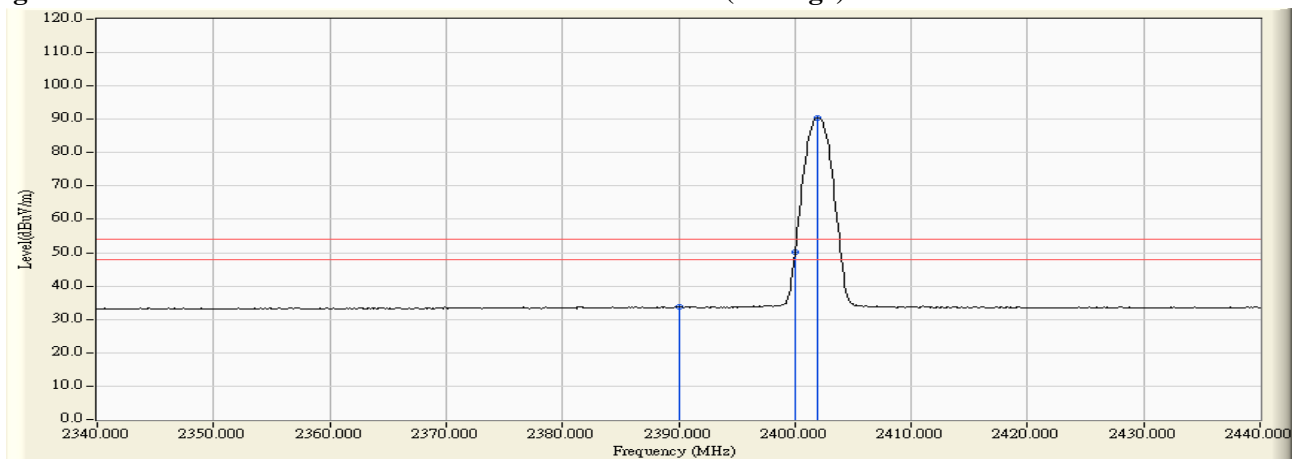


Figure Channel 00: Horizontal (Average)



Note:

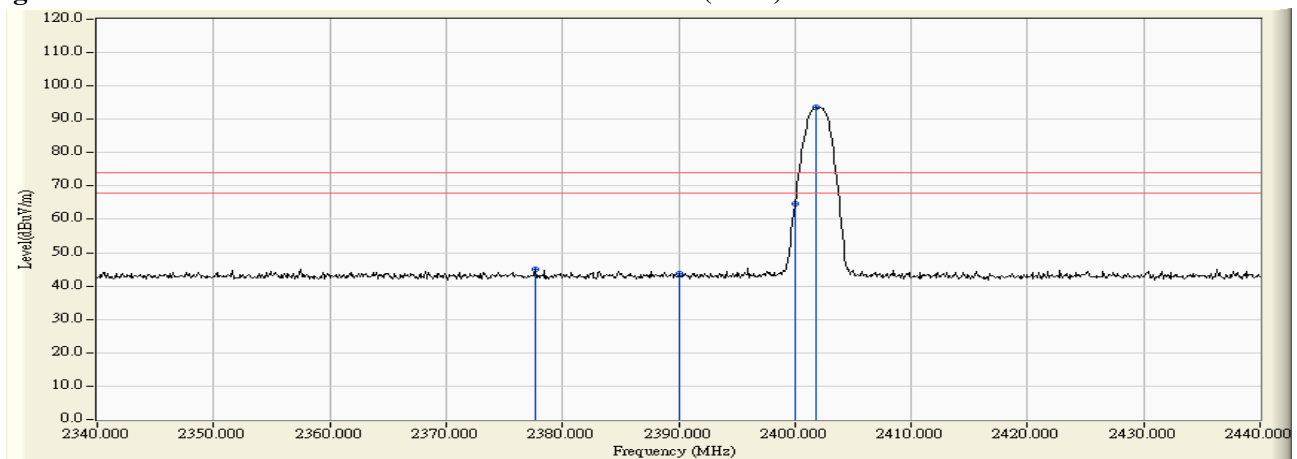
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Digital Camera  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test date : 2018/03/29  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

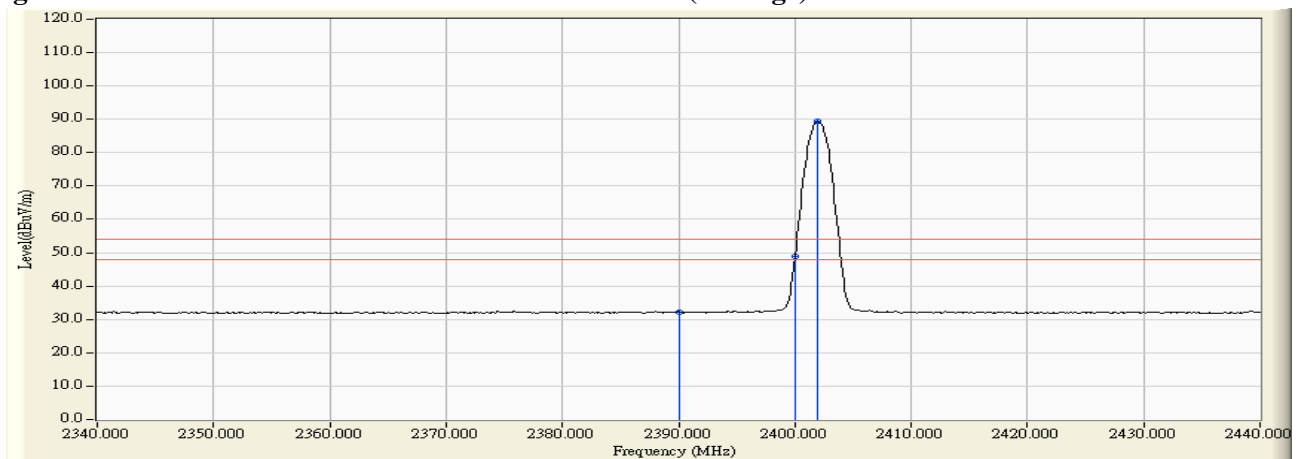
**RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
00 (Peak)	2377.700	-4.118	49.308	45.190	74.00	54.00	Pass
00 (Peak)	2390.000	-4.159	47.935	43.776	74.00	54.00	Pass
00 (Peak)	2400.000	-4.171	68.870	64.699	74.00	54.00	Pass
00 (Peak)	2401.800	-4.171	97.656	93.485	--	--	--
00 (Average)	2390.000	-4.159	36.266	32.107	74.00	54.00	Pass
00 (Average)	2400.000	-4.171	52.946	48.775	74.00	54.00	Pass
00 (Average)	2402.000	-4.171	93.476	89.305	--	--	--

**Figure Channel 00: Vertical (Peak)**



**Figure Channel 00: Vertical (Average)**



**Note:**

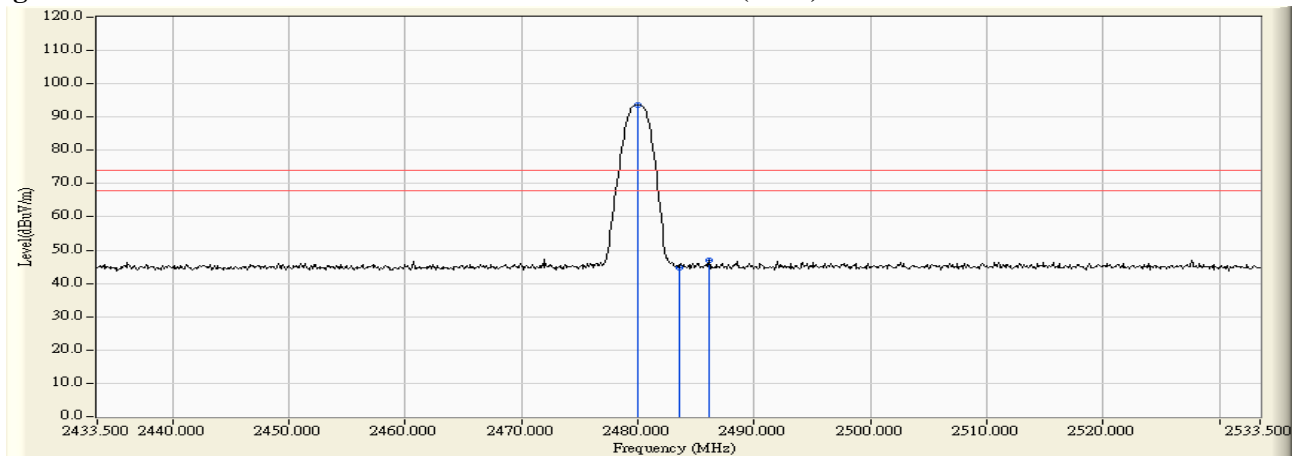
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Digital Camera  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test date : 2018/03/29  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

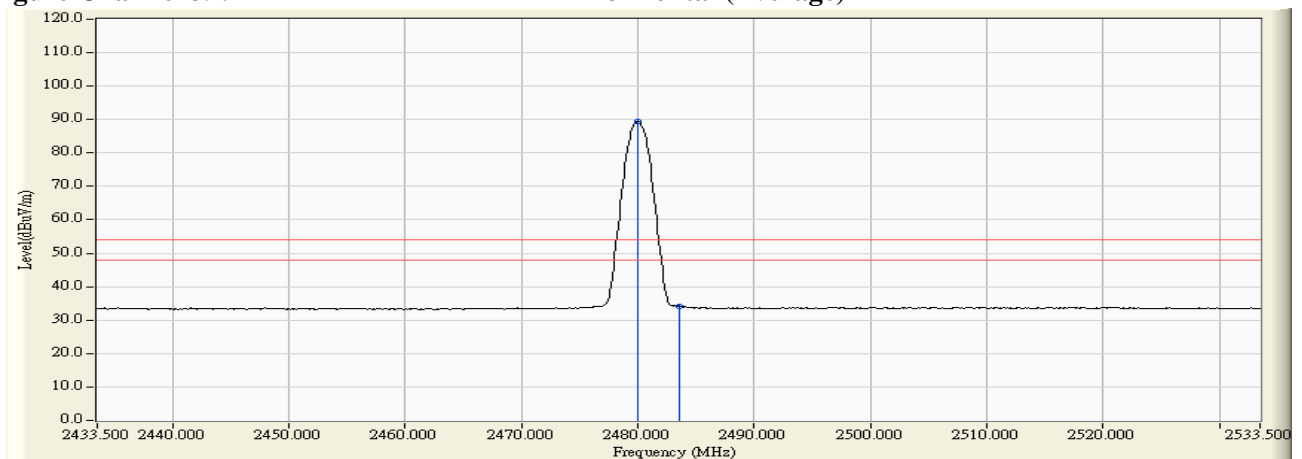
**RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
39 (Peak)	2480.000	-2.605	96.224	93.619	--	--	--
39 (Peak)	2483.500	-2.601	47.470	44.868	74.00	54.00	Pass
39 (Peak)	2486.100	-2.600	49.678	47.079	74.00	54.00	Pass
39 (Average)	2480.000	-2.605	92.067	89.462	--	--	--
39 (Average)	2483.500	-2.601	36.856	34.254	74.00	54.00	Pass

**Figure Channel 39: Horizontal (Peak)**



**Figure Channel 39: Horizontal (Average)**



Note:

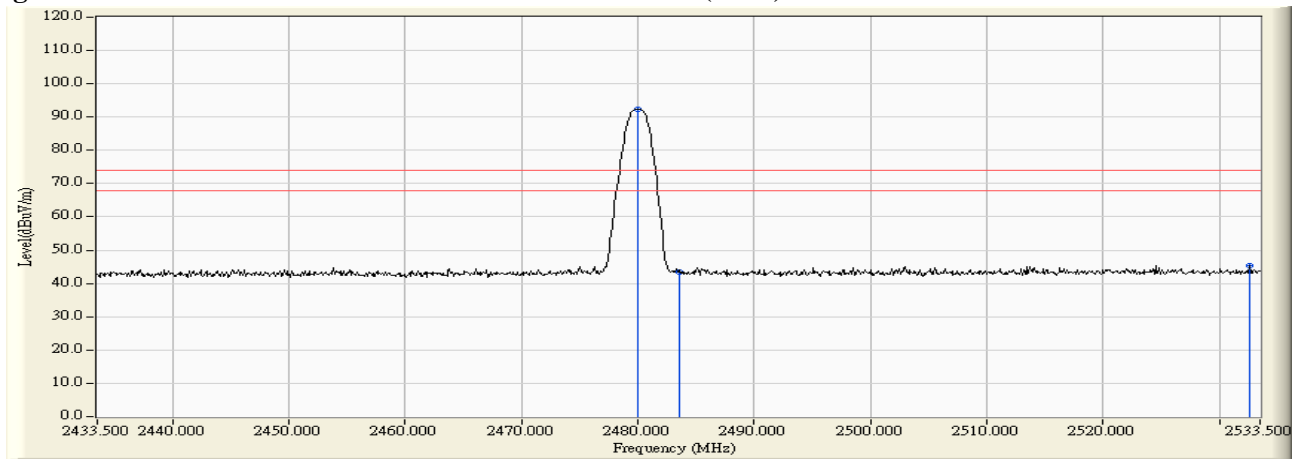
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Digital Camera  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test date : 2018/03/29  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

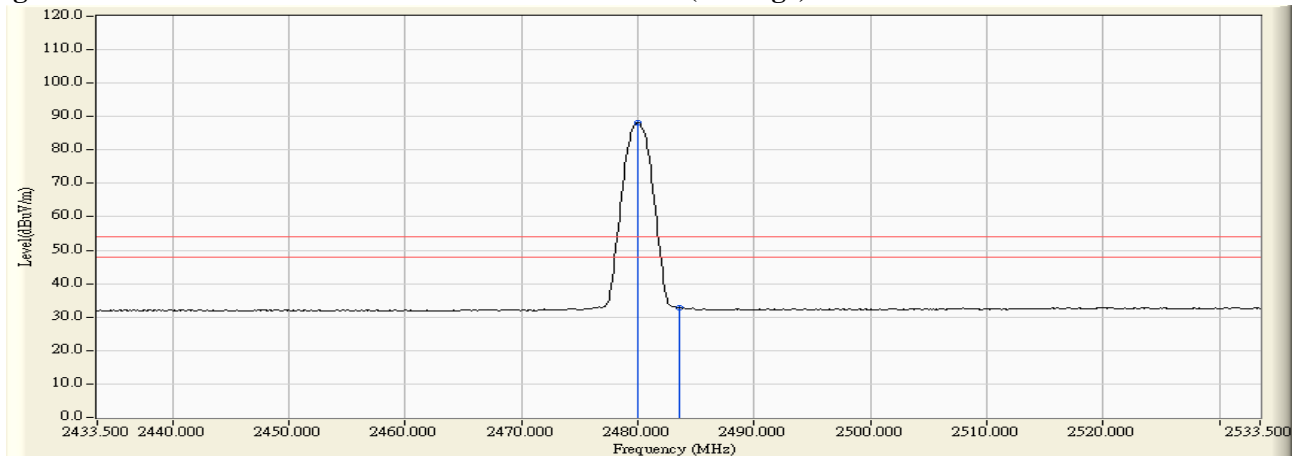
**RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
39 (Peak)	2480.000	-3.978	96.312	92.334	--	--	--
39 (Peak)	2483.500	-3.966	47.547	43.580	74.00	54.00	Pass
39 (Peak)	2532.600	-3.751	49.106	45.355	74.00	54.00	Pass
39 (Average)	2480.000	-3.978	92.122	88.144	--	--	--
39 (Average)	2483.500	-3.966	36.800	32.833	74.00	54.00	Pass

**Figure Channel 39: Vertical (Peak)**



**Figure Channel 39: Vertical (Average)**

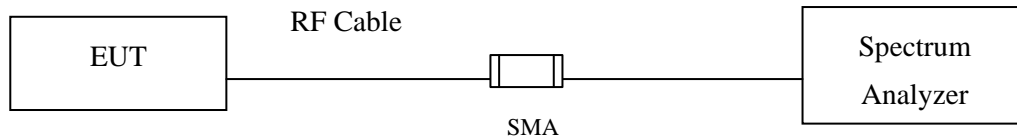


Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

## 7. 6dB Bandwidth

### 7.1. Test Setup



### 7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

### 7.3. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1-5% of the emission bandwidth,  $VBW \geq 3 * RBW$

### 7.4. Uncertainty

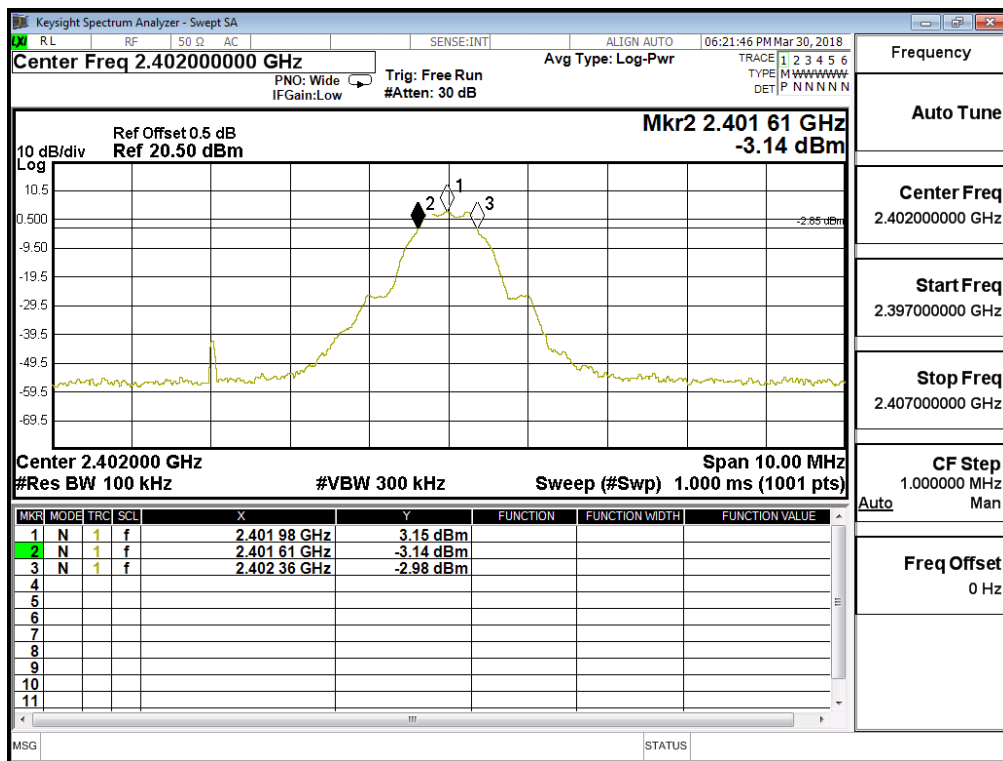
$\pm 283\text{Hz}$

### 7.5. Test Result of 6dB Bandwidth

Product : Digital Camera  
 Test Item : 6dB Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	750	>500	Pass

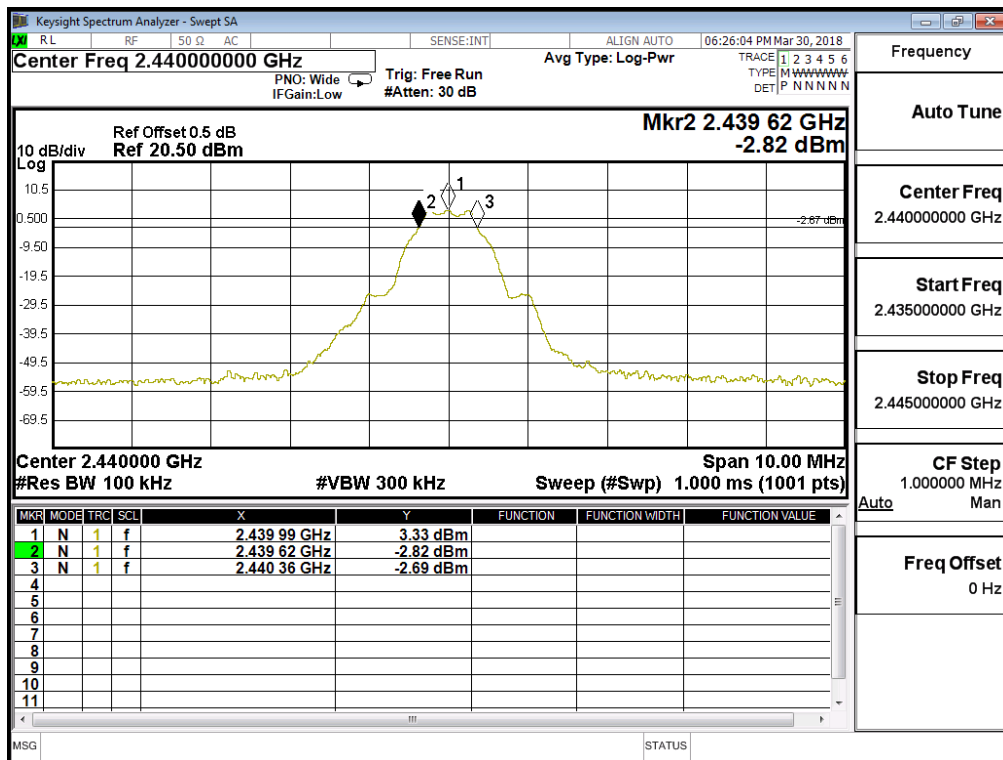
Figure Channel 00:



Product : Digital Camera  
 Test Item : 6dB Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
19	2440	740	>500	Pass

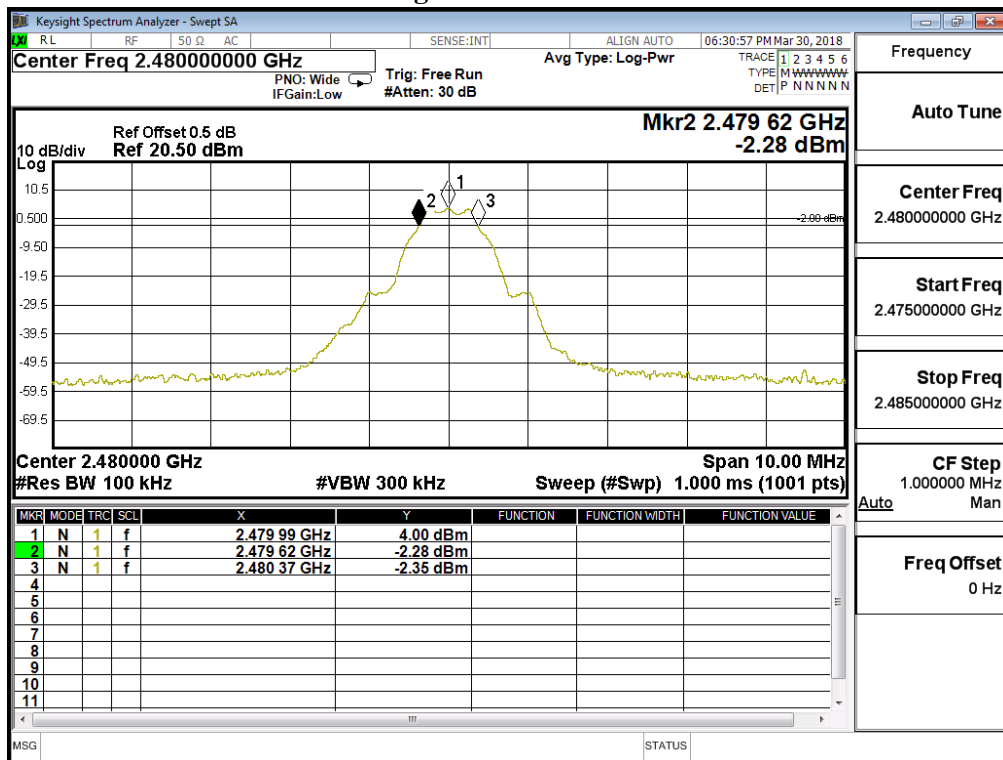
Figure Channel 19:



Product : Digital Camera  
 Test Item : 6dB Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2480	750	>500	Pass

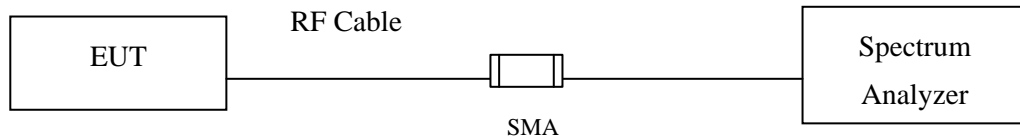
Figure Channel 39:





## 8. Power Density

### 8.1. Test Setup



### 8.2. Limits

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

### 8.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013, the maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

### 8.4. Uncertainty

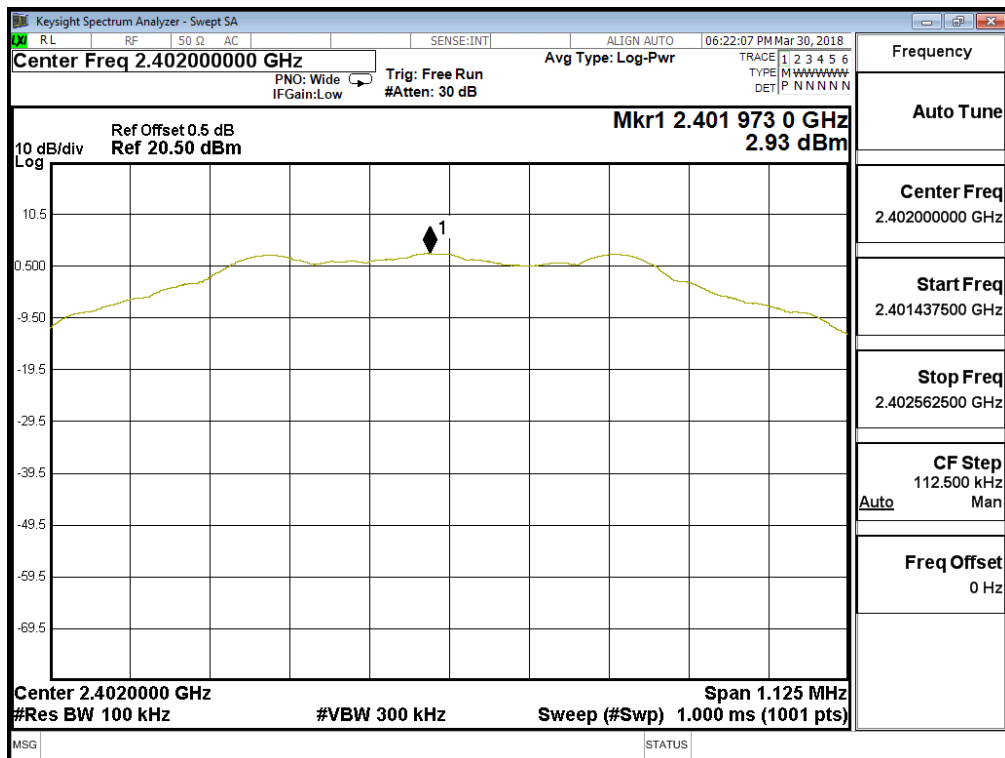
$\pm 1.20$  dB

### 8.5. Test Result of Power Density

Product : Digital Camera  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2402MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	2.93	≤ 8dBm	Pass

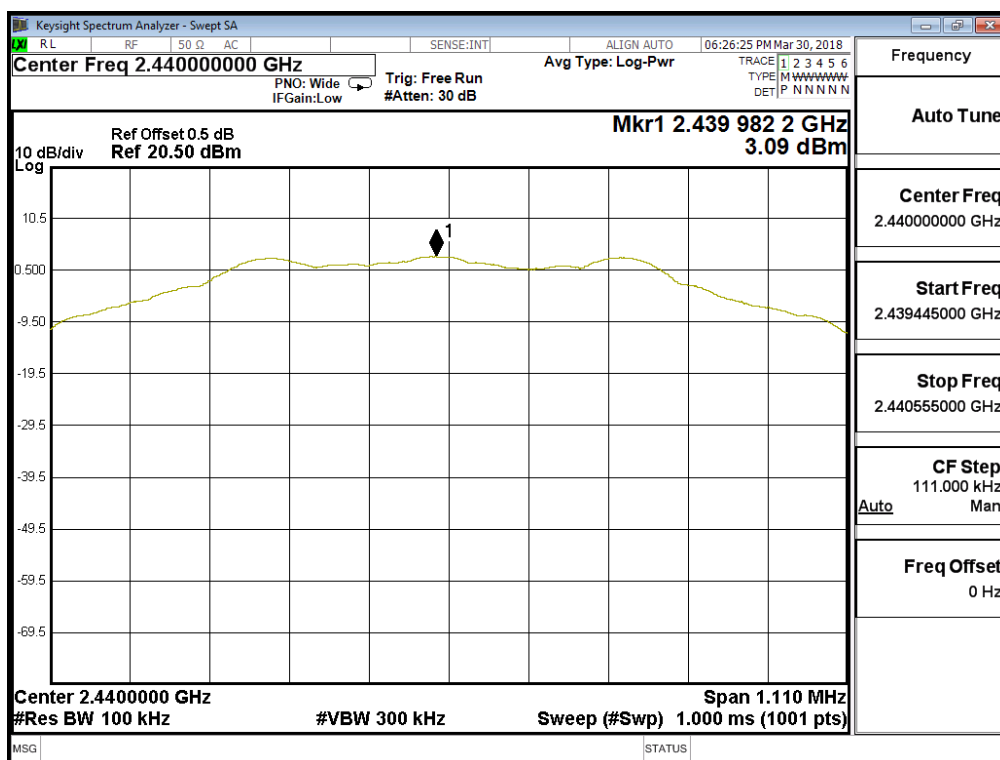
Figure Channel 00:



Product : Digital Camera  
 Test Item : Power Density Data  
 Test Site : No.3OATS  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2440	3.09	≤ 8dBm	Pass

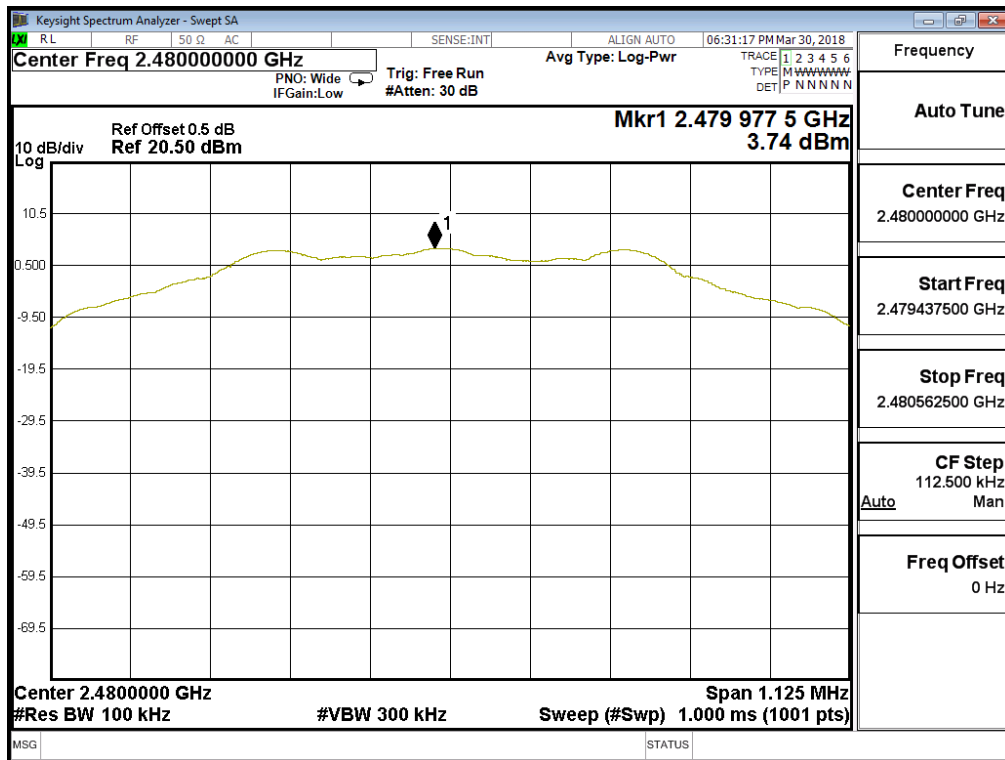
Figure Channel 19:



Product : Digital Camera  
 Test Item : Power Density Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

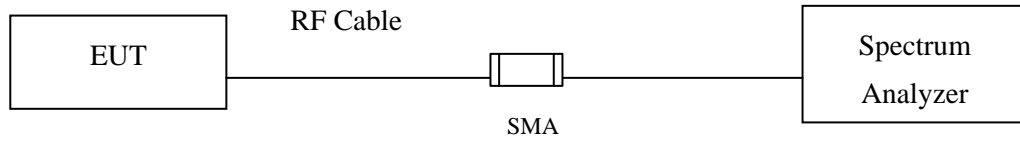
Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	3.74	≤ 8dBm	Pass

Figure Channel 39:



## 9. Duty Cycle

### 9.1. Test Setup



### 9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

### 9.3. Uncertainty

$\pm 2.31\text{msec}$

### 9.4. Test Result of Duty Cycle

Product : Digital Camera  
 Test Item : Duty Cycle  
 Test Mode : Mode 1: Transmit - BLE (GFSK)

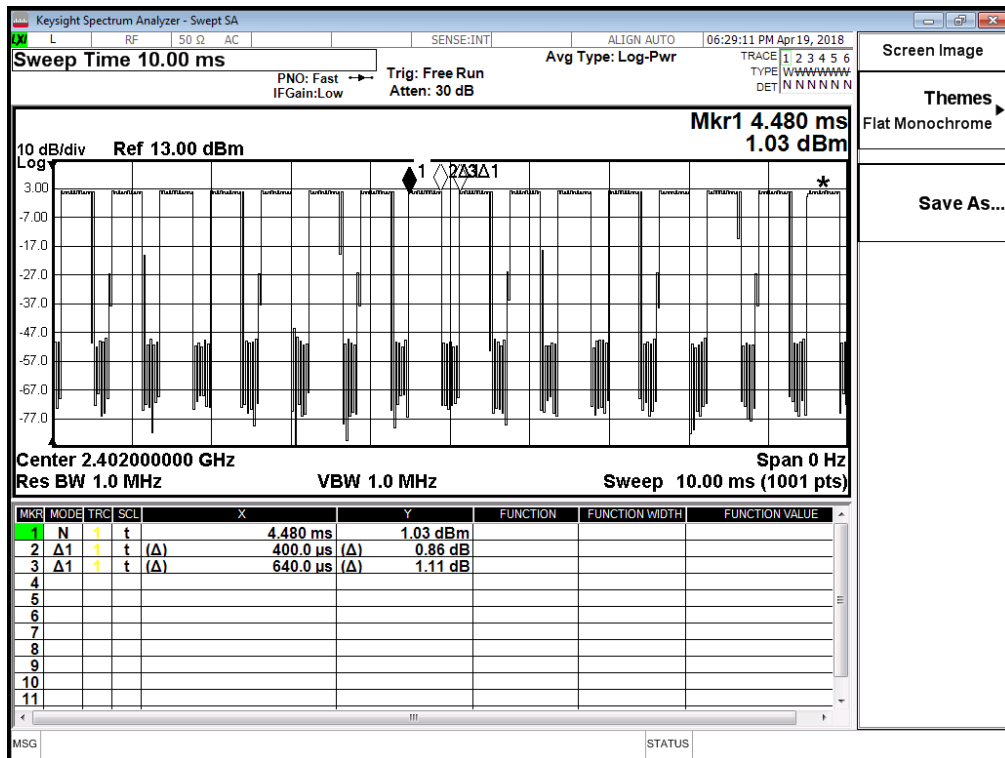
Duty Cycle Formula:

$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

$$\text{Duty Factor} = 10 \text{ Log} (1/\text{Duty Cycle})$$

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE	0.4	0.64	62.5	2.04



---

**10. EMI Reduction Method During Compliance Testing**

No modification was made during testing.

Attachment 1: EUT Test Photographs



Attachment 2: EUT Detailed Photographs