

FCC Test Report

Product Name	HYBRID INSTANT CAMERA
Model No.	INSTAX MINI HM1
FCC ID.	W2Z-03000006

Applicant	FUJIFILM CORPORATION
Address	7-3,Akasaka 9-chome,Minato-ku,Tokyo 107-0052,Japan

Date of Receipt	Feb. 11, 2019
Issued Date	Mar. 06, 2019
Report No.	1920024R-RFUSP01V00-A
Report Version	V1.0



The test results relate only to the samples tested.

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

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Test Report

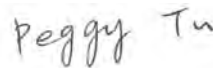
Issued Date: Mar. 06, 2019

Report No.: 1920024R-RFUSP01V00-A



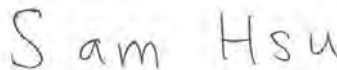
Product Name	HYBRID INSTANT CAMERA
Applicant	FUJIFILM CORPORATION
Address	7-3,Akasaka 9-chome,Minato-ku,Tokyo 107-0052,Japan
Manufacturer	ABILITY ENTERPRISE CO., LTD.
Model No.	INSTAX MINI HM1
FCC ID.	W2Z-03000006
EUT Rated Voltage	DC 5V by USB or DC 3.7V by Battery
EUT Test Voltage	DC 5V by USB
Trade Name	FUJIFILM
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 v05
Test Result	Complied

Documented By :



(Adm. Assistant / Peggy Tu)

Tested By :



(Engineer / Sam Hsu)

Approved By :



(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	HYBRID INSTANT CAMERA
Trade Name	FUJIFILM
Model No.	INSTAX MINI HM1
FCC ID.	W2Z-03000006
Frequency Range	2402 – 2480MHz
Channel Number	V4.2: 40CH
Type of Modulation	V4.2: GFSK(1Mbps)
Antenna Type	Print on PCB Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
USB Cable	Shielded, 0.6m, with one ferrite core bonded.
Contain Module	REALTEK / RTL8761ATT

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Ability	N/A	Print on PCB Antenna	1.5dBi for 2.4GHz

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

Center Frequency of Each Channel: (For V4.2)

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 HYBRID INSTANT CAMERA with a built-in Bluetooth V3.0, V2.1+EDR, V4.2 transceiver, this report for Bluetooth V4.2.
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)
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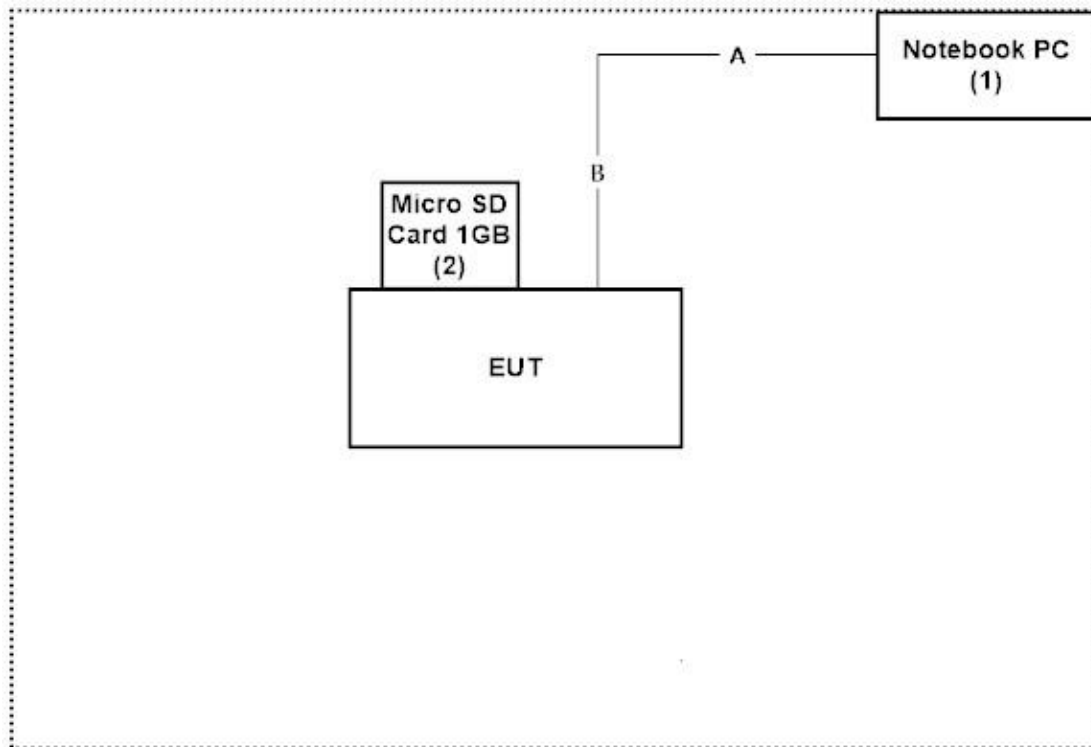
1.3. Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	Latitude E5440	HG26TZ1	N/A
2 Micro SD Card 1GB	SanDisk	N/A	0801002841D2N	N/A

Signal Cable Type	Signal cable Description
A USB Cable	Non-Shielded, 1.8m
B USB Cable	Shielded, 0.6m, with one ferrite core bonded.

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software " Vendor Command Tool" 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>

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

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd
Site Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
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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	2019/02/26	2020/02/25
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2018/09/27	2019/09/26
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2018/08/01	2019/07/31
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2018/07/25	2019/07/24
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2018/07/25	2019/07/24
X	EMI Test Receiver	R&S	ESCS 30	100369	2018/11/19	2019/11/18
X	LISN	R&S	ENV216	101105	2018/03/30	2019/03/29
X	LISN	R&S	ESH3-Z5	836679/014	2018/04/02	2019/04/01
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2018/06/21	2019/06/20

For Radiated measurements /Site3/CB8

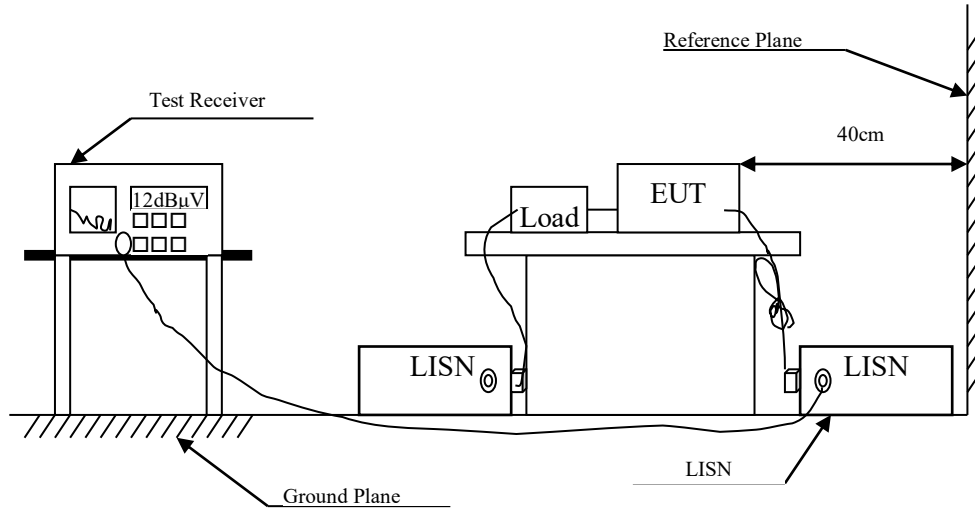
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2019/03/12	2020/03/11
X	Loop Antenna	Teseq	HLA6121	37133	2017/10/13	2019/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2018/06/24	2019/06/23
X	Coaxial Cable	DEKRA	RG 214	LC003-RG	2018/06/14	2019/06/13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

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) 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 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.

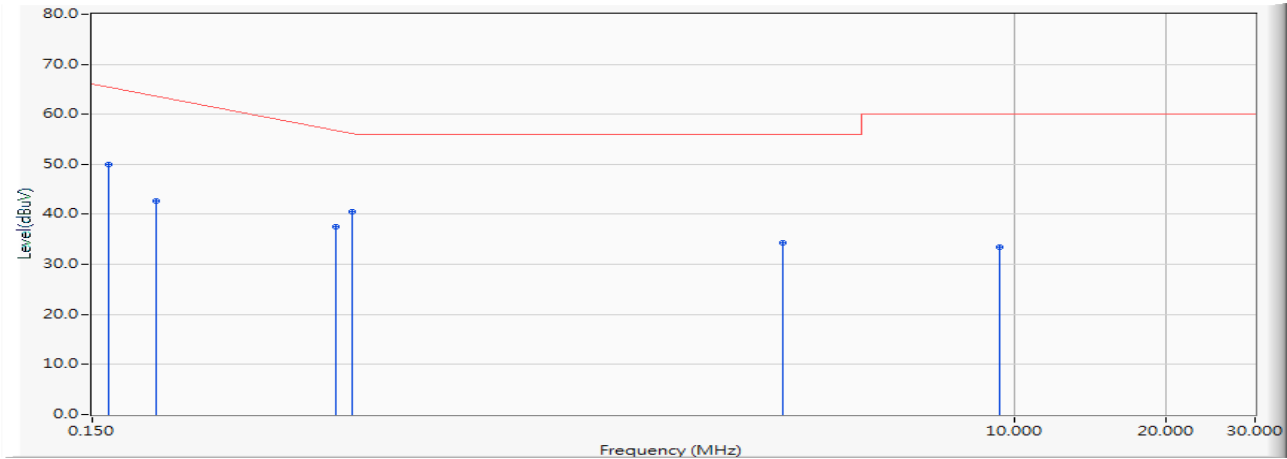
2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Product : INSTAX MINI HM1
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test date : 2019/02/26
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Line1



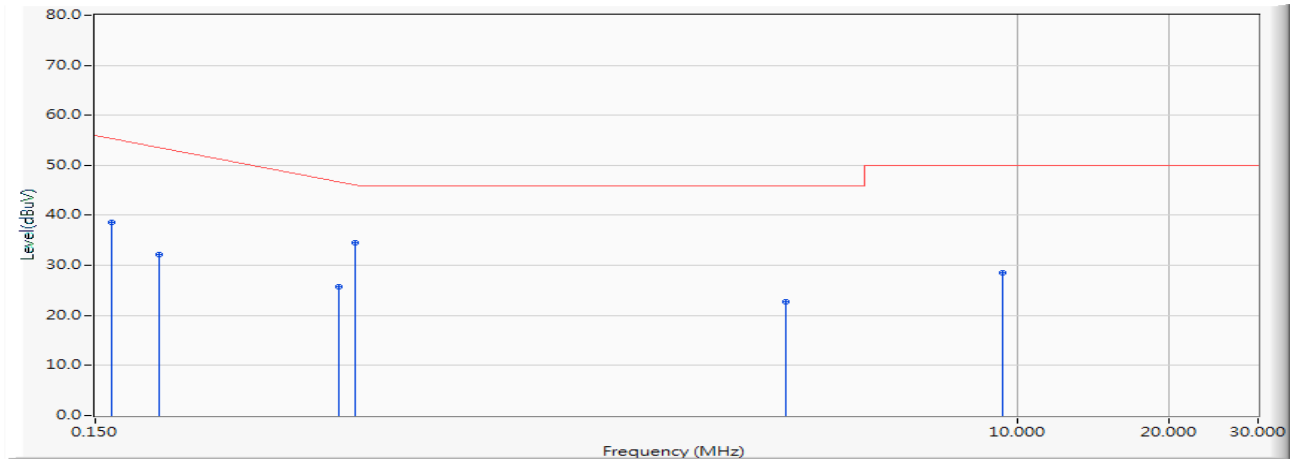
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.162	9.645	40.320	49.965	-15.692	65.657	QUASPEAK
2		0.201	9.638	33.140	42.778	-21.765	64.543	QUASPEAK
3		0.455	9.638	27.900	37.538	-19.748	57.286	QUASPEAK
4		0.490	9.640	30.920	40.560	-15.726	56.286	QUASPEAK
5		3.478	9.759	24.560	34.319	-21.681	56.000	QUASPEAK
6		9.361	9.930	23.620	33.550	-26.450	60.000	QUASPEAK

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 : INSTAX MINI HM1
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test date : 2019/02/26
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Line1



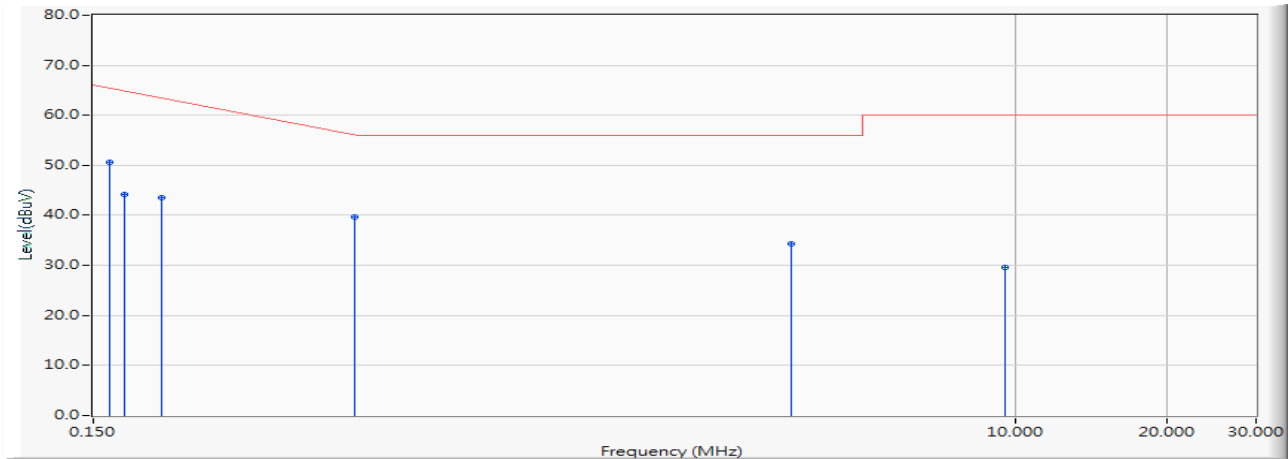
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.162	9.645	28.940	38.585	-17.072	55.657	AVERAGE
2	0.201	9.638	22.610	32.248	-22.295	54.543	AVERAGE
3	0.455	9.638	16.050	25.688	-21.598	47.286	AVERAGE
4	* 0.490	9.640	24.950	34.590	-11.696	46.286	AVERAGE
5	3.478	9.759	13.070	22.829	-23.171	46.000	AVERAGE
6	9.361	9.930	18.630	28.560	-21.440	50.000	AVERAGE

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 : INSTAX MINI HM1
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test date : 2019/02/26
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Line2



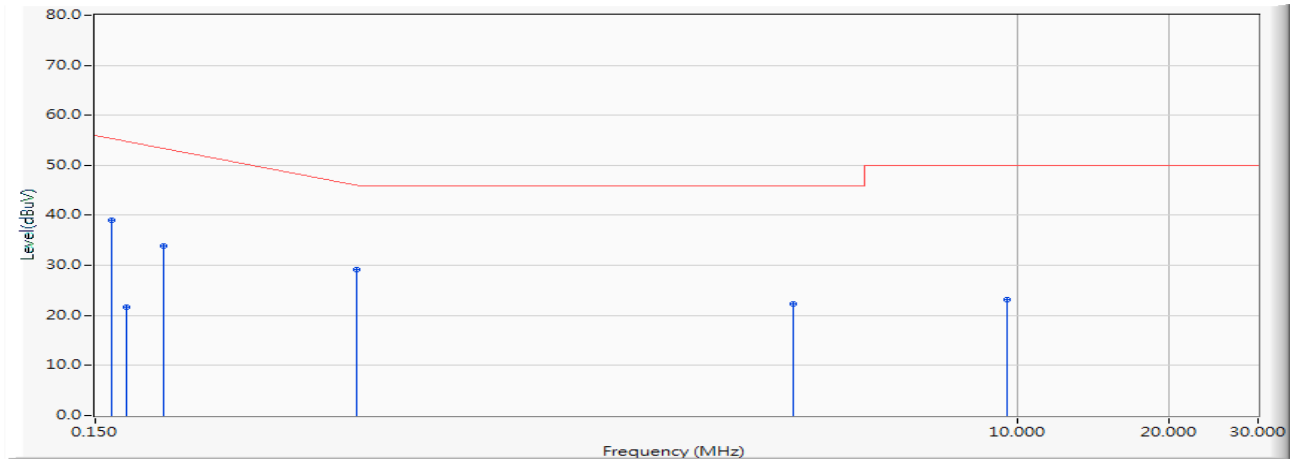
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.162	9.604	40.980	50.584	-15.073	65.657	QUASPEAK
2		0.173	9.597	34.540	44.137	-21.206	65.343	QUASPEAK
3		0.205	9.588	33.860	43.448	-20.981	64.429	QUASPEAK
4		0.494	9.590	30.160	39.750	-16.421	56.171	QUASPEAK
5		3.611	9.722	24.660	34.382	-21.618	56.000	QUASPEAK
6		9.564	9.914	19.660	29.574	-30.426	60.000	QUASPEAK

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 : INSTAX MINI HM1
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test date : 2019/02/26
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Line2



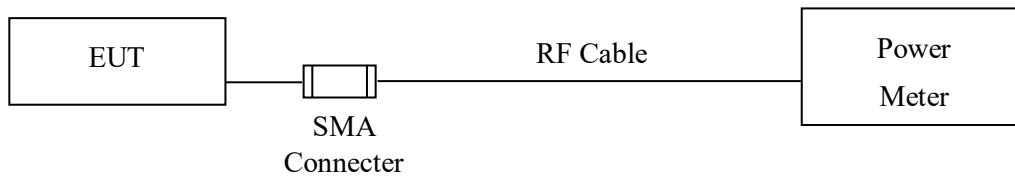
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.162	9.604	29.430	39.034	-16.623	55.657	AVERAGE
2		0.173	9.597	12.110	21.707	-33.636	55.343	AVERAGE
3		0.205	9.588	24.370	33.958	-20.471	54.429	AVERAGE
4		0.494	9.590	19.550	29.140	-17.031	46.171	AVERAGE
5		3.611	9.722	12.500	22.222	-23.778	46.000	AVERAGE
6		9.564	9.914	13.300	23.214	-26.786	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. 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

± 1.19 dB

3.5. Test Result of Peak Power Output

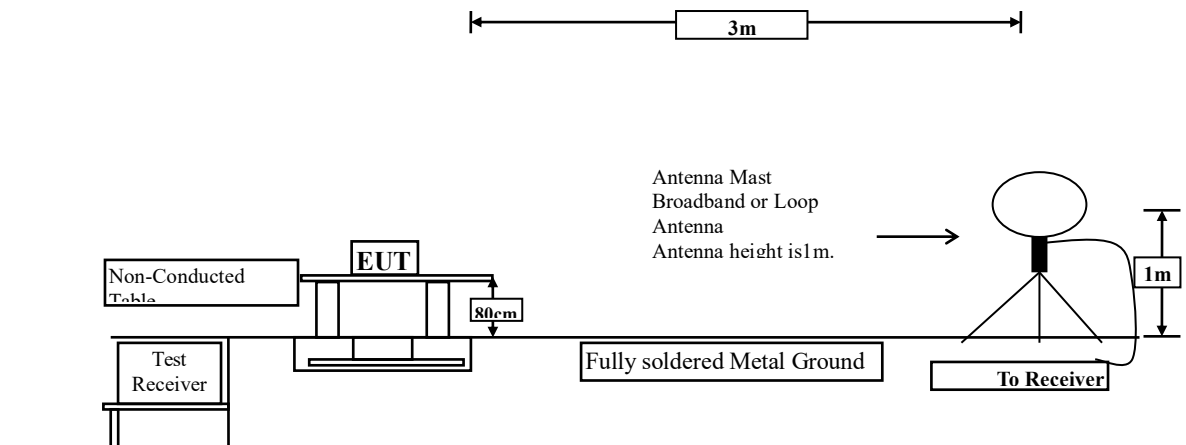
Product : INSTAX MINI HM1
Test Item : Peak Power Output
Test Site : No.3 OATS
Test date : 2019/02/25
Test Mode : Mode 1: Transmit - BLE (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	6.71	1 Watt= 30 dBm	Pass
Channel 19	2440.00	7.46	1 Watt= 30 dBm	Pass
Channel 39	2480.00	7.54	1 Watt= 30 dBm	Pass

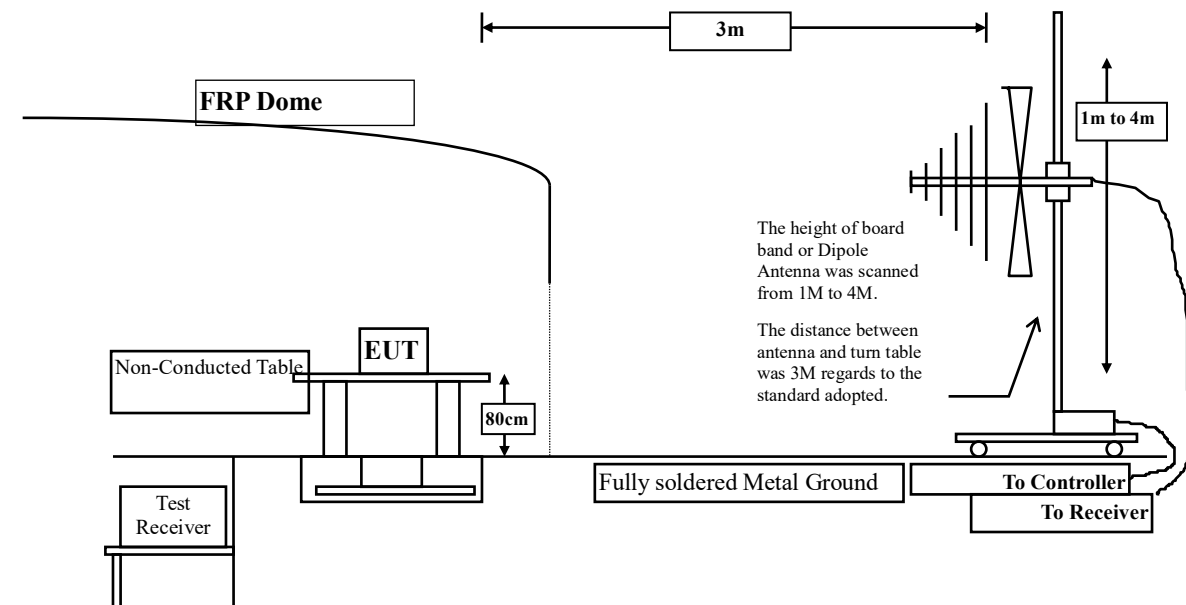
4. Radiated Emission

4.1. Test Setup

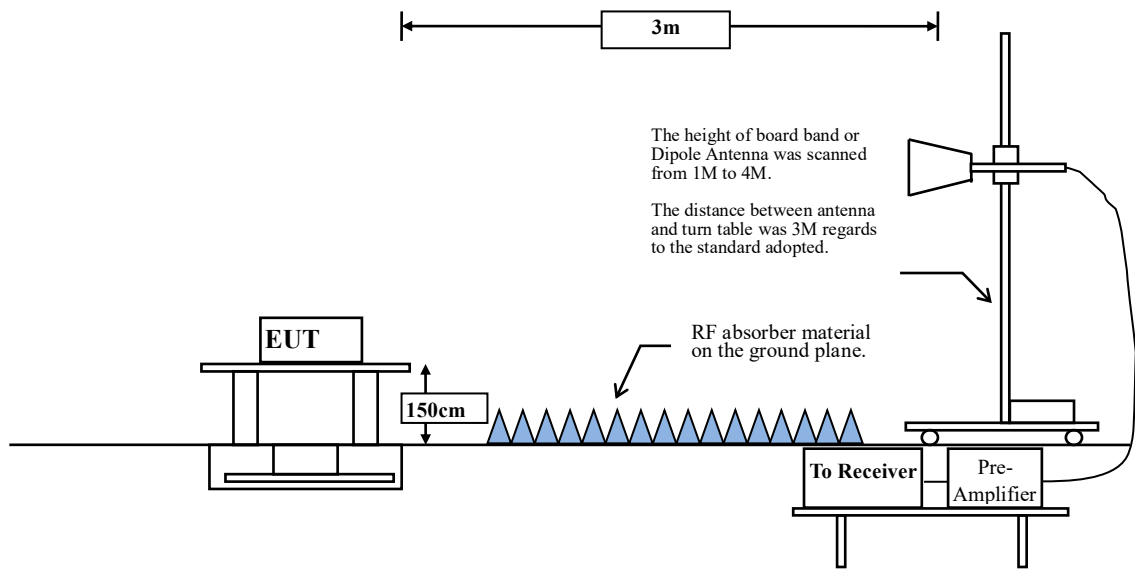
Under 30MHz



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.

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 (dB μ 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	63.89	0.4000	2500	3k

Note: Duty Cycle Refer to Section 9

4.4. Uncertainty

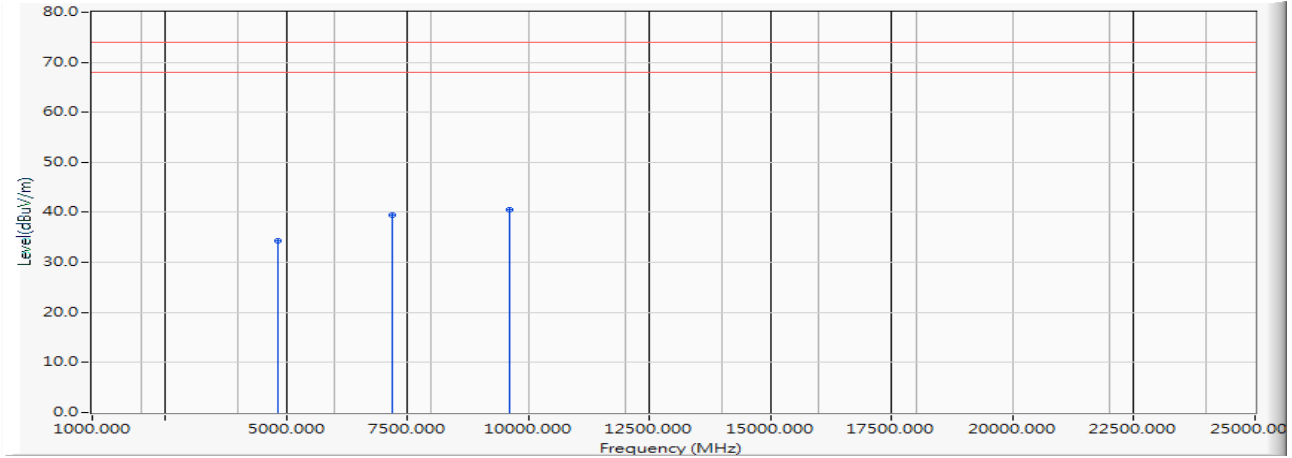
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product : INSTAX MINI HM1
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK)(2402MHz)

Horizontal



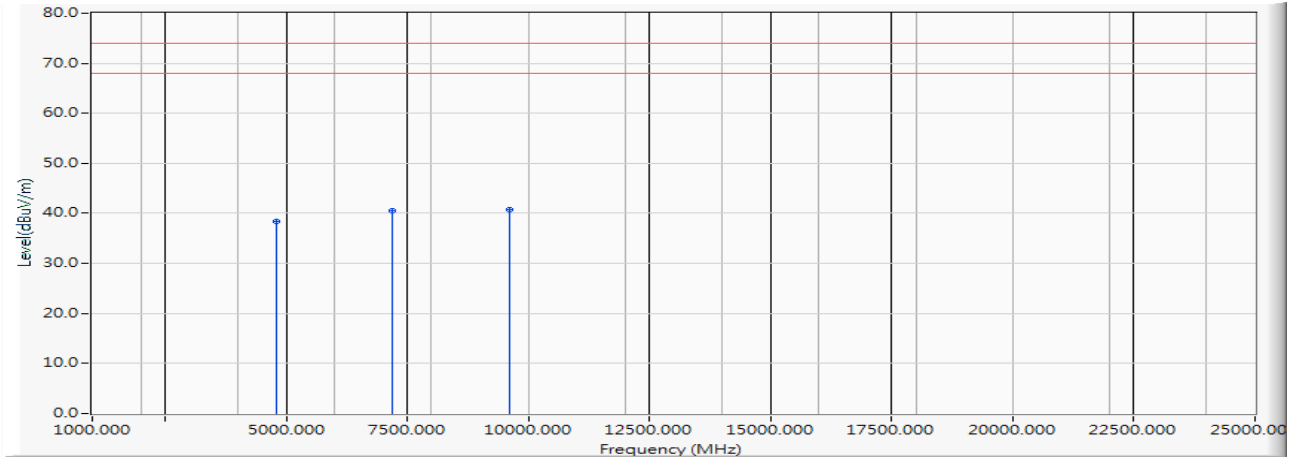
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4840.000	6.892	27.439	34.331	-39.669	74.000	PEAK
2	7206.000	11.333	28.091	39.424	-34.576	74.000	PEAK
3	* 9608.000	14.713	25.910	40.623	-33.377	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK)(2402MHz)

Vertical



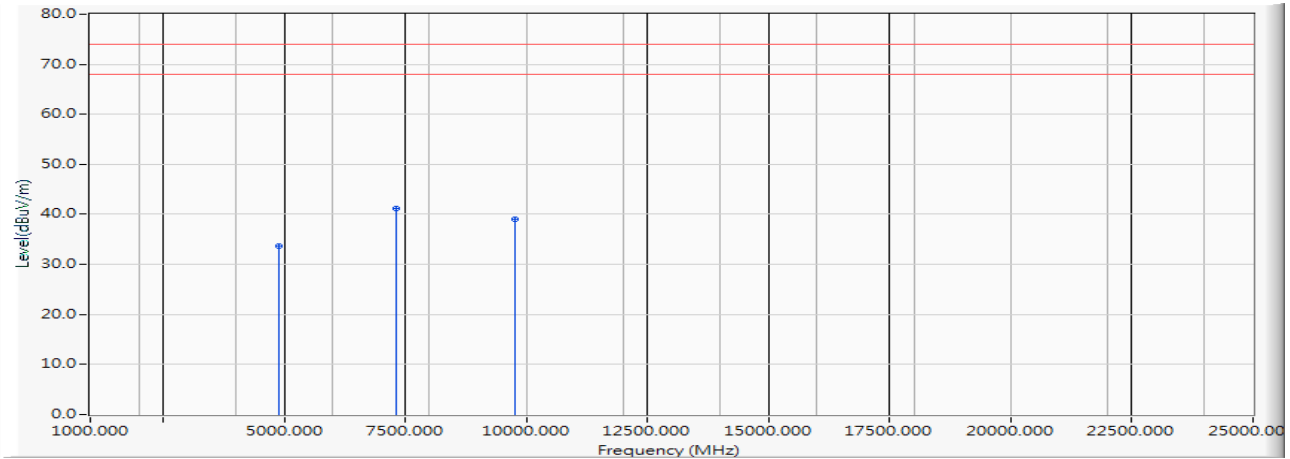
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	6.787	31.545	38.332	-35.668	74.000	PEAK
2		7206.000	11.333	29.121	40.454	-33.546	74.000	PEAK
3	*	9608.000	14.713	26.007	40.720	-33.280	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Horizontal



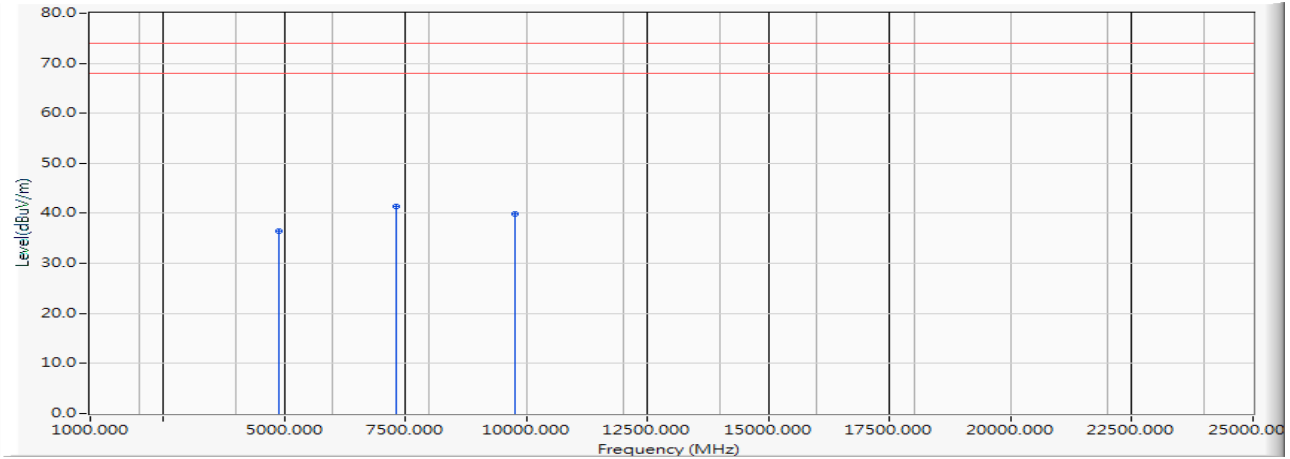
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4880.000	6.907	26.814	33.722	-40.278	74.000	PEAK
2	* 7320.000	11.400	29.832	41.233	-32.767	74.000	PEAK
3	9760.000	15.113	23.923	39.036	-34.964	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Vertical



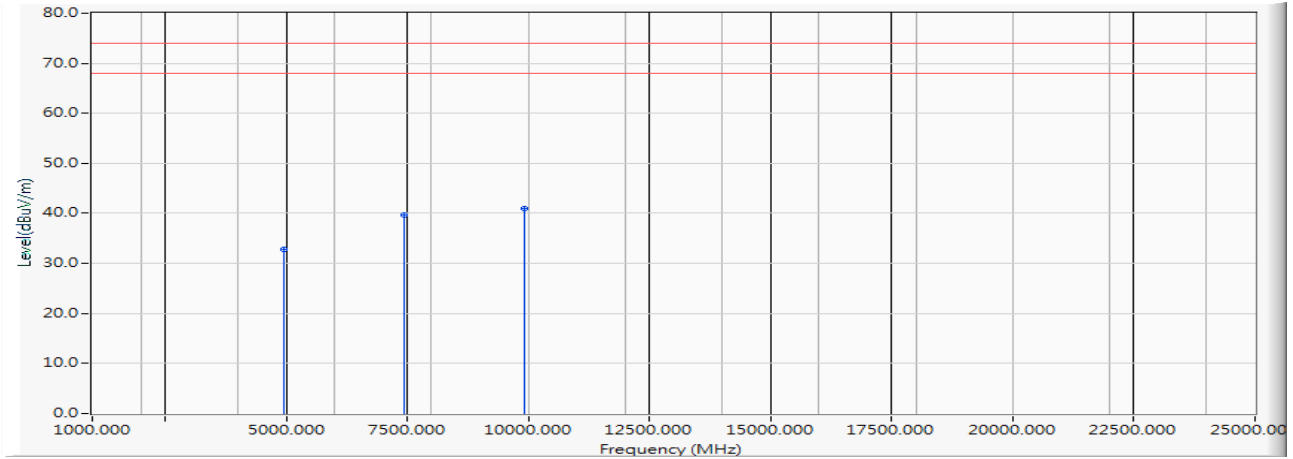
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4880.000	6.907	29.632	36.540	-37.460	74.000	PEAK
2	* 7320.000	11.400	29.892	41.293	-32.707	74.000	PEAK
3	9760.000	15.113	24.675	39.788	-34.212	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Horizontal



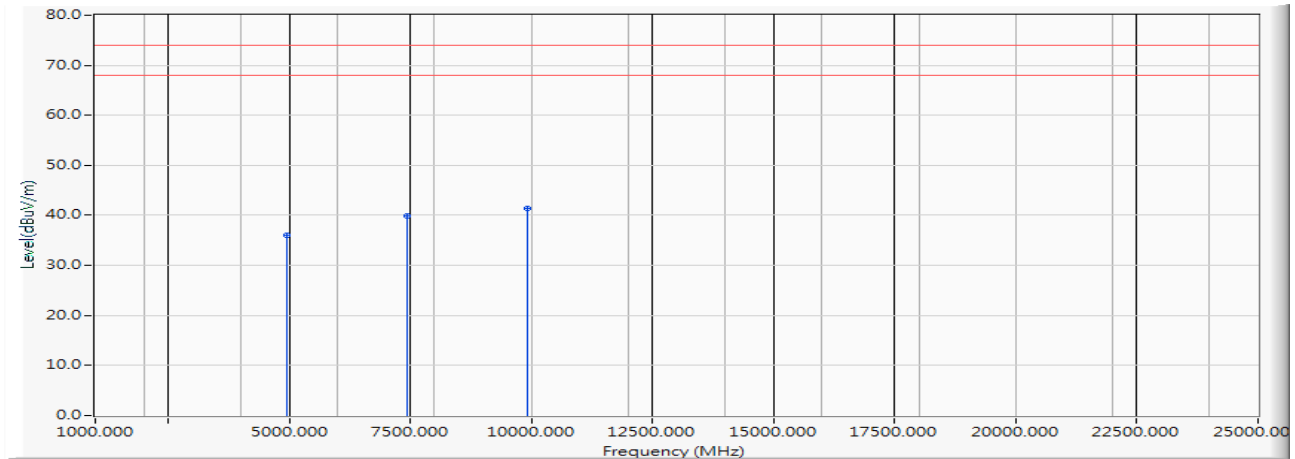
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4960.000	7.008	25.717	32.725	-41.275	74.000	PEAK
2	7440.000	11.485	28.243	39.728	-34.272	74.000	PEAK
3	* 9920.000	15.146	25.740	40.886	-33.114	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Vertical



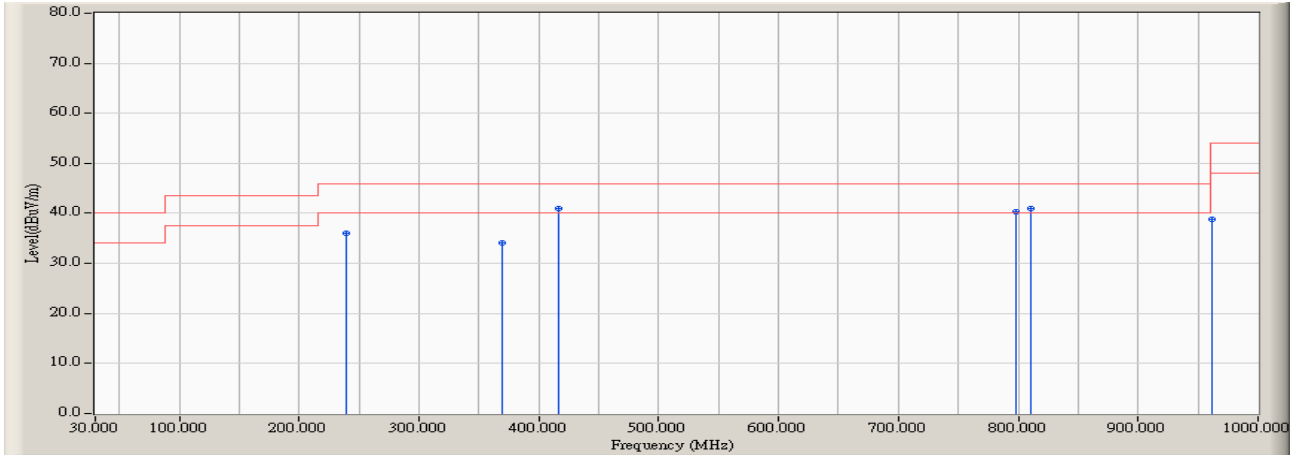
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4960.000	7.008	29.014	36.022	-37.978	74.000	PEAK
2	7440.000	11.485	28.452	39.937	-34.063	74.000	PEAK
3	* 9920.000	15.146	26.242	41.388	-32.612	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Horizontal



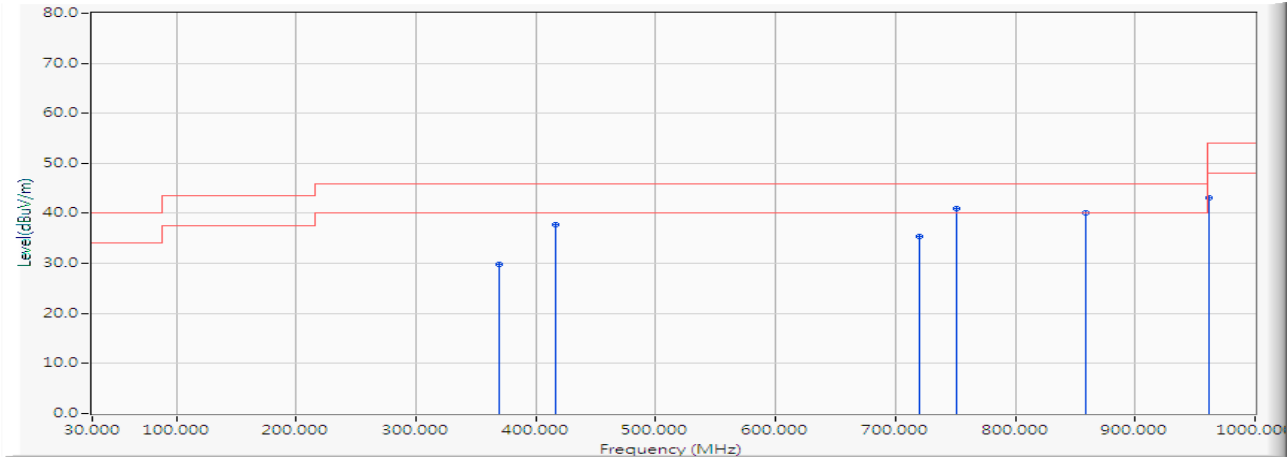
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	239.856	-0.285	36.232	35.947	-10.053	46.000	QUASPEAK
2	368.878	4.012	30.121	34.133	-11.867	46.000	QUASPEAK
3	* 417.067	5.242	35.740	40.982	-5.018	46.000	QUASPEAK
4	797.917	10.739	29.572	40.311	-5.689	46.000	QUASPEAK
5	810.353	10.968	29.910	40.878	-5.122	46.000	QUASPEAK
6	961.138	13.052	25.811	38.863	-15.137	54.000	QUASPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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.

Product : INSTAX MINI HM1
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test date : 2019/02/25
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Vertical



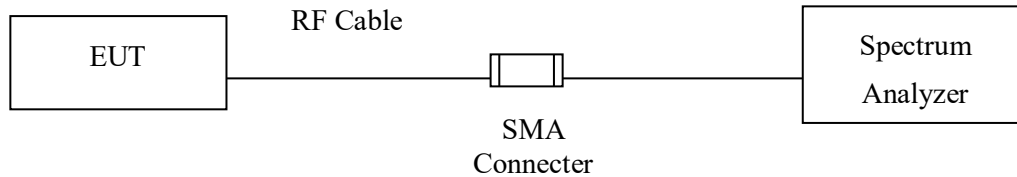
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	368.878	4.012	25.897	29.909	-16.091	46.000	QUASPEAK
2	417.067	5.242	32.495	37.737	-8.263	46.000	QUASPEAK
3	720.192	9.706	25.746	35.453	-10.547	46.000	QUASPEAK
4	* 793.253	10.693	31.108	41.801	-4.199	46.000	QUASPEAK
5	859.146	11.381	28.738	40.119	-5.881	46.000	QUASPEAK
6	961.138	13.052	30.107	43.159	-10.841	54.000	QUASPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. 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 : INSTAX MINI HM1
Test Item : RF Antenna Conducted Test
Test Site : No.3 OATS
Test date : 2019/02/14
Test Mode : Mode 1: Transmit - BLE (GFSK)

Figure Channel 00:

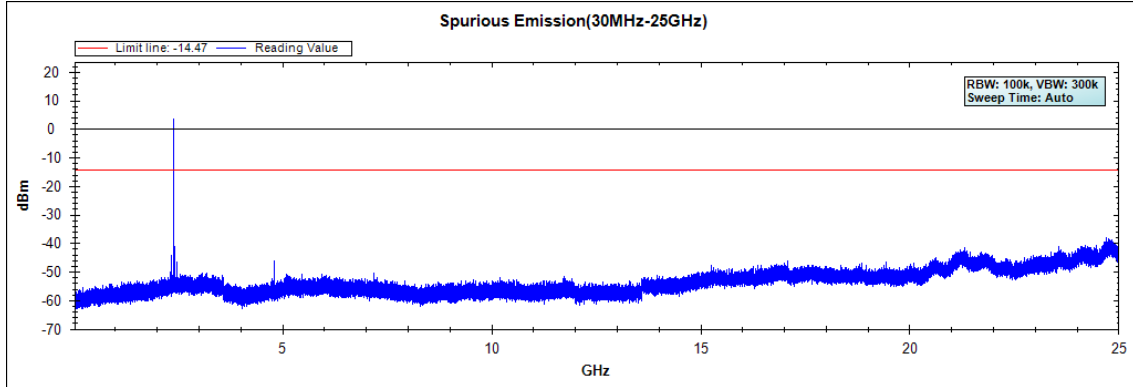


Figure Channel 19:

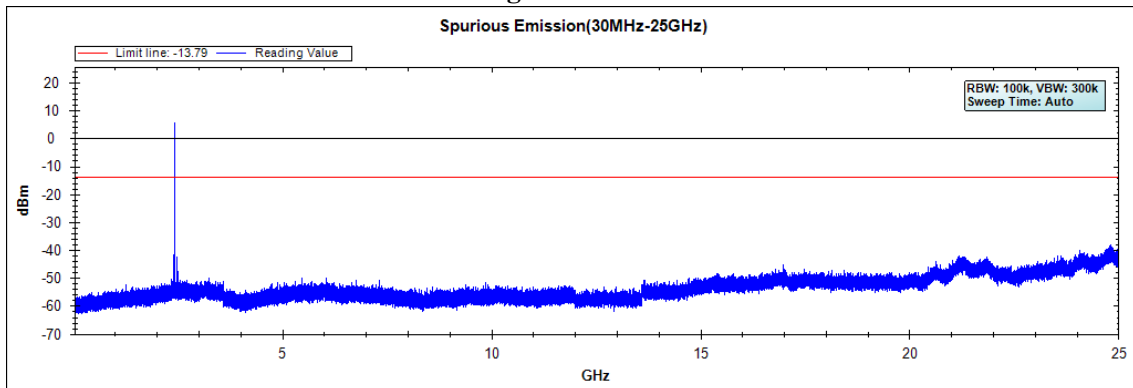
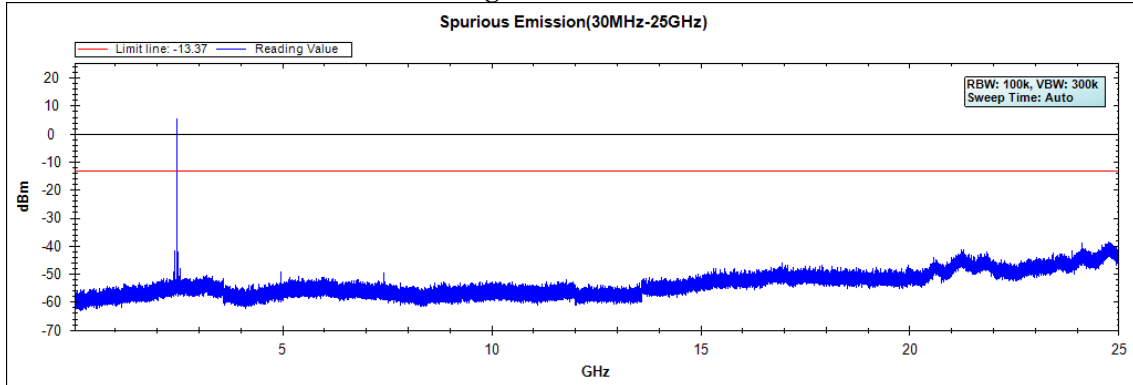


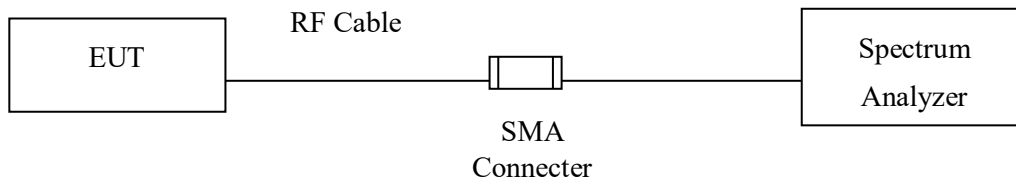
Figure Channel 39:



6. Band Edge

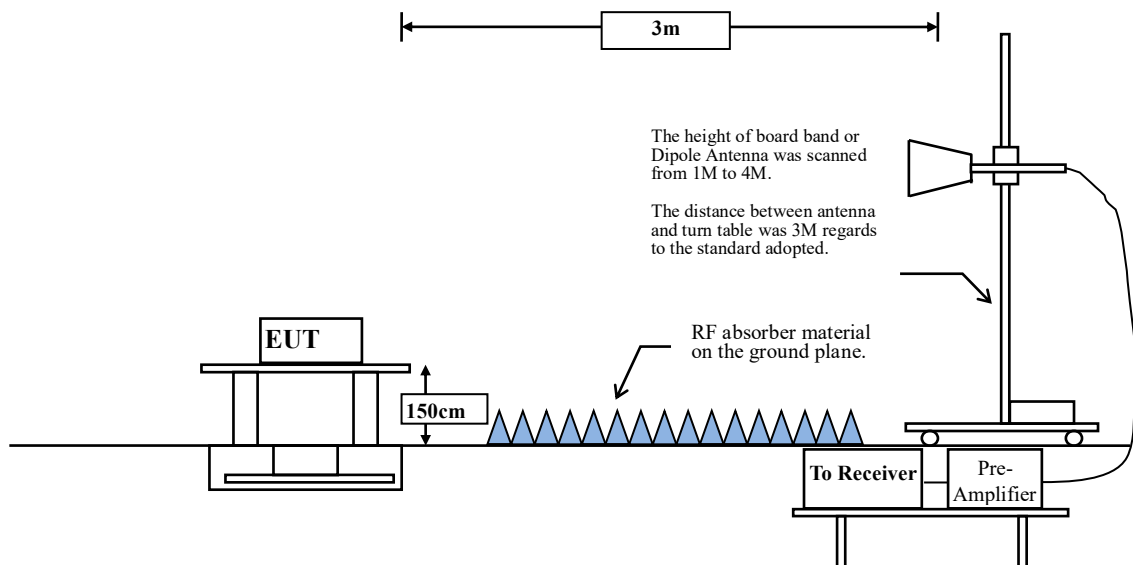
6.1. Test Setup

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	63.89	0.4000	2500	3k

Note: Duty Cycle Refer to Section 9

6.4. Uncertainty

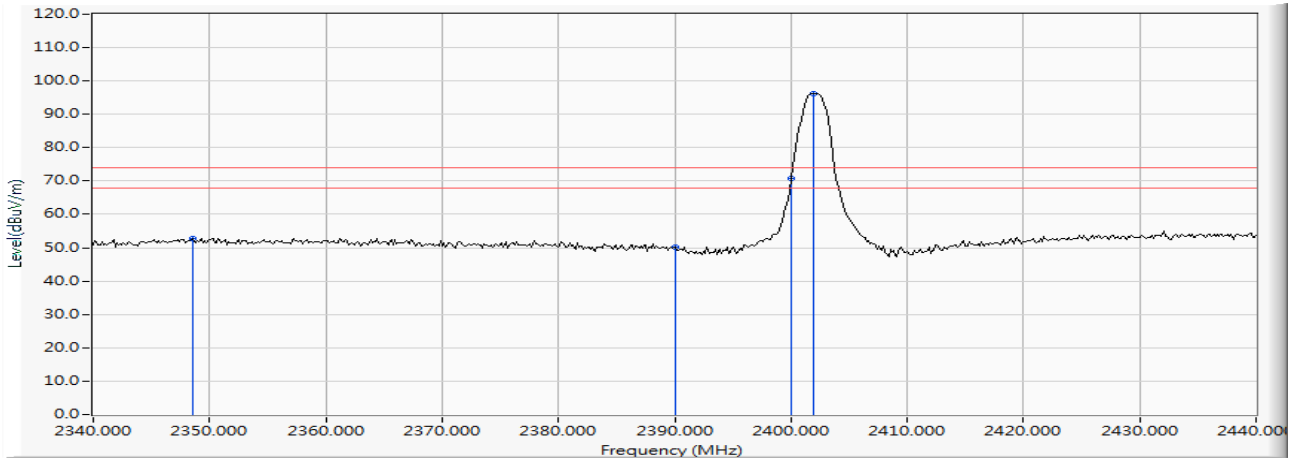
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

6.5. Test Result of Band Edge

Product : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Horizontal



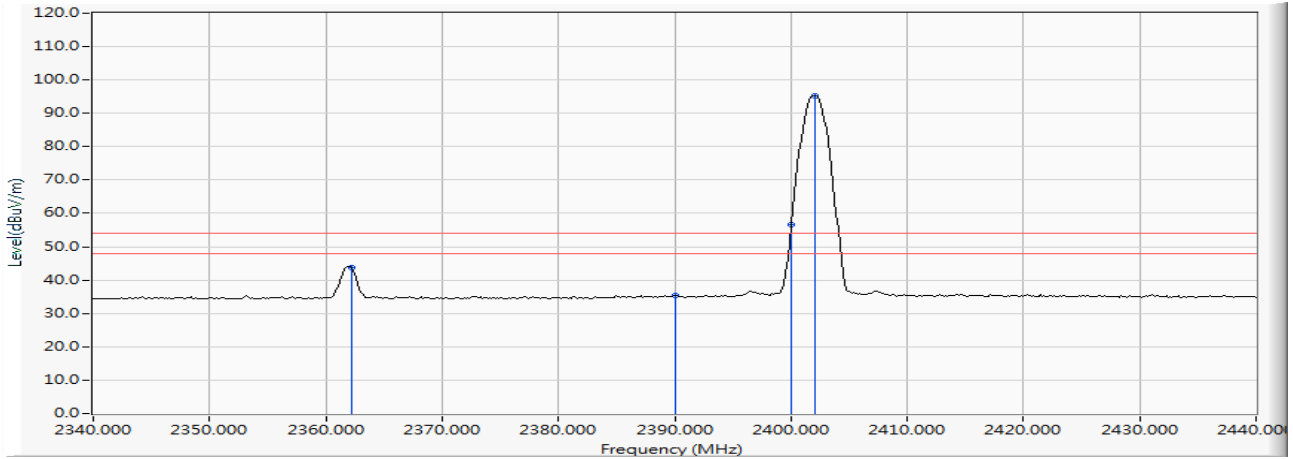
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2348.551	6.291	46.494	52.785	-21.215	74.000	PEAK
2	2390.000	6.474	43.857	50.332	-23.668	74.000	PEAK
3	2400.000	6.528	64.310	70.838	-3.162	74.000	PEAK
4	* 2401.884	6.540	89.646	96.186	22.186	74.000	PEAK

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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Vertical



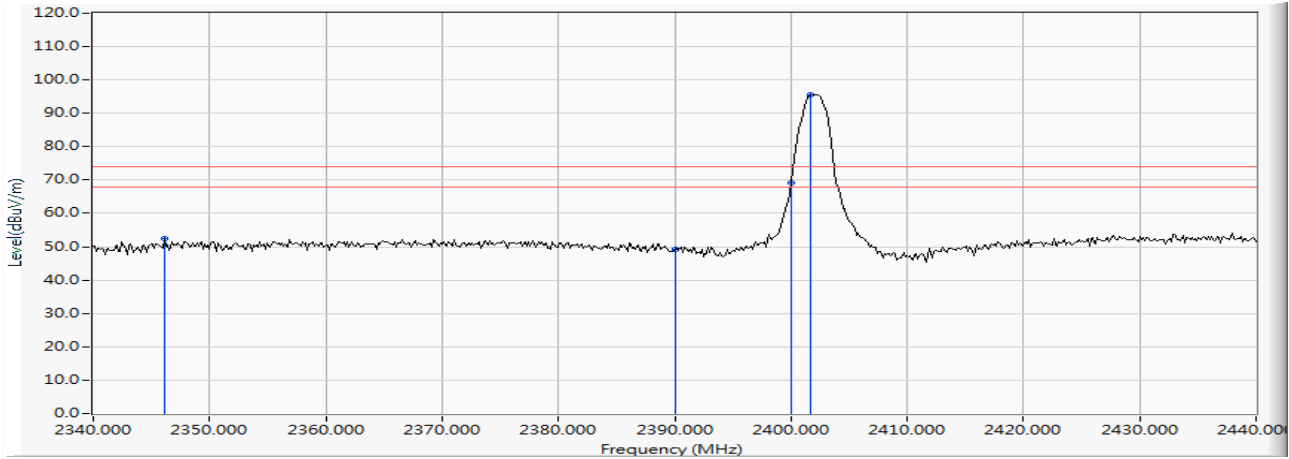
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2362.174	6.351	37.537	43.888	-10.112	54.000	AVERAGE
2		2390.000	6.474	28.757	35.232	-18.768	54.000	AVERAGE
3		2400.000	6.528	50.200	56.728	2.728	54.000	AVERAGE
4	*	2402.029	6.540	88.816	95.356	41.356	54.000	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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Horizontal



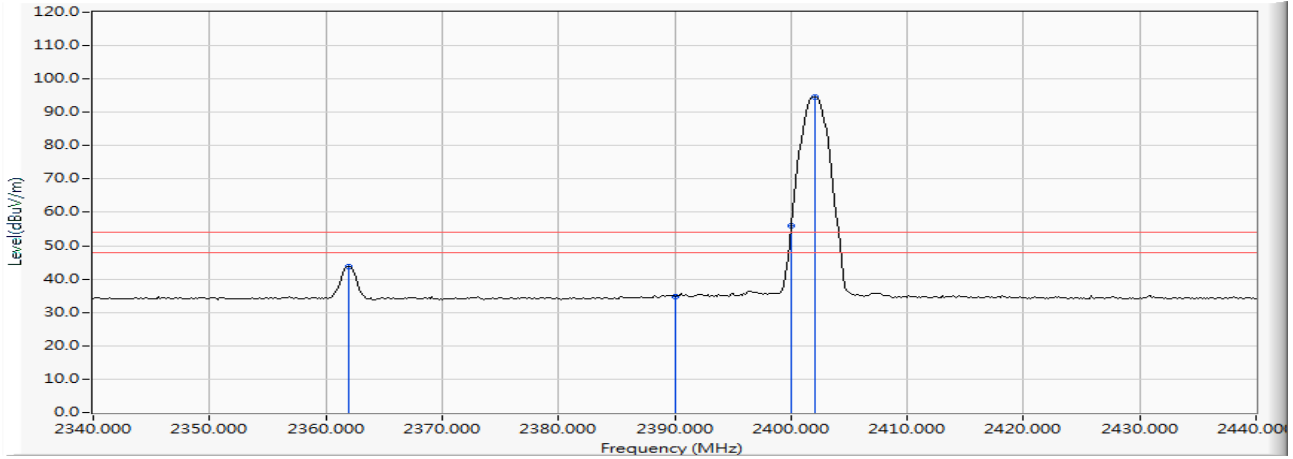
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2346.087	6.061	46.295	52.356	-21.644	74.000	PEAK
2		2390.000	5.880	43.470	49.351	-24.649	74.000	PEAK
3		2400.000	5.879	63.289	69.168	-4.832	74.000	PEAK
4	*	2401.739	5.883	89.662	95.545	21.545	74.000	PEAK

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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Vertical



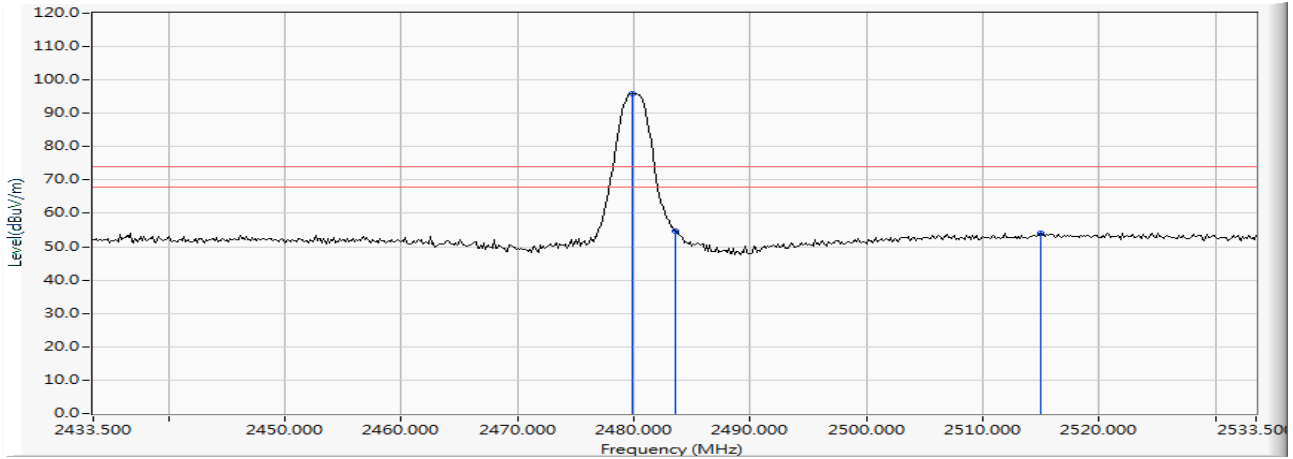
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2362.029	5.996	37.757	43.752	-10.248	54.000	AVERAGE
2	2390.000	5.880	28.873	34.754	-19.246	54.000	AVERAGE
3	2400.000	5.879	50.095	55.974	1.974	54.000	AVERAGE
4	* 2402.029	5.884	88.818	94.702	40.702	54.000	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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Horizontal



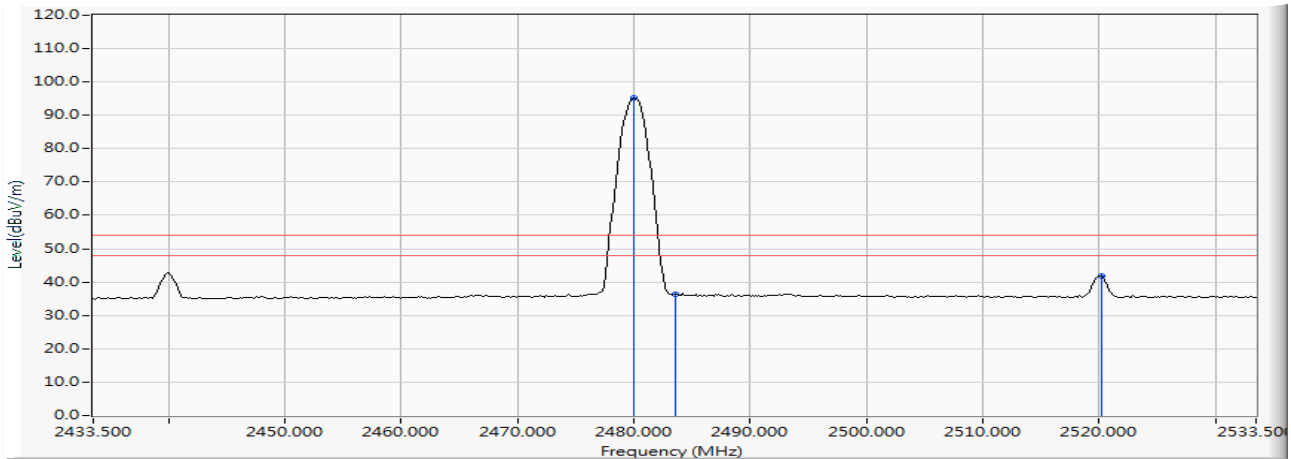
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.877	7.085	88.753	95.837	21.837	74.000	PEAK
2		2483.500	7.110	47.694	54.804	-19.196	74.000	PEAK
3		2514.949	7.151	46.859	54.010	-19.990	74.000	PEAK

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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Vertical



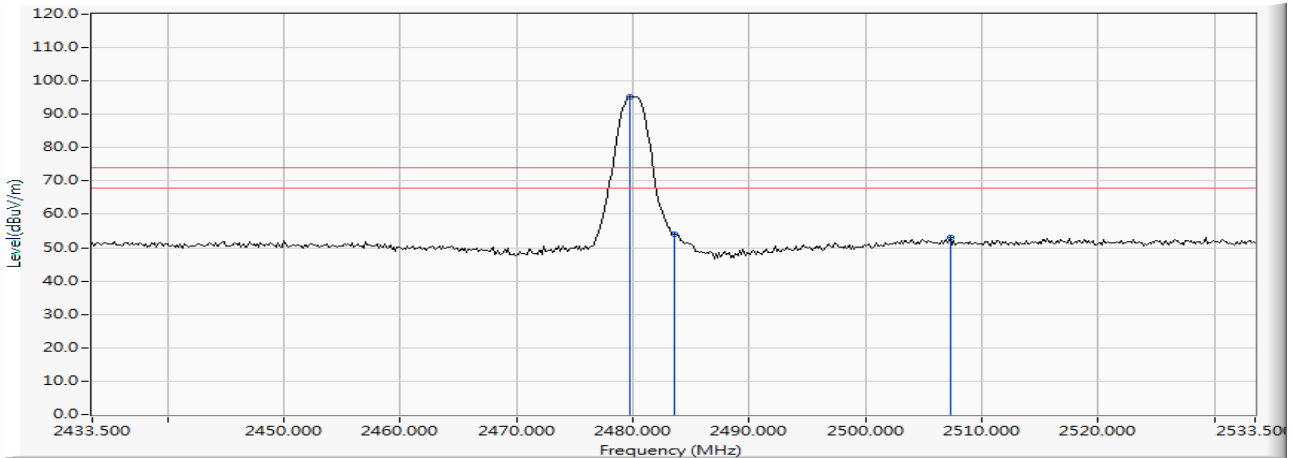
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2480.022	7.086	87.998	95.083	41.083	54.000	AVERAGE
2		2483.500	7.110	29.123	36.233	-17.767	54.000	AVERAGE
3		2520.167	7.124	34.630	41.754	-12.246	54.000	AVERAGE

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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)

Horizontal

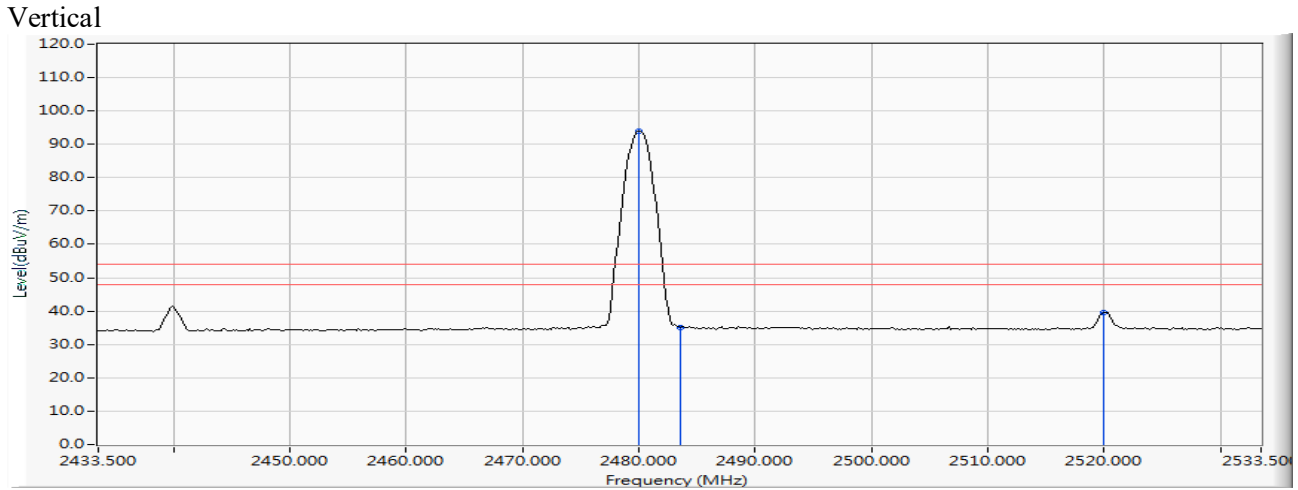


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.732	6.340	88.903	95.243	21.243	74.000	PEAK
2		2483.500	6.363	47.810	54.173	-19.827	74.000	PEAK
3		2507.268	6.458	46.481	52.939	-21.061	74.000	PEAK

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 : INSTAX MINI HM1
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test date : 2019/02/19
 Test Mode : Mode 1: Transmit - BLE (GFSK)



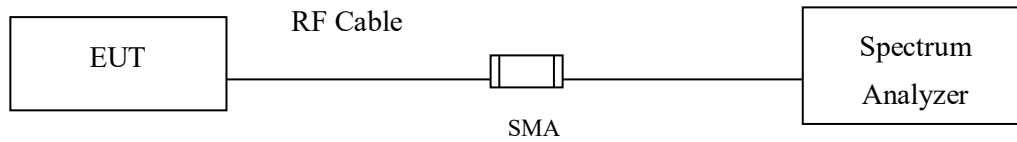
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2480.022	6.342	87.580	93.922	39.922	54.000	AVERAGE
2		2483.500	6.363	28.807	35.170	-18.830	54.000	AVERAGE
3		2520.022	6.465	33.255	39.720	-14.280	54.000	AVERAGE

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

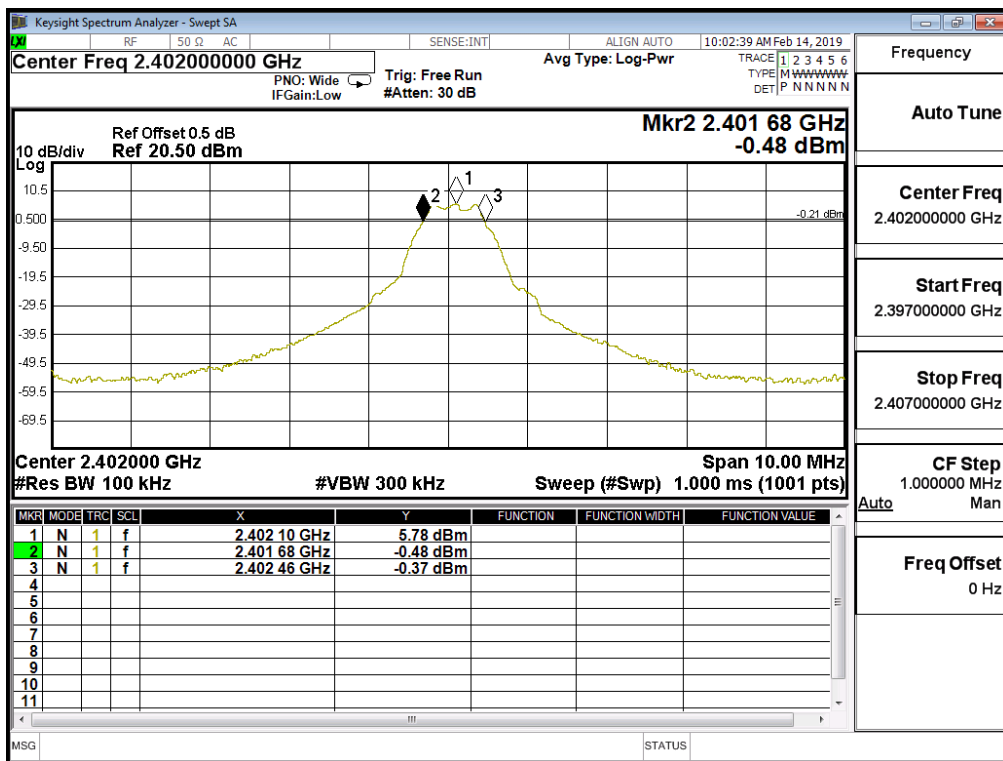
$\pm 283\text{Hz}$

7.5. Test Result of 6dB Bandwidth

Product : INSTAX MINI HM1
 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	780	>500	Pass

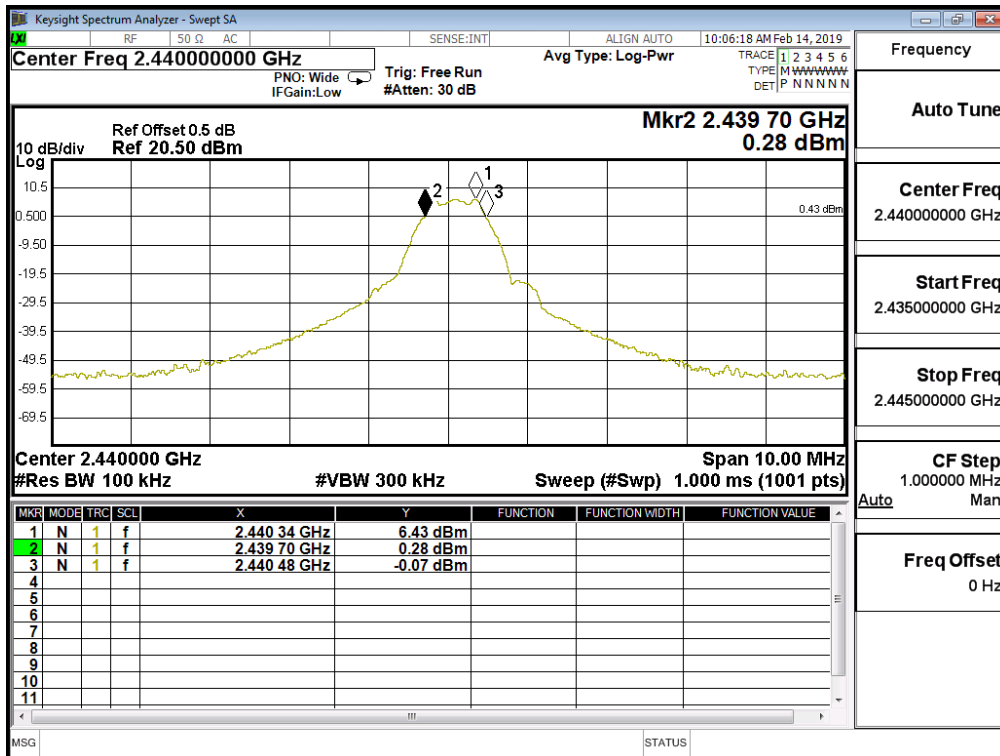
Figure Channel 00:



Product : INSTAX MINI HM1
 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	780	>500	Pass

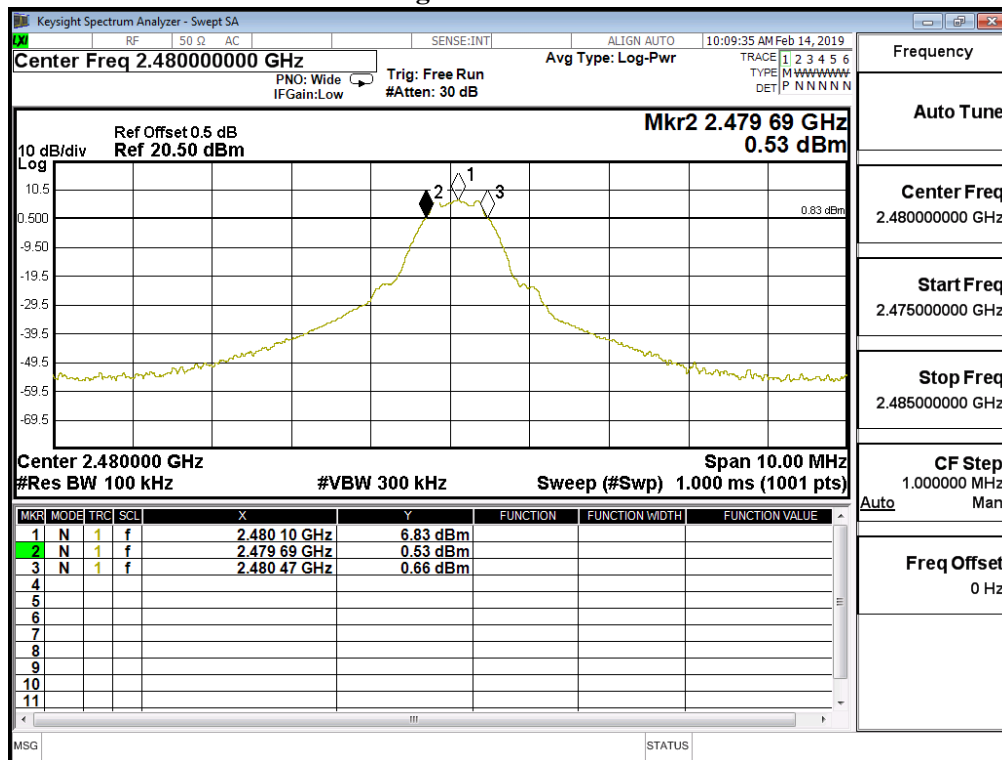
Figure Channel 19:



Product : INSTAX MINI HM1
 Test Item : 6dB Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

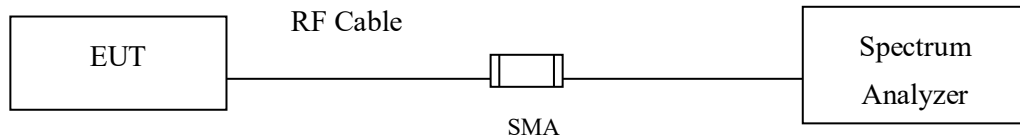
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2480	780	>500	Pass

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

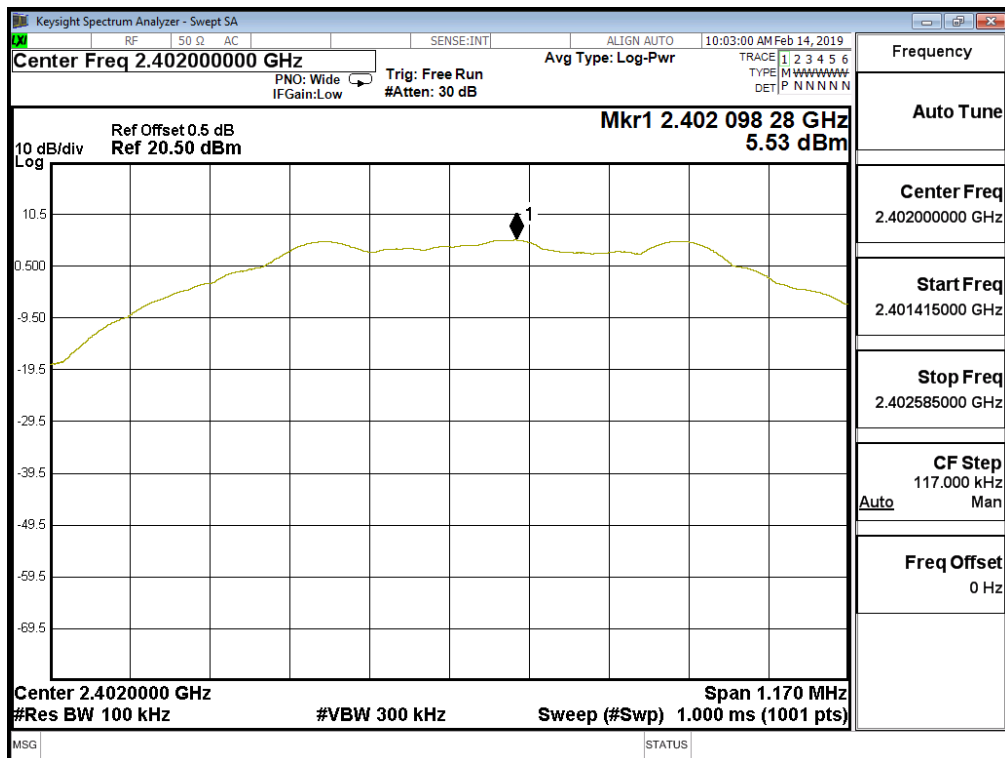
± 1.20 dB

8.5. Test Result of Power Density

Product : INSTAX MINI HM1
 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	5.530	≤ 8dBm	Pass

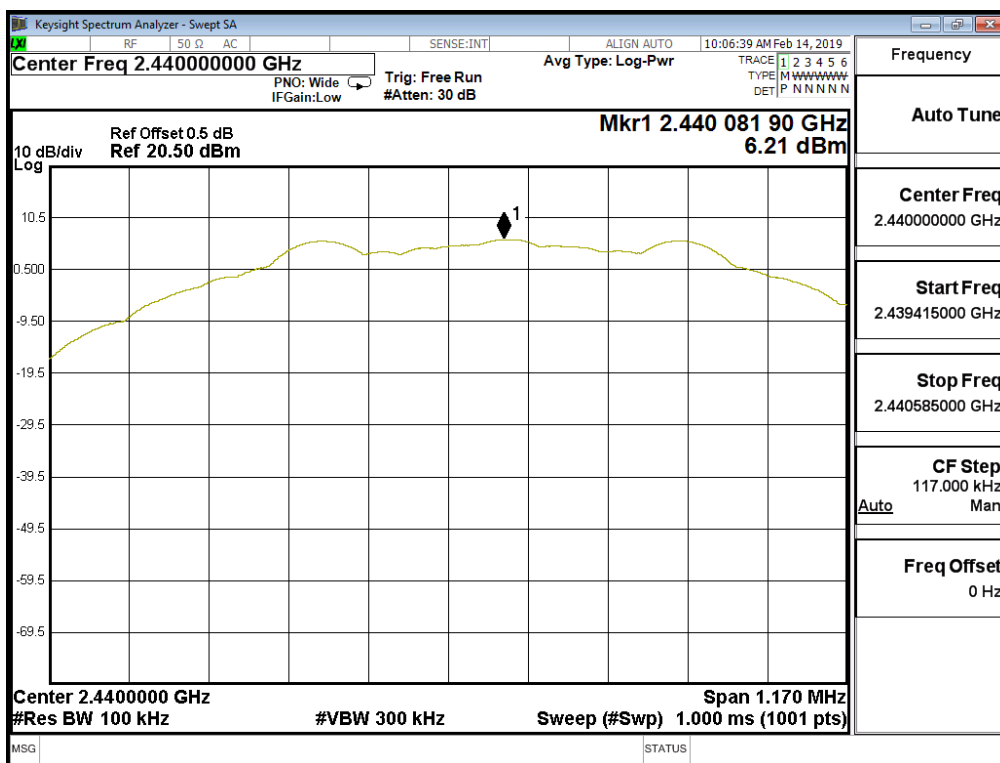
Figure Channel 00:



Product : INSTAX MINI HM1
 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	6.210	≤ 8dBm	Pass

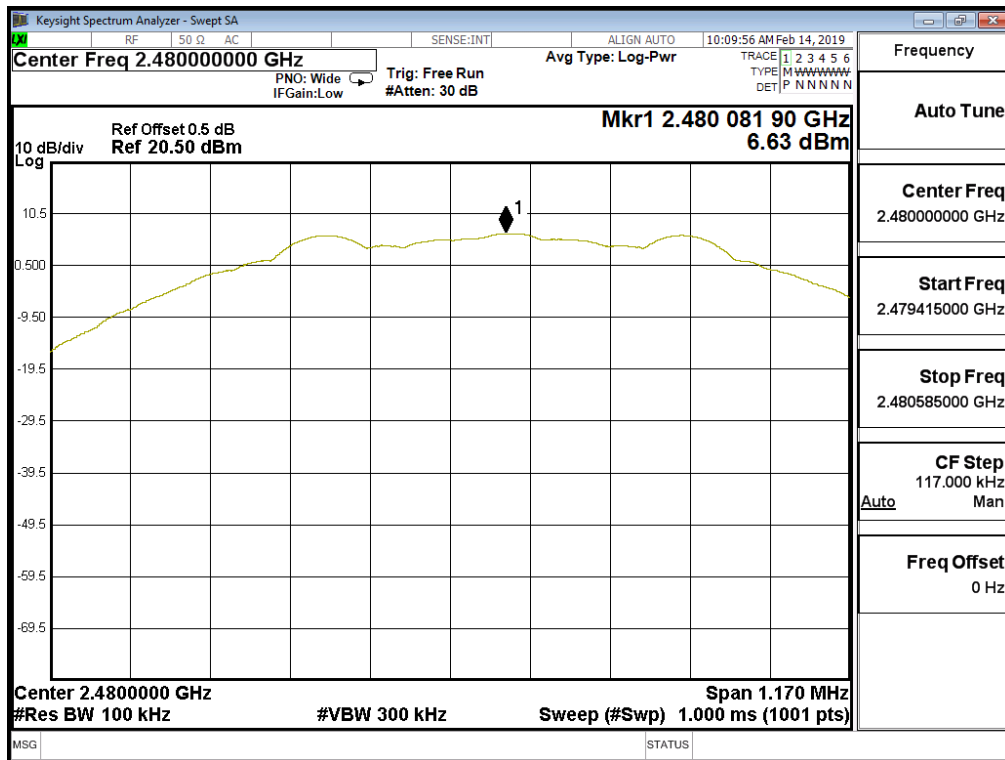
Figure Channel 19:



Product : INSTAX MINI HM1
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

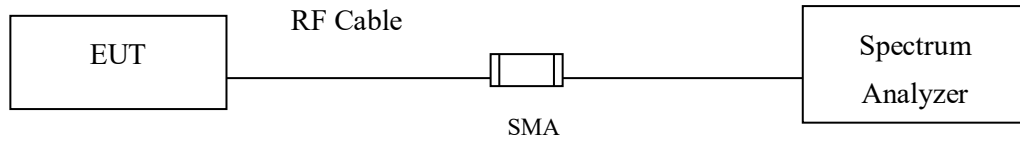
Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	6.630	≤ 8dBm	Pass

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 : INSTAX MINI HM1
 Test Item : Duty Cycle
 Test Mode : Mode 1: Transmit - BLE (GFSK)

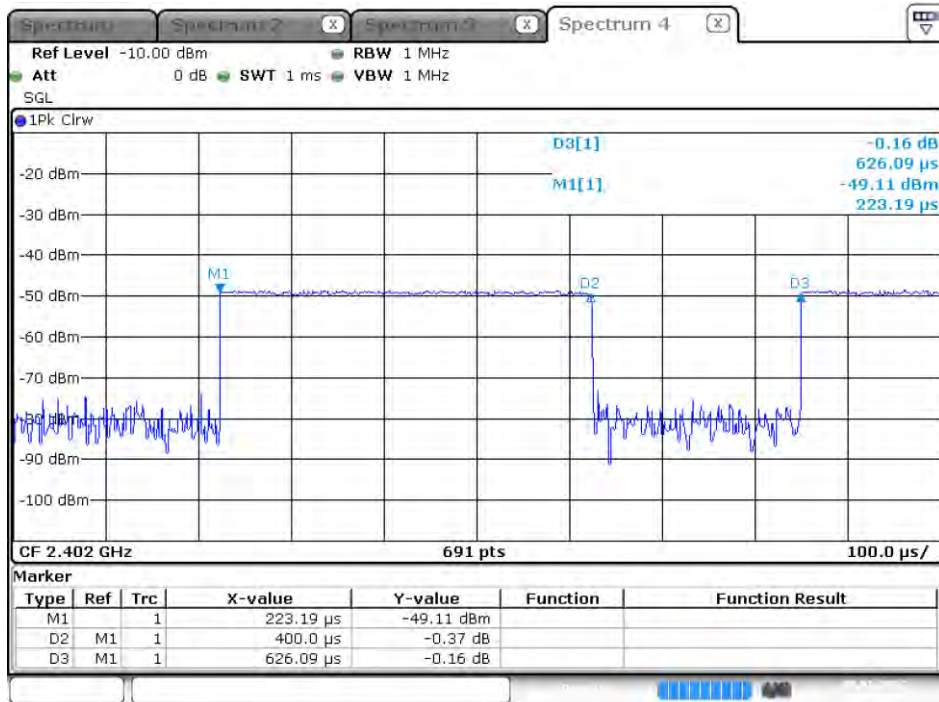
Duty Cycle Formula:

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

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

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE	0.4000	0.6261	63.89	1.95



Date: 8 JAN.2007. 18:12:28

10. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs