FCC Test Report

Product Name	Humly Room Display One
Model No.	HUM1001
FCC ID.	2APYB-HUM1001

Applicant	Certus Eiger Ltd.
Address	814, Houston Center, Mody Road, TST East Kowloon, Hong Kong

Date of Receipt	Oct. 08, 2019
Issued Date	Nov. 13, 2019
Report No.	19A0116R-RFUSP01V00-A
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..

Test Report

Issued Date: Nov. 13, 2019
Report No.: 19A0116R-RFUSP01V00-A

Product Name	Humly Room Display One
Applicant	Certus Eiger Ltd.
Address	814, Houston Center, Mody Road, TST East Kowloon, Hong Kong
Manufacturer	Certus Eiger Ltd.
Model No.	HUM1001
FCC ID.	2APYB-HUM1001
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 110 V / 50 Hz
Trade Name	Humly
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Rita Huang

(Senior Adm. Specialist / Rita Huang)

Tested By : Yun Che Chen

(Engineer / Yunche Chen)

Approved By :

(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs
Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Humly Room Display One
Trade Name	Humly
Model No.	HUM1001
FCC ID.	2APYB-HUM1001
Frequency Range	2402 – 2480MHz
Channel Number	V5.0: 40CH
Type of Modulation	V5.0: GFSK(2Mbps)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	ANJIE	AJDQ1J-B0027 (Main), AJDQ1J-W0020 (Aux)	PIFA Antenna	2.17dBi for 2.4GHz

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

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

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

Note:

1. The EUT is a Humly Room Display One with built-in WLAN (802.11a/b/g/n/ac) and Bluetooth (5.0 and V3.0+HS, V2.1+EDR) transceiver, this report for Bluetooth V5.0.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth 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.
5. The consider Co-Location based on KDB 996369 D02 Question 1 and KDB 996369 D04 for Radiated Spurious Emission.

Test Mode	Mode 1: Transmit - BLE (1Mbps) Mode 2: Transmit - BLE (2Mbps) Mode 3: Transmit - BLE (1Mbps)+NFC Mode 4: Transmit - BLE (2Mbps)+NFC

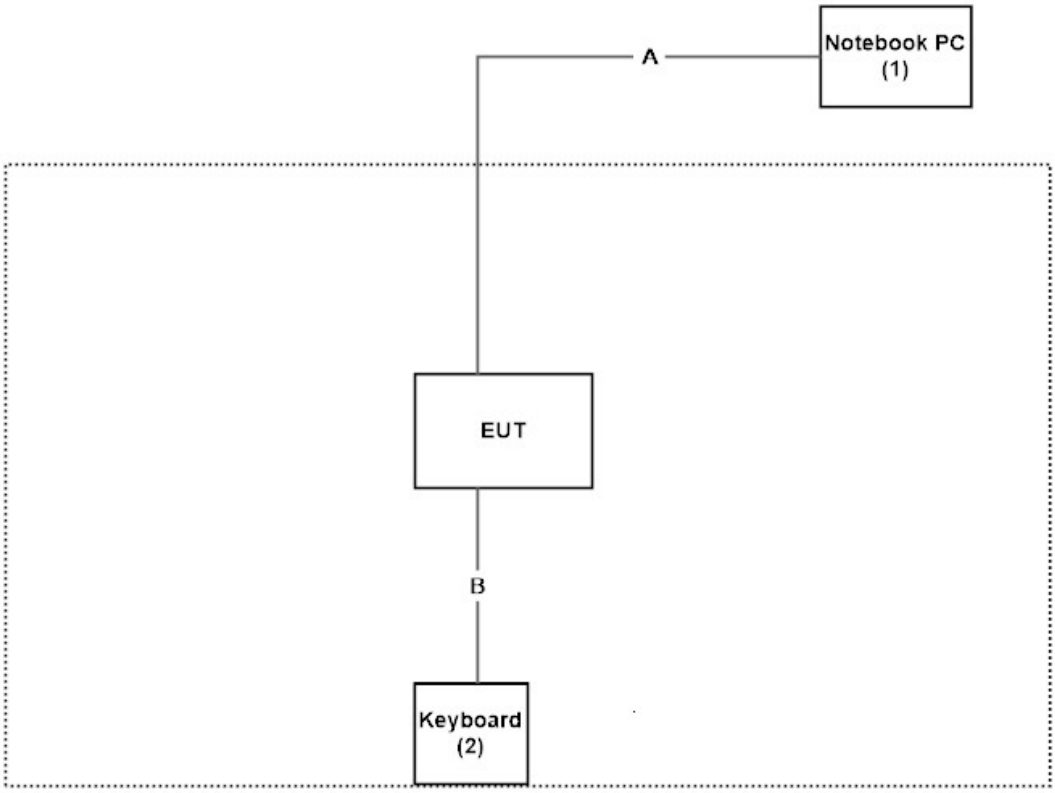
1.3. Tested System Details

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	B6TYTZ1	Non-Shielded, 0.8m
2	Keyboard	Dell	SK-8175	MY-0W217F-71619-092-0497-A01	N/A

Signal Cable Type		Signal cable Description
A	LAN Cable	Non-Shielded, 2.0m
B	Keyboard Cable	Shielded, 1.8m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

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

1.6. 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

USA : FCC Registration Number: TW3023

Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

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

1.7. List of Test Equipment

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	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/30	2020/07/29
X	EMI Test Receiver	R&S	ESCS 30	100369	2018/11/19	2019/11/18
X	LISN	R&S	ENV216	101105	2019/04/10	2020/04/09
X	LISN	R&S	ESH3-Z5	836679/014	2019/04/10	2020/04/09
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/20	2020/06/19

Note:

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

For Radiated measurements /Site3/CB8

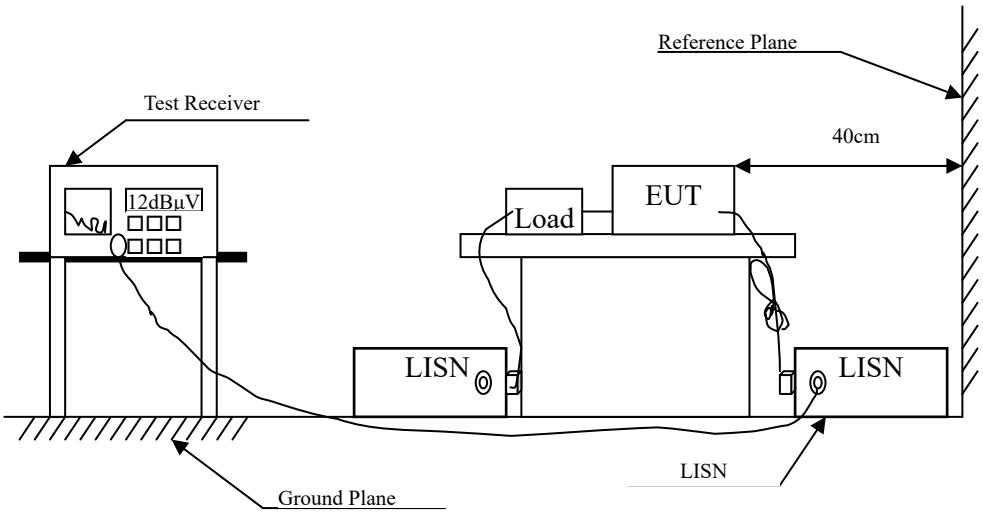
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2019/03/11	2020/03/10
X	Loop Antenna	Teseq	HLA6121	37133	2019/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2794	2019/06/23	2020/06/22
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC001330	980254	2019/08/22	2020/08/21
X	Horn Antenna	ETS-LINDGREN	3117	00228113	2019/05/02	2020/05/01
X	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC05820SE	980362	2019/06/26	2020/06/25
X	Amplifier	EMCI	EMC051845SE	SN980632	2019/08/08	2020/08/07
	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
	Amplifier + Cable	EMCI	EMC184045SE	980369	2019/04/16	2020/04/15
	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2019/06/23	2020/06/22
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC001330	980255	2019/06/28	2020/06/27
X	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

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 System V2.1.134.

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.

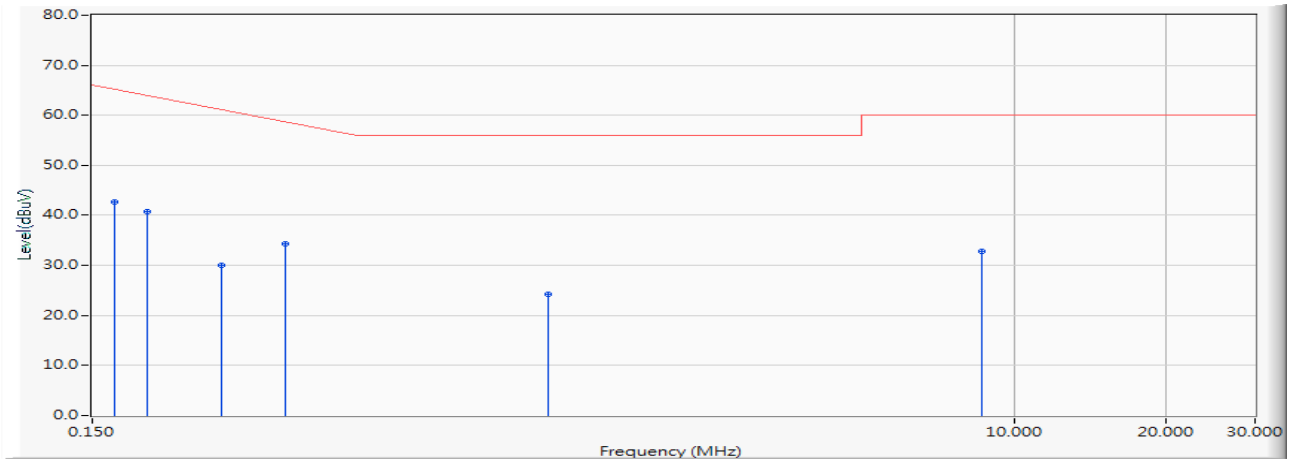
2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test date	:	2019/11/02
Test Mode	:	Mode 2: Transmit - BLE (2Mbps) (2440MHz)

Line1



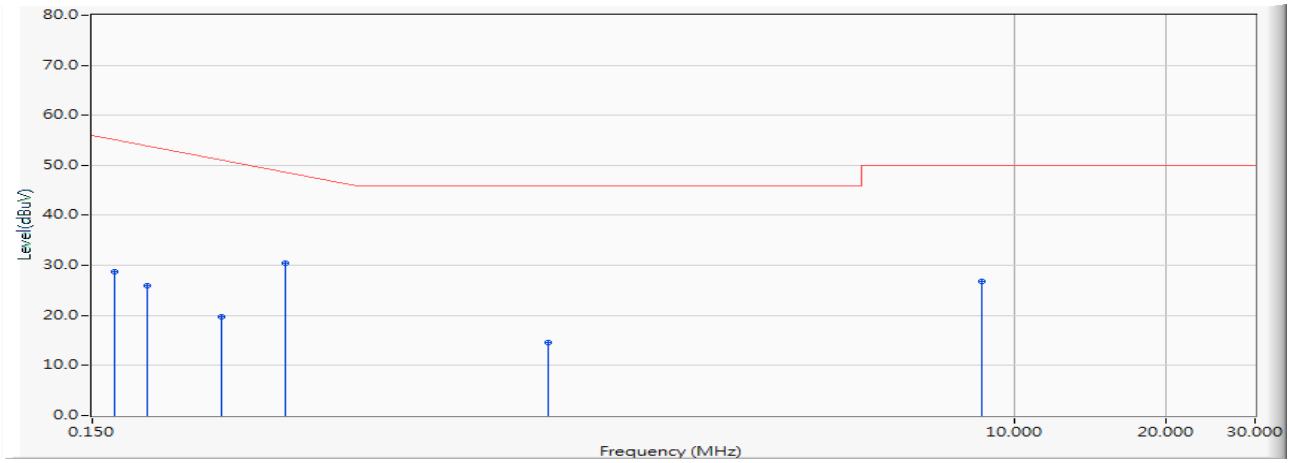
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.166	9.669	33.110	42.779	-22.764	65.543	QUASIPEAK
2		0.193	9.670	31.130	40.800	-23.971	64.771	QUASIPEAK
3		0.271	9.674	20.360	30.034	-32.509	62.543	QUASIPEAK
4		0.361	9.679	24.660	34.339	-25.632	59.971	QUASIPEAK
5		1.197	9.725	14.480	24.205	-31.795	56.000	QUASIPEAK
6		8.642	9.986	22.910	32.896	-27.104	60.000	QUASIPEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test date	:	2019/11/02
Test Mode	:	Mode 2: Transmit - BLE (2Mbps) (2440MHz)

Line1



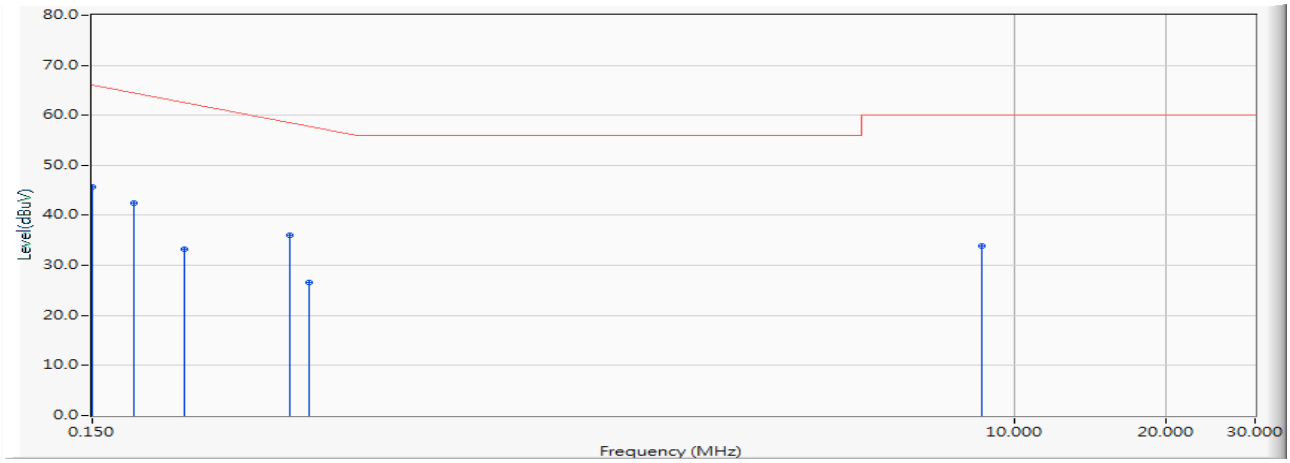
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.166	9.669	19.110	28.779	-26.764	55.543	AVERAGE
2		0.193	9.670	16.200	25.870	-28.901	54.771	AVERAGE
3		0.271	9.674	9.960	19.634	-32.909	52.543	AVERAGE
4	*	0.361	9.679	20.670	30.349	-19.622	49.971	AVERAGE
5		1.197	9.725	4.950	14.675	-31.325	46.000	AVERAGE
6		8.642	9.986	16.820	26.806	-23.194	50.000	AVERAGE

Note:

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

Product : Humly Room Display One
Test Item : Conducted Emission Test
Test date : 2019/11/02
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2440MHz)

Line2



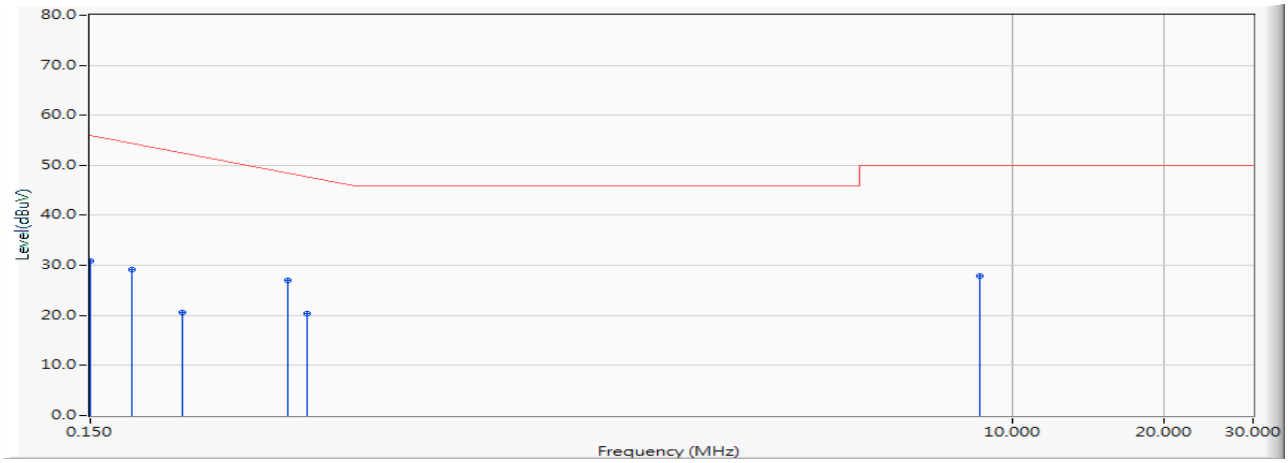
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.150	9.708	35.920	45.628	-20.372	66.000	QUASIPEAK
2		0.181	9.702	32.830	42.532	-22.582	65.114	QUASIPEAK
3		0.228	9.702	23.630	33.332	-30.439	63.771	QUASIPEAK
4		0.369	9.710	26.290	36.000	-23.743	59.743	QUASIPEAK
5		0.404	9.712	16.930	26.642	-32.101	58.743	QUASIPEAK
6		8.654	10.046	23.880	33.926	-26.074	60.000	QUASIPEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test date	:	2019/11/02
Test Mode	:	Mode 2: Transmit - BLE (2Mbps) (2440MHz)

Line2



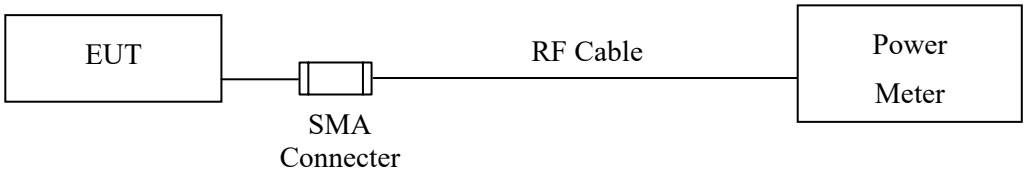
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.150	9.708	21.150	30.858	-25.142	56.000	AVERAGE
2		0.181	9.702	19.570	29.272	-25.842	55.114	AVERAGE
3		0.228	9.702	10.950	20.652	-33.119	53.771	AVERAGE
4		0.369	9.710	17.350	27.060	-22.683	49.743	AVERAGE
5		0.404	9.712	10.630	20.342	-28.401	48.743	AVERAGE
6	*	8.654	10.046	17.810	27.856	-22.144	50.000	AVERAGE

Note:

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

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

3.4. Uncertainty

± 1.19 dB

3.5. Test Result of Peak Power Output

Product : Humly Room Display One
Test Item : Peak Power Output
Test date : 2019/11/01
Test Mode : Mode 1: Transmit - BLE (1Mbps)

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	1.03	1 Watt= 30 dBm	Pass
Channel 19	2440.00	1.03	1 Watt= 30 dBm	Pass
Channel 39	2480.00	0.27	1 Watt= 30 dBm	Pass

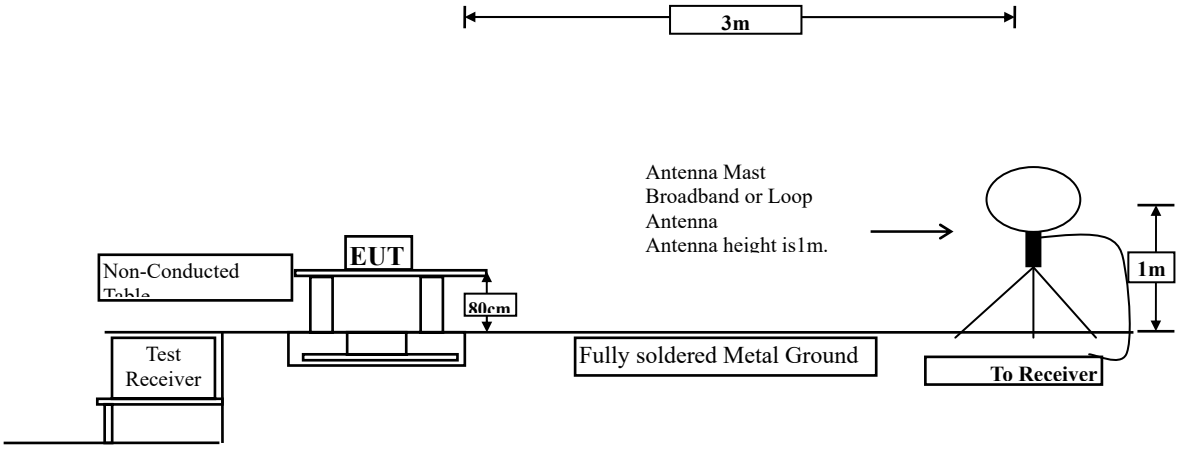
Product : Humly Room Display One
Test Item : Peak Power Output
Test date : 2019/11/01
Test Mode : Mode 2: Transmit - BLE (2Mbps)

Channel No.	Frequency (MHz)	Peak Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	1.23	1 Watt= 30 dBm	Pass
Channel 19	2440.00	1.06	1 Watt= 30 dBm	Pass
Channel 39	2480.00	0.34	1 Watt= 30 dBm	Pass

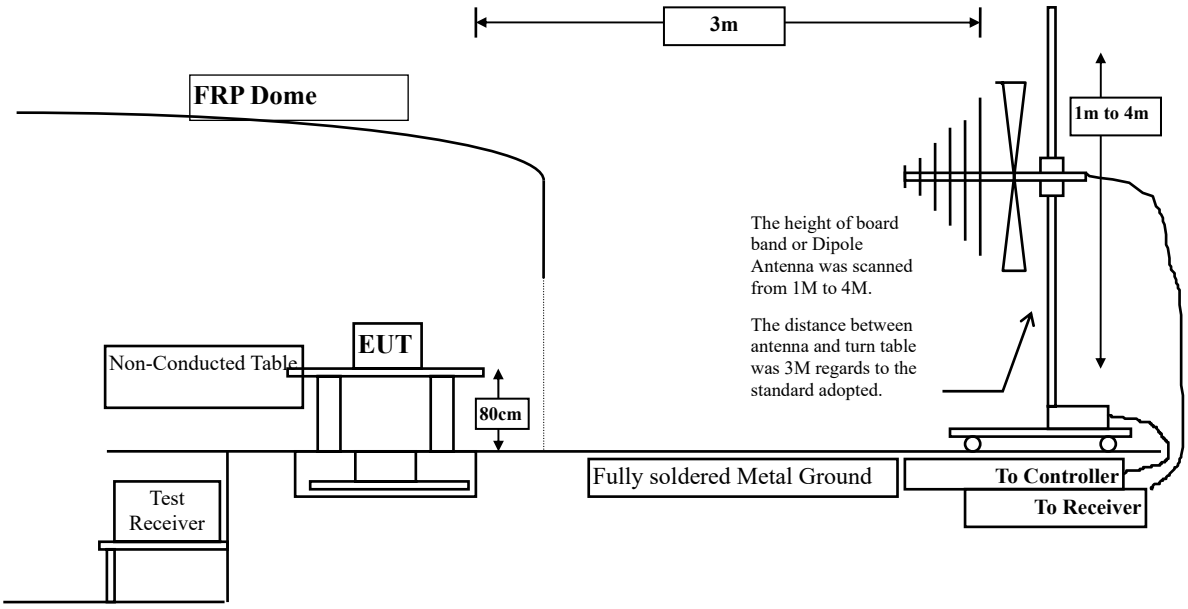
4. Radiated Emission

4.1. Test Setup

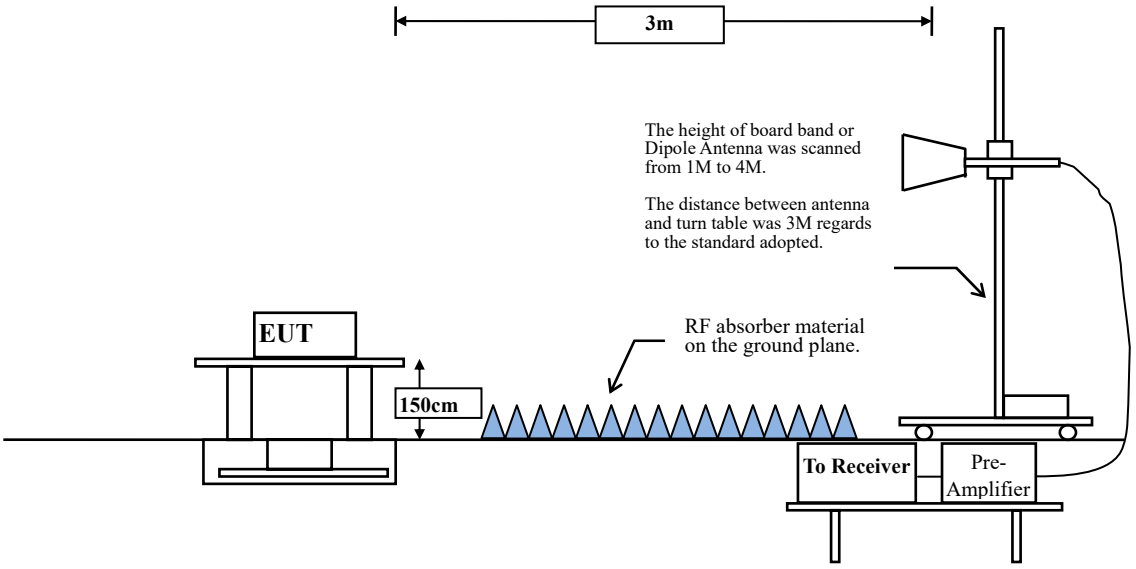
Under 30MHz



Below 1GHz



Above 1GHz


3m
The height of board band or Dipole Antenna was scanned from 1M to 4M.
The distance between antenna and turn table was 3M regards to the standard adopted.
EUT
150cm
RF absorber material on the ground plane.
To Receiver
Pre-Amplifier

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

4.3. Test Procedure

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

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

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

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

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

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

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

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

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

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

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

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

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

According to C63.10 Section 11.12.2.5 Average measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

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

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE-1Mpbs	85.36	2.1304	469	500
BLE-2Mpbs	86.77	1.0916	916	1000

Note: Duty Cycle Refer to Section 9

4.4. Uncertainty

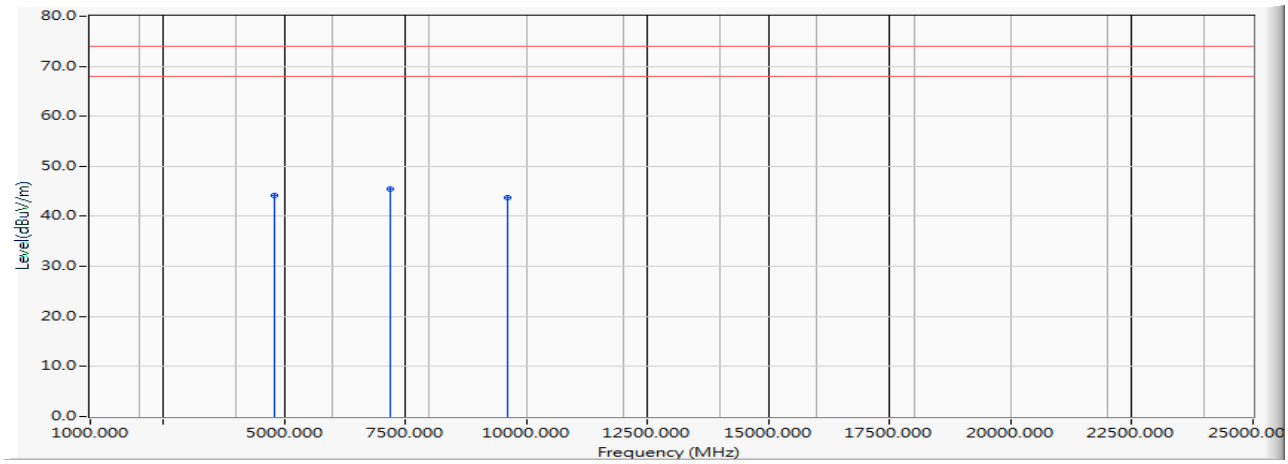
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC(2402MHz)

Horizontal



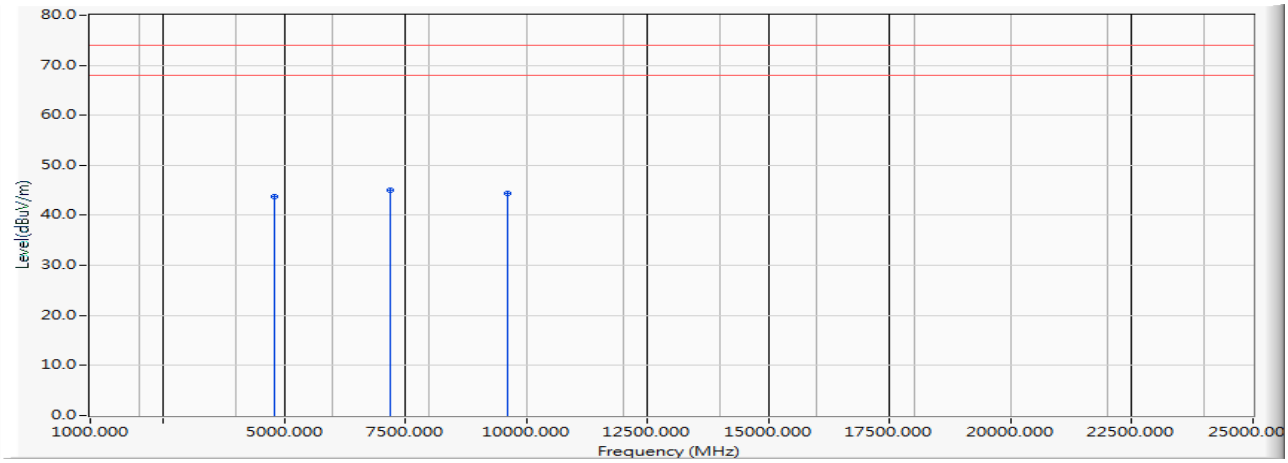
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	-12.148	56.260	44.112	-29.888	74.000	PEAK
2	*	7206.000	-13.147	58.640	45.493	-28.507	74.000	PEAK
3		9608.000	-13.430	57.210	43.780	-30.220	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC(2402MHz)

Vertical



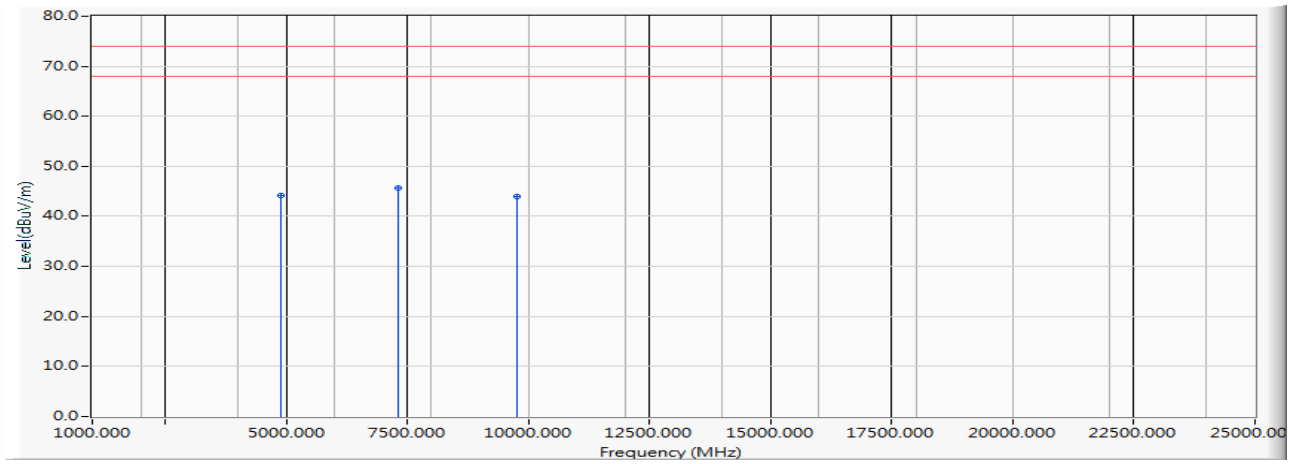
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	-12.148	56.000	43.852	-30.148	74.000	PEAK
2	*	7206.000	-13.147	58.240	45.093	-28.907	74.000	PEAK
3		9608.000	-13.430	57.810	44.380	-29.620	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC (2440MHz)

Horizontal



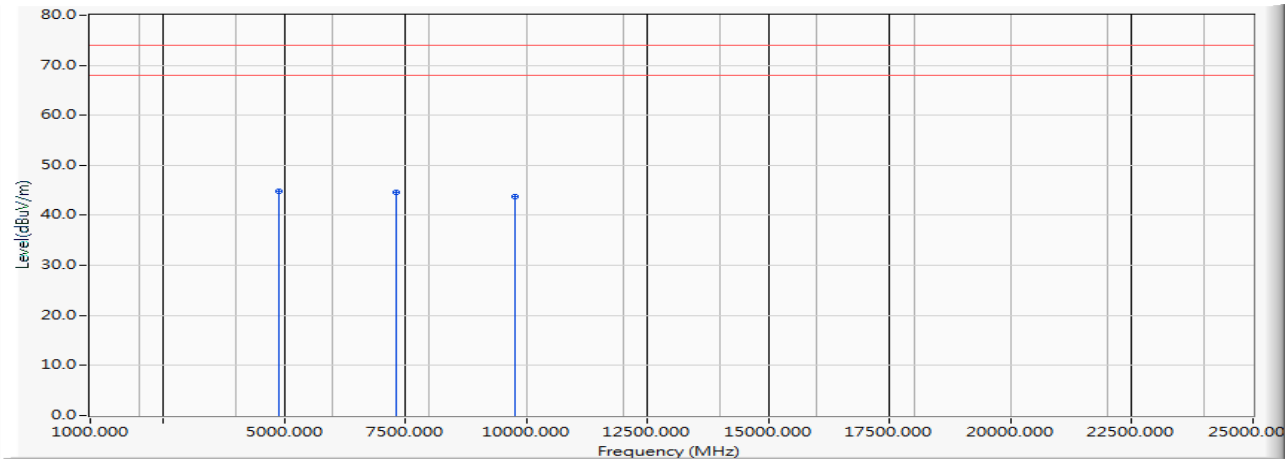
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	-11.601	55.800	44.199	-29.801	74.000	PEAK
2	*	7320.000	-13.547	59.300	45.753	-28.247	74.000	PEAK
3		9760.000	-12.486	56.510	44.025	-29.975	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC (2440MHz)

Vertical



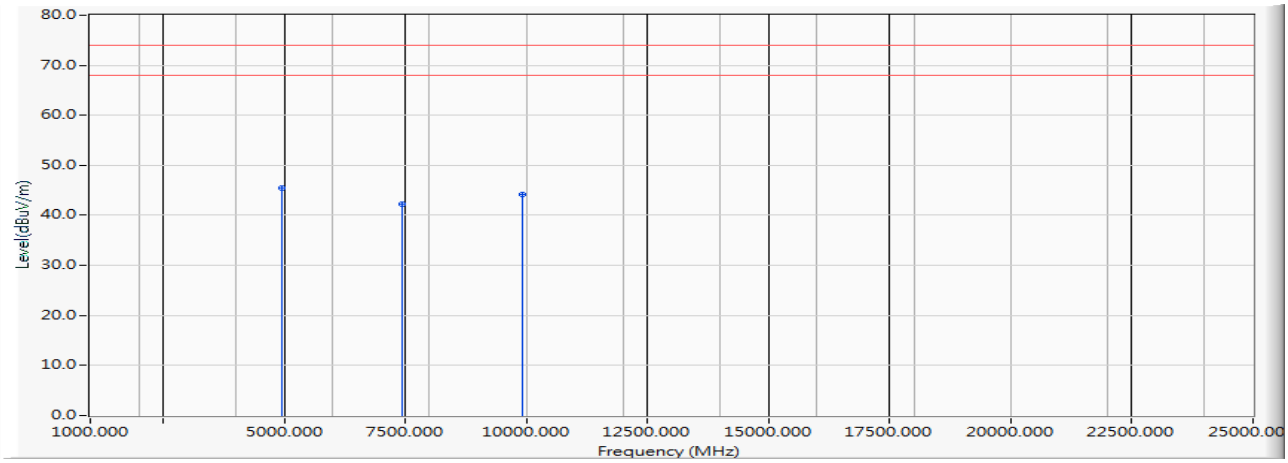
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4880.000	-11.601	56.350	44.749	-29.251	74.000	PEAK
2		7320.000	-13.547	58.220	44.673	-29.327	74.000	PEAK
3		9760.000	-12.486	56.160	43.675	-30.325	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC (2480MHz)

Horizontal



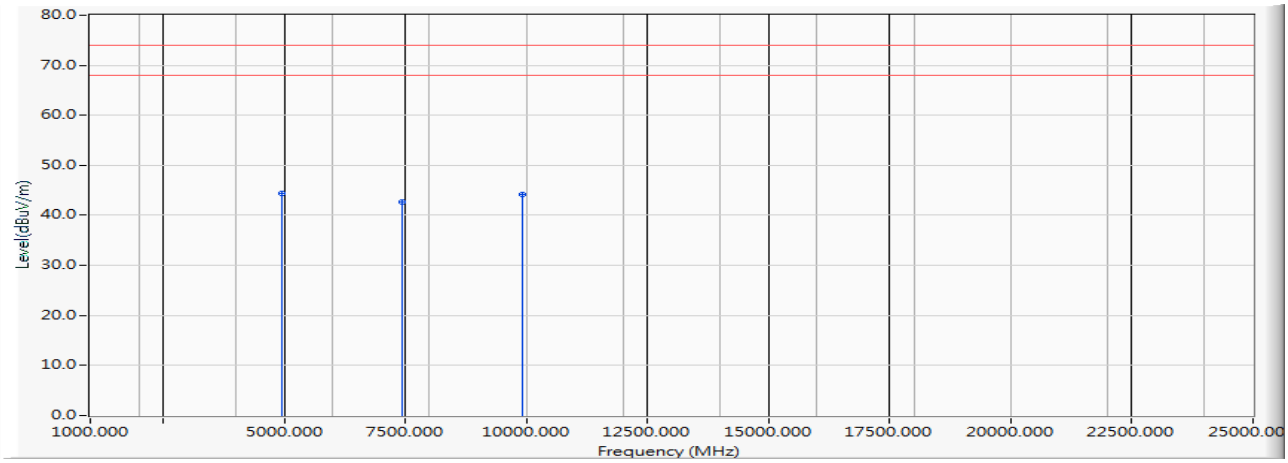
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4960.000	-10.882	56.260	45.378	-28.622	74.000	PEAK
2		7440.000	-14.622	56.980	42.358	-31.642	74.000	PEAK
3		9920.000	-14.231	58.350	44.119	-29.881	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC (2480MHz)

Vertical



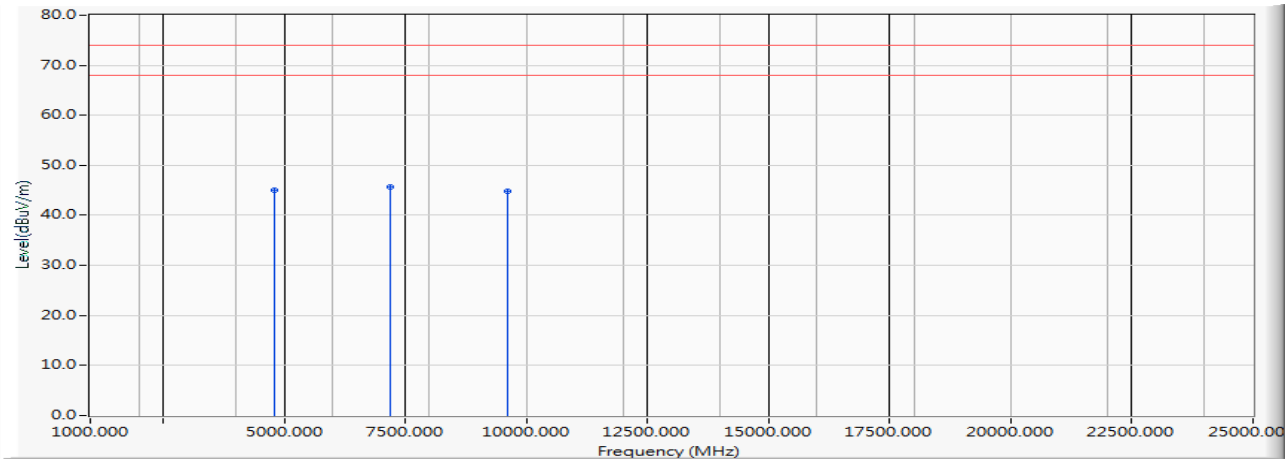
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4960.000	-10.882	55.260	44.378	-29.622	74.000	PEAK
2		7440.000	-14.622	57.350	42.728	-31.272	74.000	PEAK
3		9920.000	-14.231	58.340	44.109	-29.891	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 4: Transmit - BLE (2Mbps)+NFC(2402MHz)

Horizontal



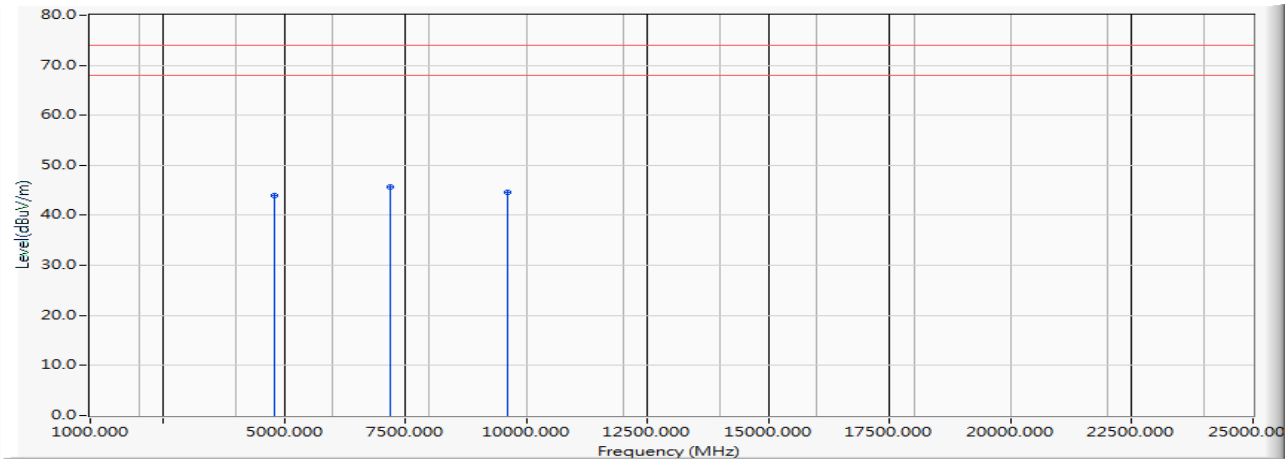
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	-12.148	57.260	45.112	-28.888	74.000	PEAK
2	*	7206.000	-13.147	58.741	45.594	-28.406	74.000	PEAK
3		9608.000	-13.430	58.270	44.840	-29.160	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 4: Transmit - BLE (2Mbps)+NFC(2402MHz)

Vertical



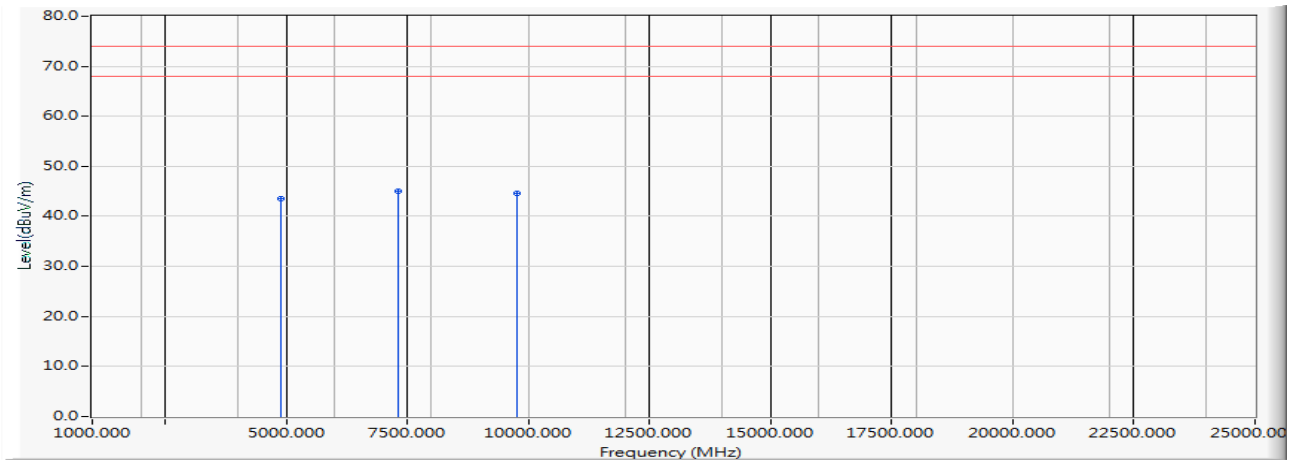
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	-12.148	56.096	43.948	-30.052	74.000	PEAK
2	*	7206.000	-13.147	58.795	45.648	-28.352	74.000	PEAK
3		9608.000	-13.430	58.050	44.620	-29.380	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 4: Transmit - BLE (2Mbps)+NFC (2440MHz)

Horizontal



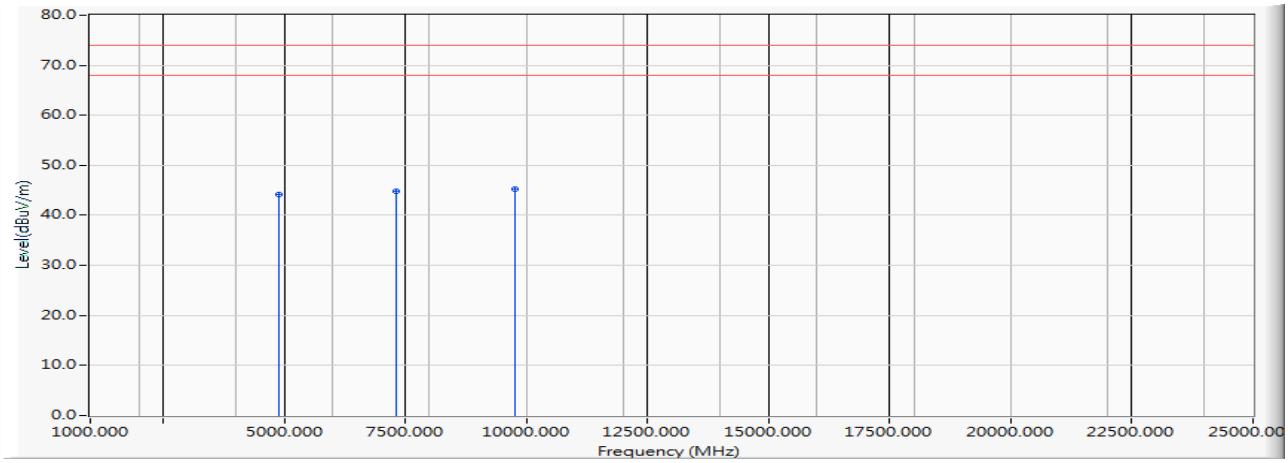
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	-11.601	55.160	43.559	-30.441	74.000	PEAK
2	*	7320.000	-13.547	58.620	45.073	-28.927	74.000	PEAK
3		9760.000	-12.486	57.120	44.635	-29.365	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 4: Transmit - BLE (2Mbps)+NFC (2440MHz)

Vertical



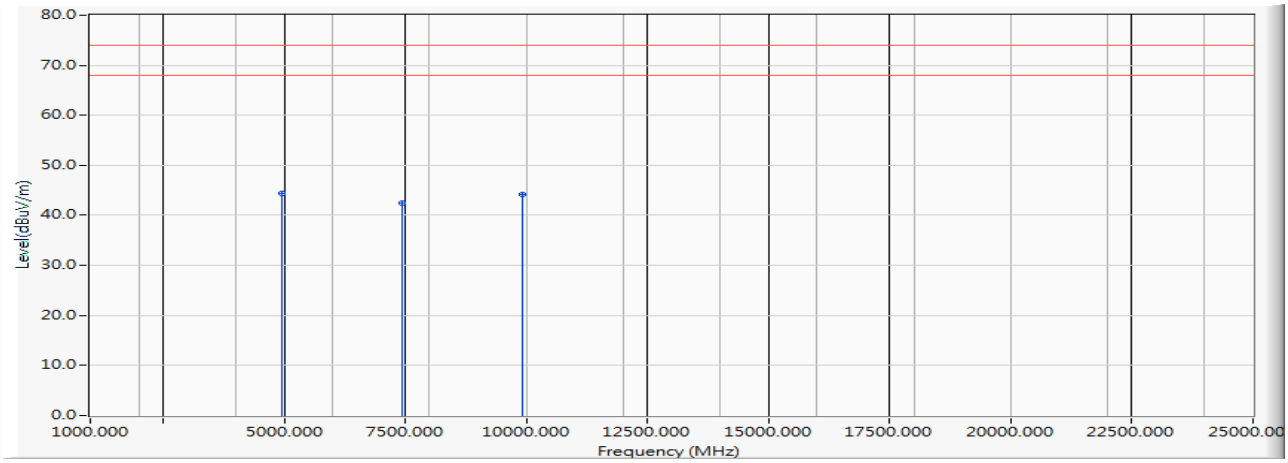
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	-11.601	55.760	44.159	-29.841	74.000	PEAK
2		7320.000	-13.547	58.350	44.803	-29.197	74.000	PEAK
3	*	9760.000	-12.486	57.740	45.255	-28.745	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 4: Transmit - BLE (2Mbps)+NFC (2480MHz)

Horizontal



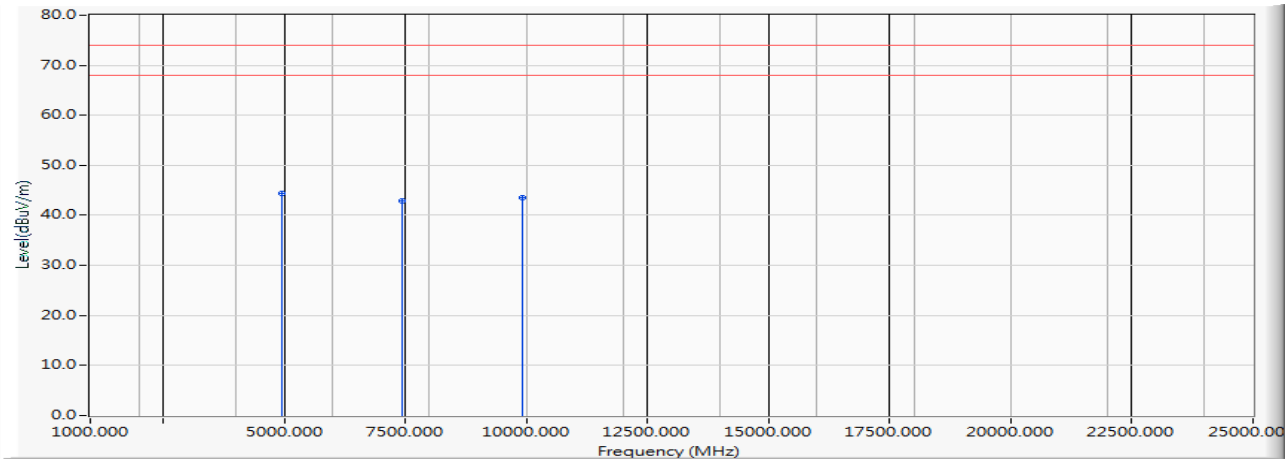
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4960.000	-10.882	55.190	44.308	-29.692	74.000	PEAK
2		7440.000	-14.622	56.990	42.368	-31.632	74.000	PEAK
3		9920.000	-14.231	58.410	44.179	-29.821	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Humly Room Display One
Test Item : Harmonic Radiated Emission
Test date : 2019/11/02
Test Mode : Mode 4: Transmit - BLE (2Mbps)+NFC (2480MHz)

Vertical



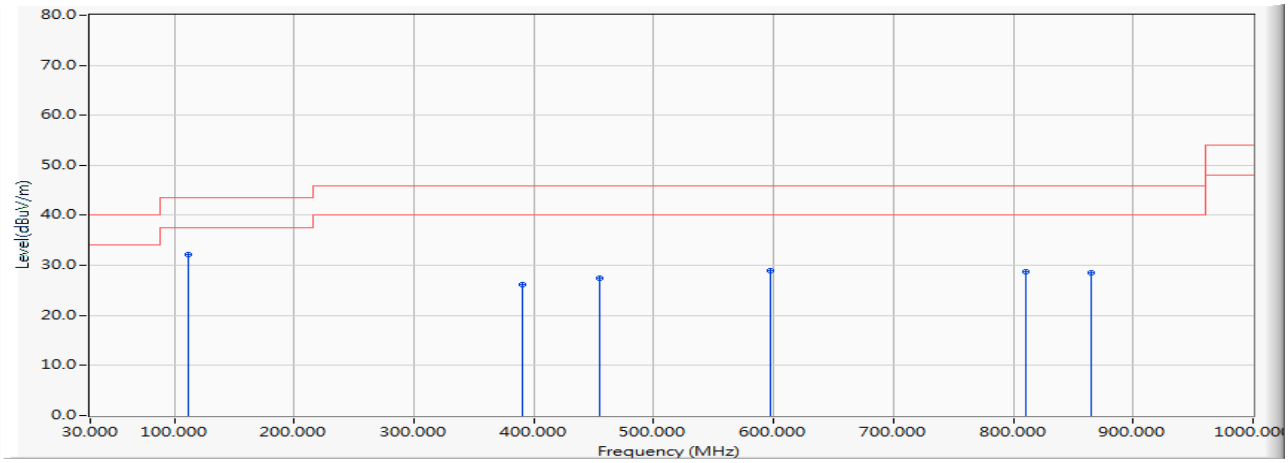
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4960.000	-10.882	55.190	44.308	-29.692	74.000	PEAK
2		7440.000	-14.622	57.440	42.818	-31.182	74.000	PEAK
3		9920.000	-14.231	57.690	43.459	-30.541	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	Humly Room Display One
Test Item	:	General Radiated Emission
Test date	:	2019/11/02
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2440MHz)

Horizontal



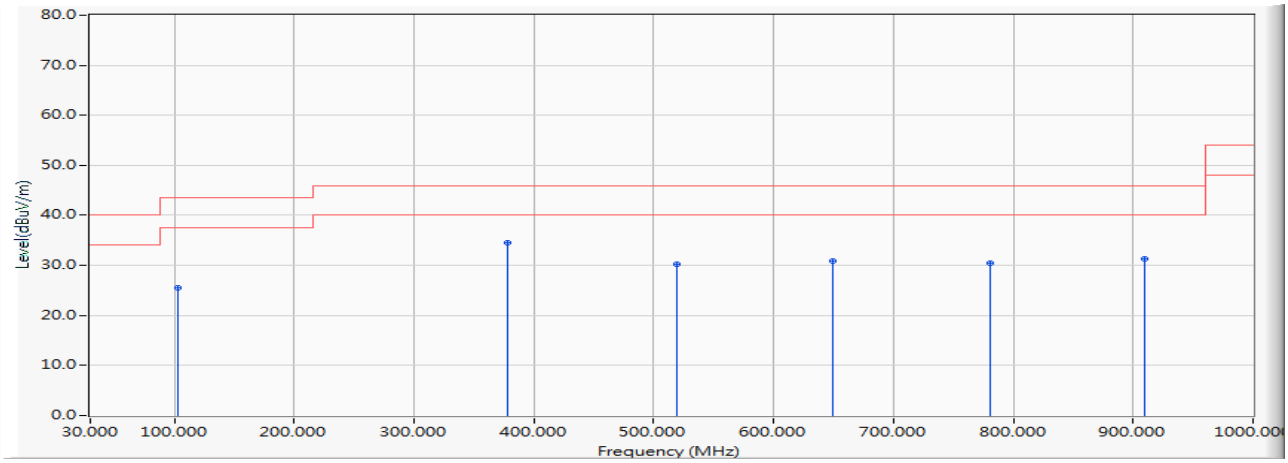
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	111.536	-16.821	48.993	32.172	-11.328	43.500	QUASIPEAK
2		389.884	-12.845	39.106	26.261	-19.739	46.000	QUASIPEAK
3		454.551	-10.307	37.734	27.427	-18.573	46.000	QUASIPEAK
4		597.942	-6.696	35.620	28.924	-17.076	46.000	QUASIPEAK
5		810.217	-8.944	37.627	28.683	-17.317	46.000	QUASIPEAK
6		865.043	-8.419	36.893	28.474	-17.526	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	Humly Room Display One
Test Item	:	General Radiated Emission
Test date	:	2019/11/02
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2440MHz)

Vertical



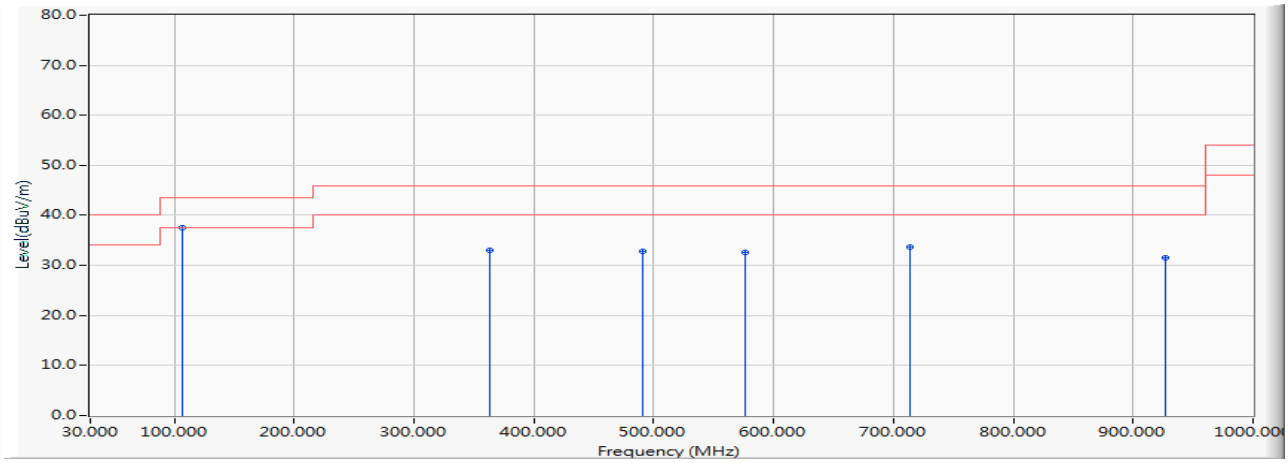
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		103.101	-16.269	41.770	25.501	-17.999	43.500	QUASIPEAK
2	*	378.638	-12.074	46.621	34.547	-11.453	46.000	QUASIPEAK
3		519.217	-11.232	41.546	30.315	-15.685	46.000	QUASIPEAK
4		649.957	-9.372	40.306	30.935	-15.065	46.000	QUASIPEAK
5		780.696	-8.577	39.112	30.535	-15.465	46.000	QUASIPEAK
6		910.029	-10.072	41.391	31.319	-14.681	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	Humly Room Display One
Test Item	:	General Radiated Emission
Test date	:	2019/11/02
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2440MHz)

Horizontal



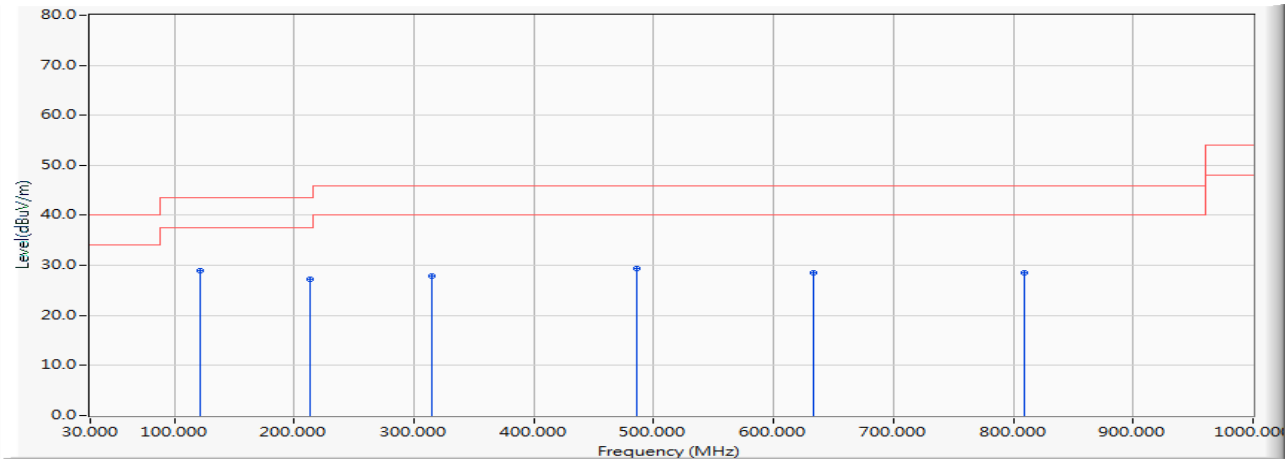
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	107.319	-16.595	54.215	37.621	-5.879	43.500	QUASIPEAK
2		363.174	-12.606	45.669	33.063	-12.937	46.000	QUASIPEAK
3		491.101	-11.424	44.294	32.870	-13.130	46.000	QUASIPEAK
4		576.855	-7.979	40.668	32.689	-13.311	46.000	QUASIPEAK
5		713.217	-9.013	42.737	33.724	-12.276	46.000	QUASIPEAK
6		926.899	-9.789	41.217	31.428	-14.572	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product	:	Humly Room Display One
Test Item	:	General Radiated Emission
Test date	:	2019/11/02
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2440MHz)

Vertical



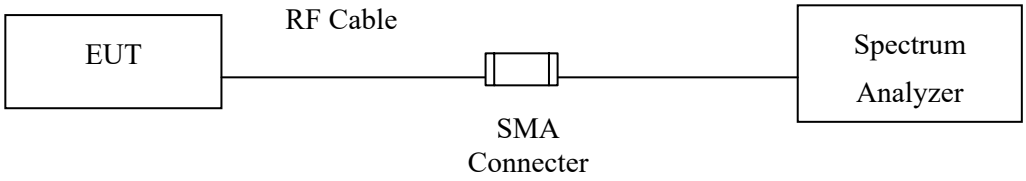
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	121.377	-16.799	45.811	29.011	-14.489	43.500	QUASIPEAK
2		212.754	-18.175	45.475	27.300	-16.200	43.500	QUASIPEAK
3		315.377	-14.184	41.964	27.780	-18.220	46.000	QUASIPEAK
4		485.478	-11.794	41.132	29.337	-16.663	46.000	QUASIPEAK
5		633.087	-8.585	37.010	28.424	-17.576	46.000	QUASIPEAK
6		808.812	-8.946	37.459	28.513	-17.487	46.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

5. RF Antenna Conducted Test

5.1. Test Setup



5.2. Limits

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

5.3. Test Procedure

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

5.4. Uncertainty

± 1.20dB

5.5. Test Result of RF Antenna Conducted Test

Product	:	Humly Room Display One
Test Item	:	RF Antenna Conducted Test
Test date	:	2019/11/02
Test Mode	:	Mode 1: Transmit - BLE (1Mbps)

Figure Channel 00:

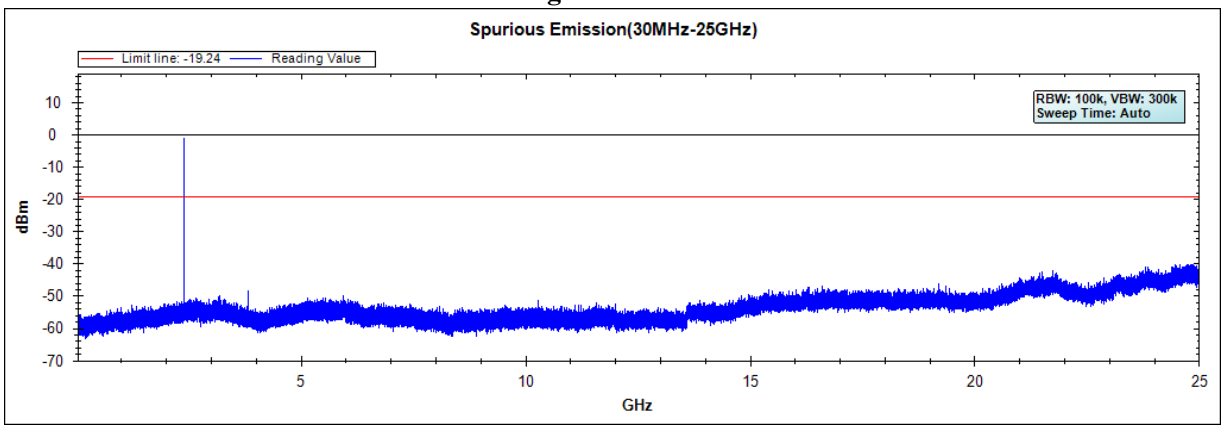


Figure Channel 19:

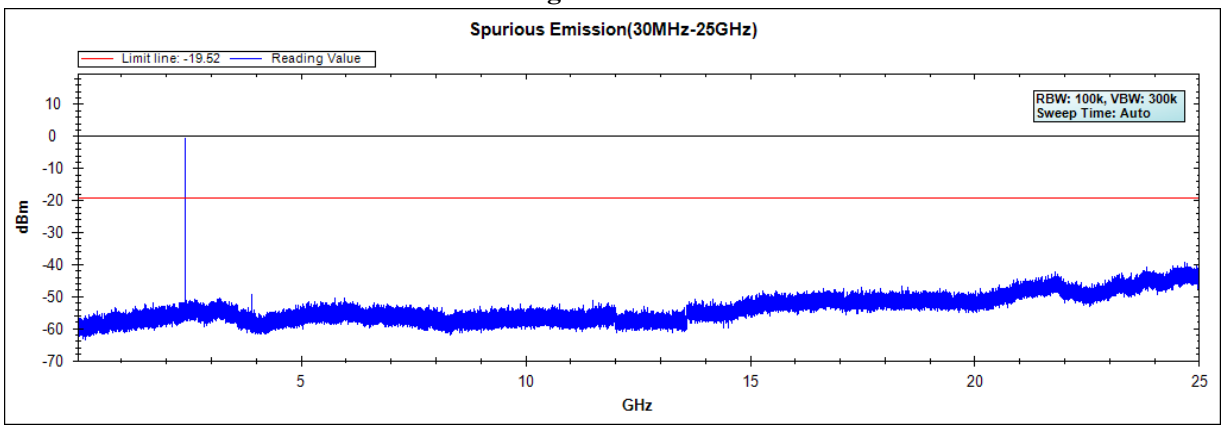
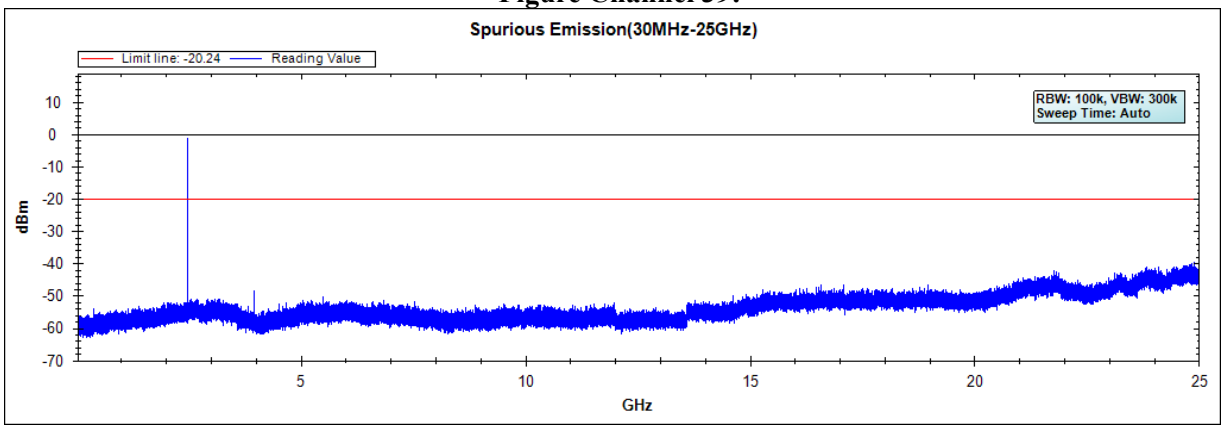


Figure Channel 39:



Product	:	Humly Room Display One
Test Item	:	RF Antenna Conducted Test
Test date	:	2019/11/02
Test Mode	:	Mode 2: Transmit - BLE (2Mbps)

Figure Channel 00:

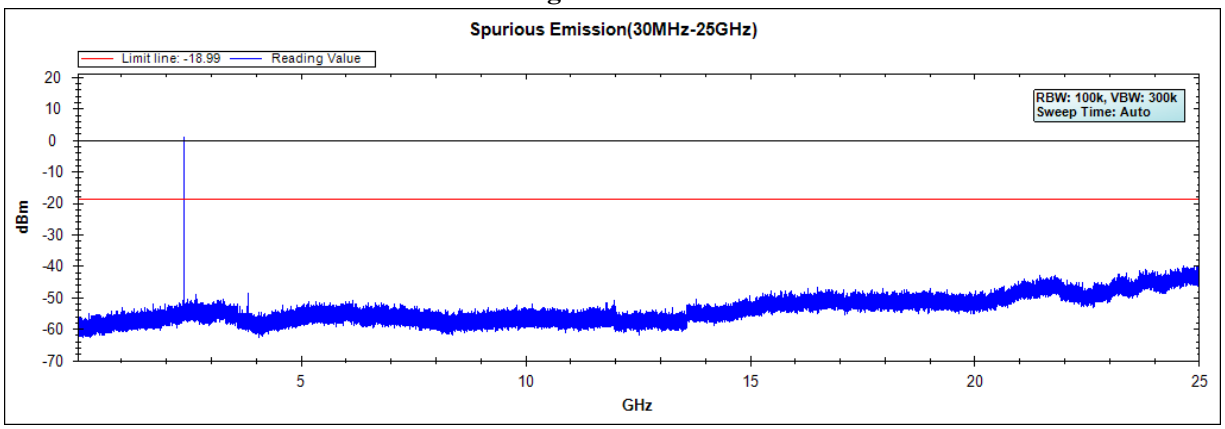


Figure Channel 19:

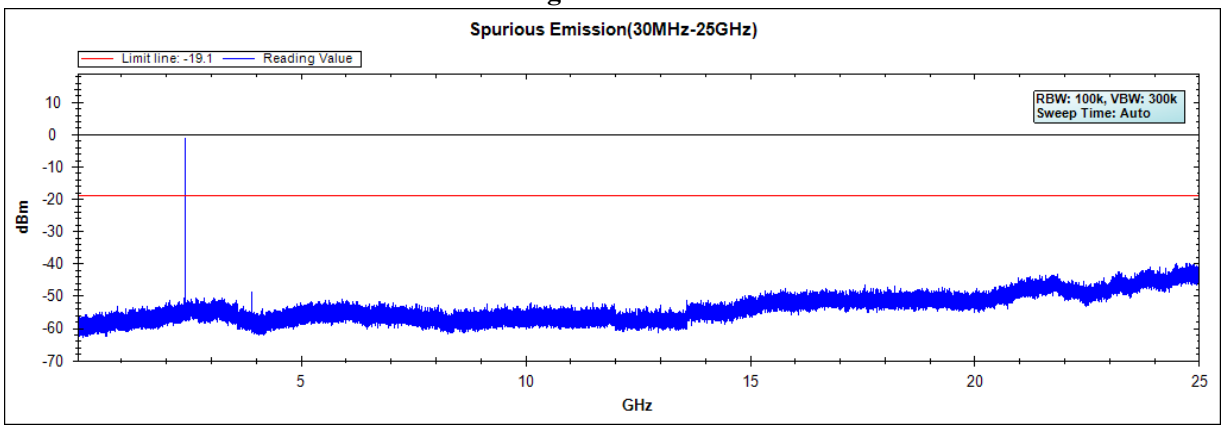
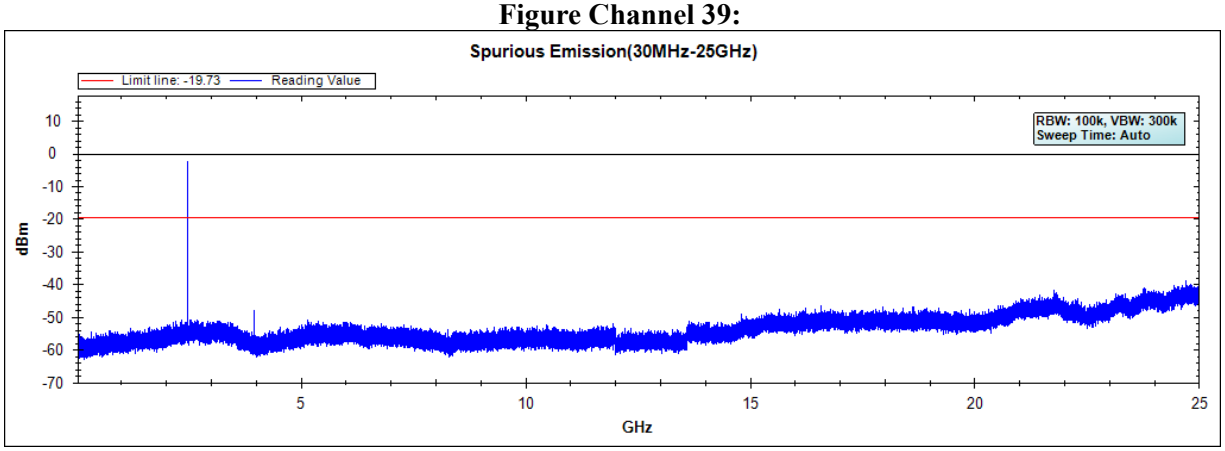


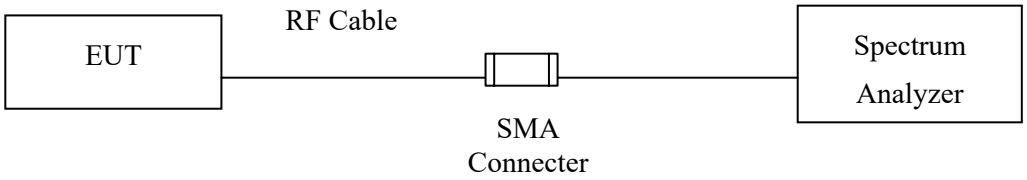
Figure Channel 39:



6. Band Edge

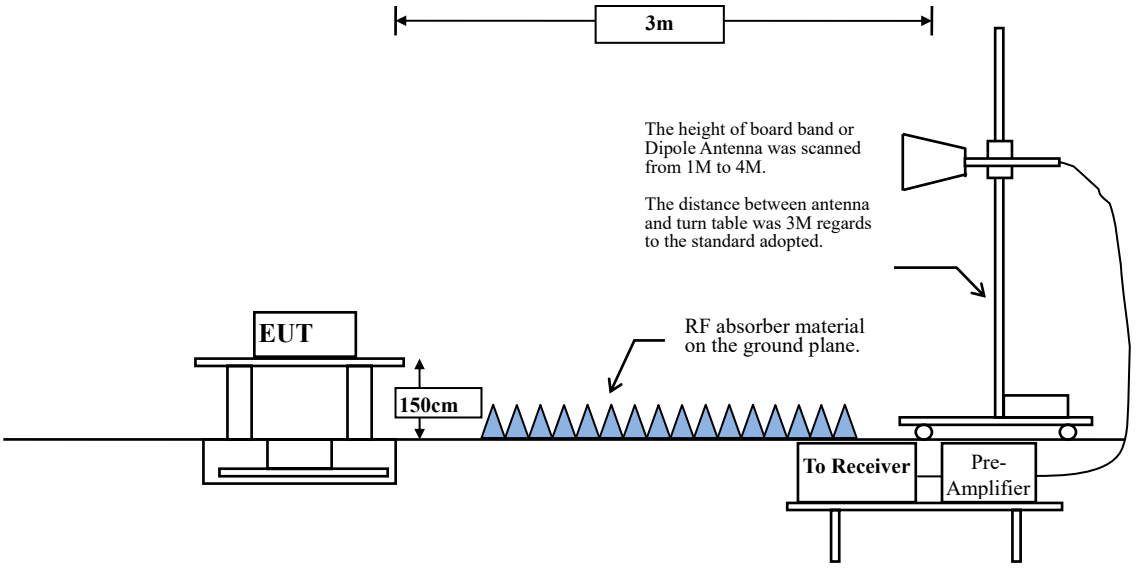
6.1. Test Setup

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 ANSI C63.10, 2013 for compliance to FCC 47CFR 15.247 requirements.

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

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

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

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

According to C63.10 Section 11.12.2.5 Average measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

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

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE-1Mpbs	85.36	2.1304	469	500
BLE-2Mpbs	86.77	1.0916	916	1000

Note: Duty Cycle Refer to Section 9

6.4. Uncertainty

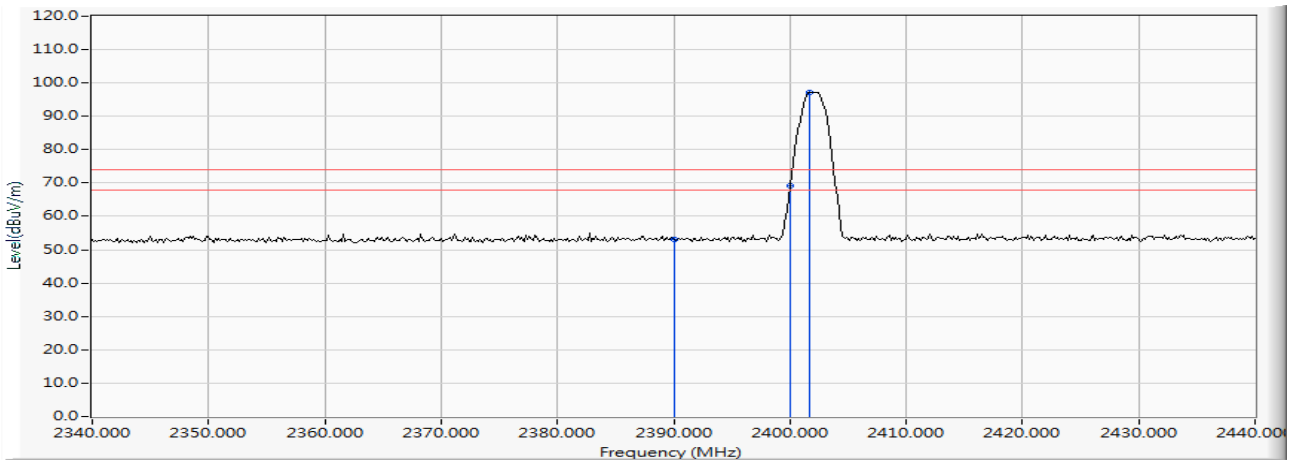
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

6.5. Test Result of Band Edge

Product : Humly Room Display One
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2019/10/30
Test Mode : Mode 3: Transmit - BLE (1Mbps)+NFC (2402MHz)

Horizontal



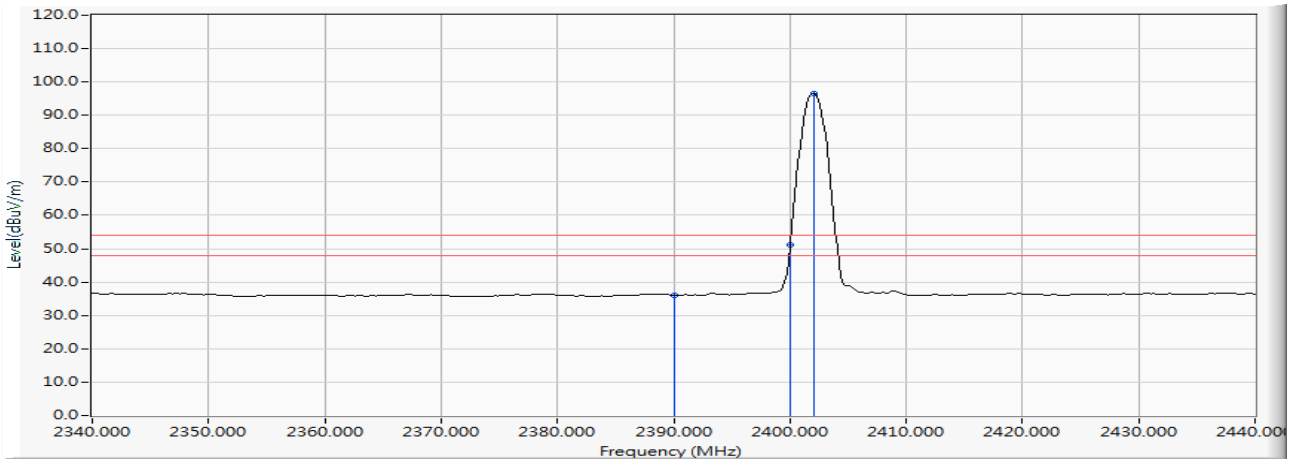
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	40.200	53.099	-20.901	74.000	PEAK
2		2400.000	12.961	56.265	69.226	--	--	PEAK
3	*	2401.739	12.972	84.257	97.230	--	--	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2402MHz)

Horizontal



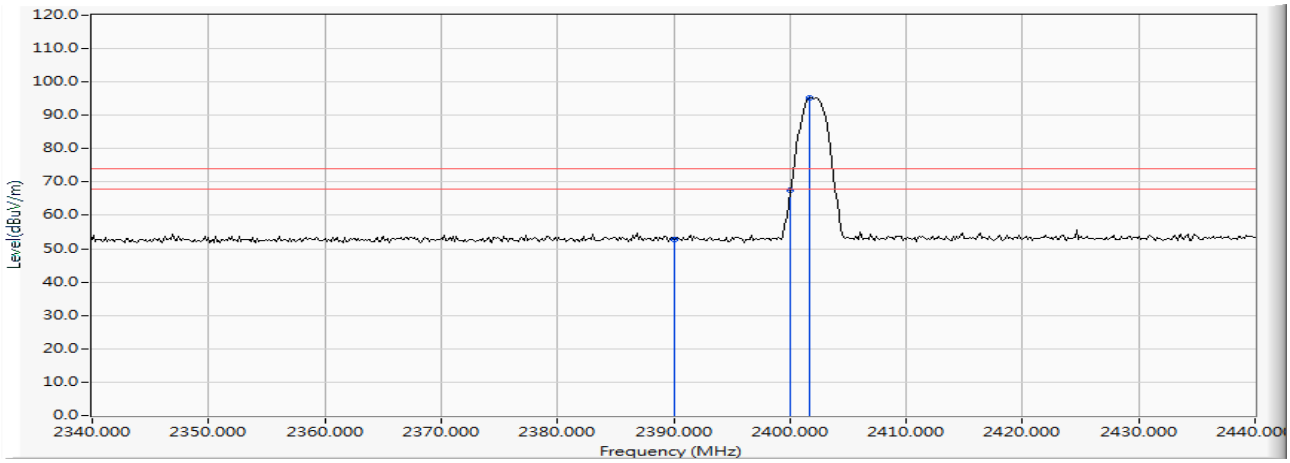
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	23.136	36.035	-17.965	54.000	AVERAGE
2		2400.000	12.961	38.275	51.236	--	--	AVERAGE
3	*	2402.029	12.975	83.667	96.642	--	--	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2402MHz)

Vertical



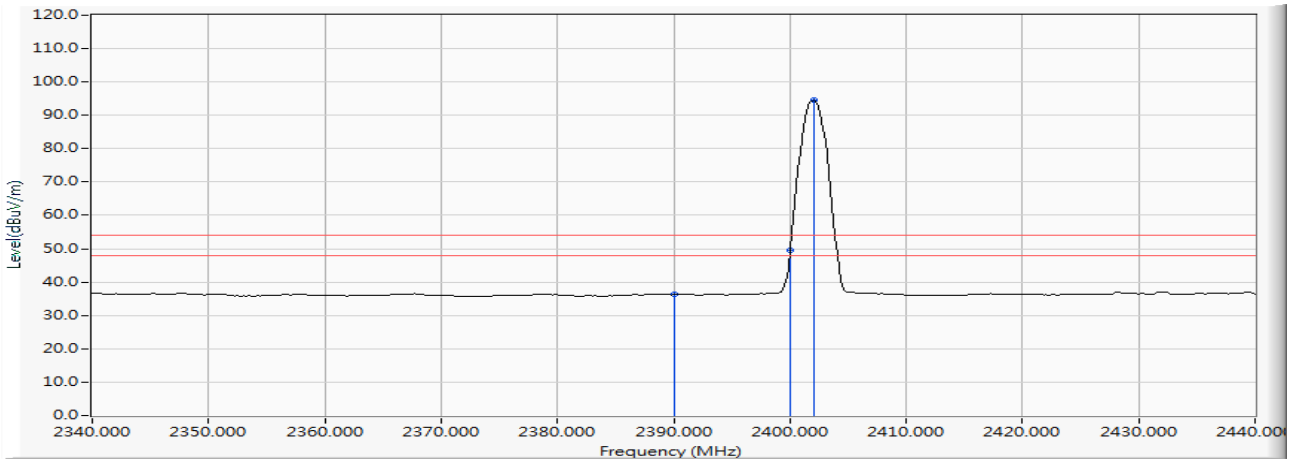
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	39.721	52.620	-21.380	74.000	PEAK
2		2400.000	12.961	54.578	67.539	--	--	PEAK
3	*	2401.739	12.972	82.156	95.129	--	--	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2402MHz)

Vertical



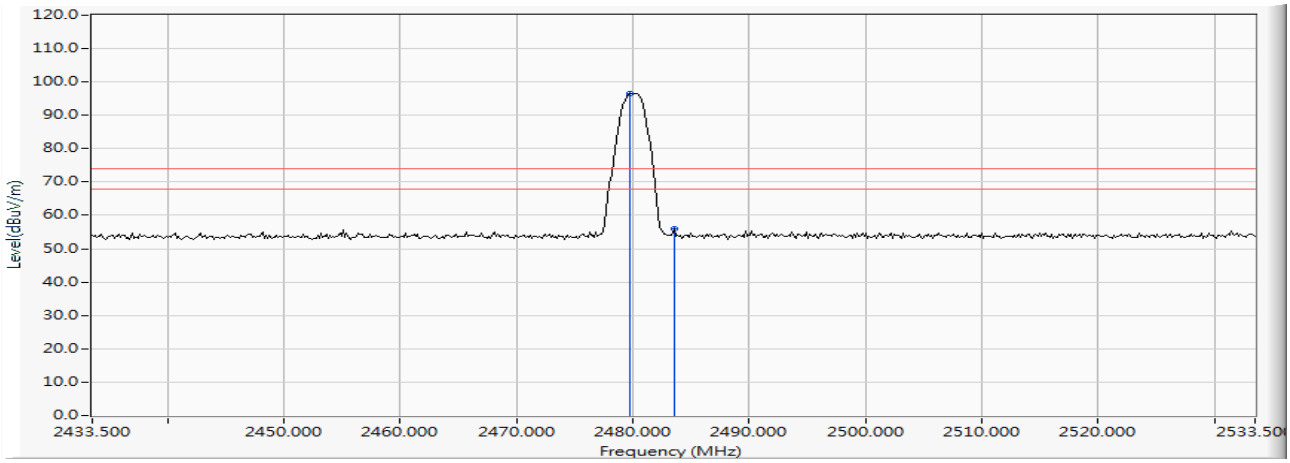
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	23.364	36.263	-17.737	54.000	AVERAGE
2		2400.000	12.961	36.431	49.392	--	--	AVERAGE
3	*	2402.029	12.975	81.538	94.513	--	--	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2480MHz)

Horizontal



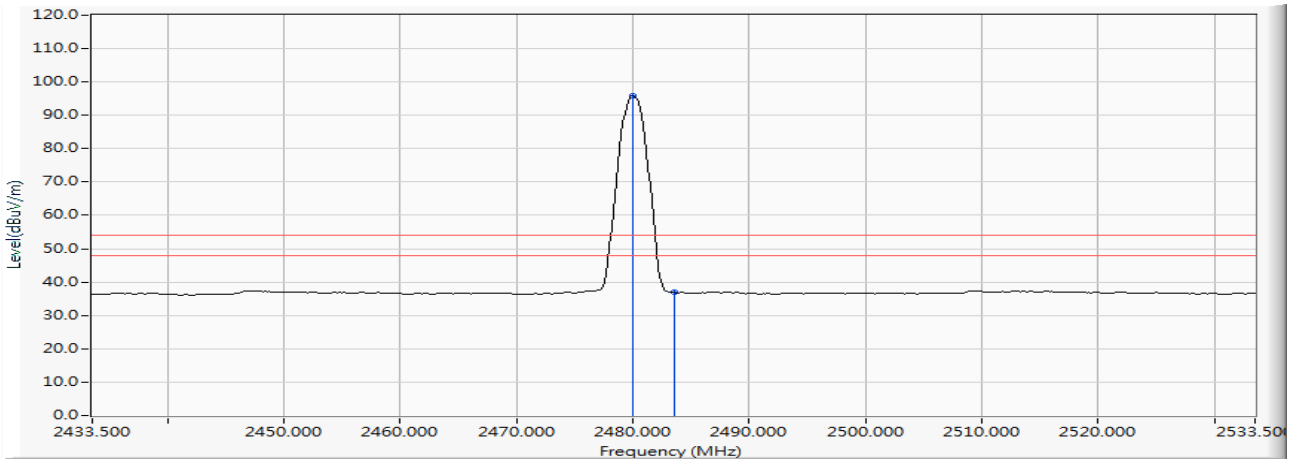
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.732	13.369	83.179	96.548	--	--	PEAK
2		2483.500	13.375	42.488	55.862	-18.138	74.000	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2480MHz)

Horizontal



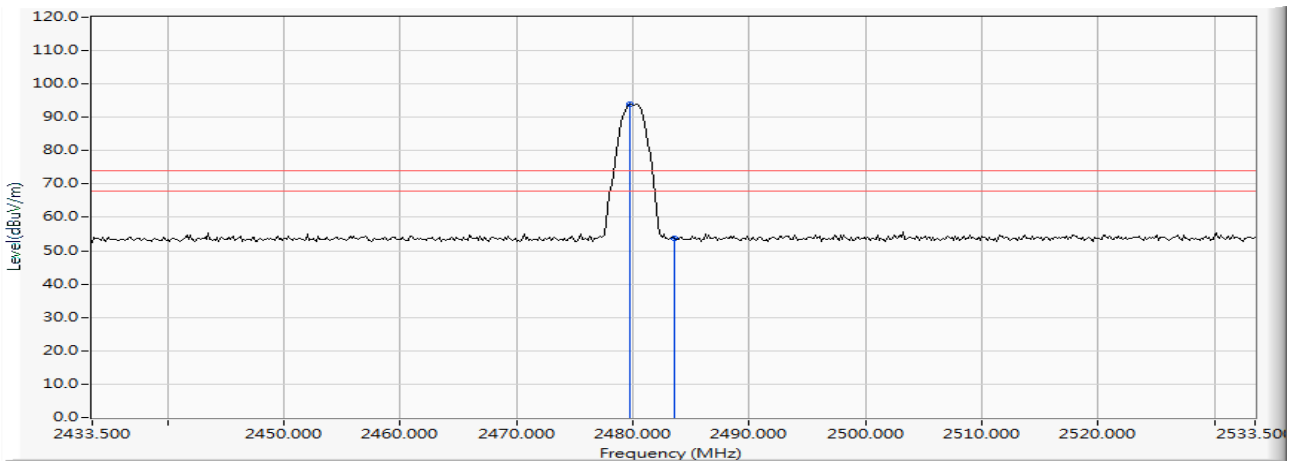
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2480.022	13.369	82.438	95.807	--	--	AVERAGE
2		2483.500	13.375	23.497	36.871	-17.129	54.000	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2480MHz)

Vertical



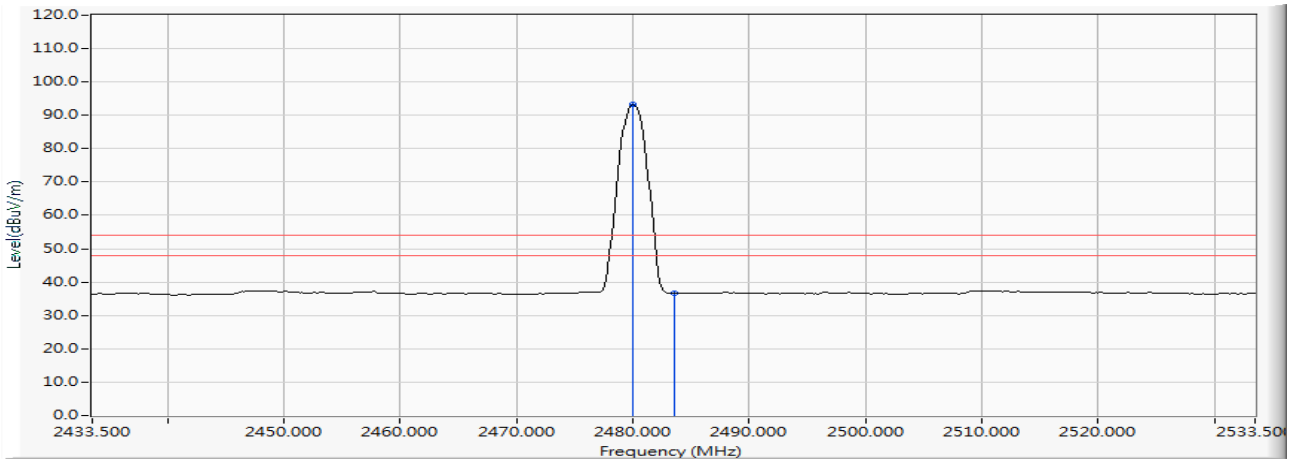
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.732	13.369	80.522	93.891	--	--	PEAK
2		2483.500	13.375	40.391	53.765	-20.235	74.000	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 3: Transmit - BLE (1Mbps)+NFC (2480MHz)

Vertical



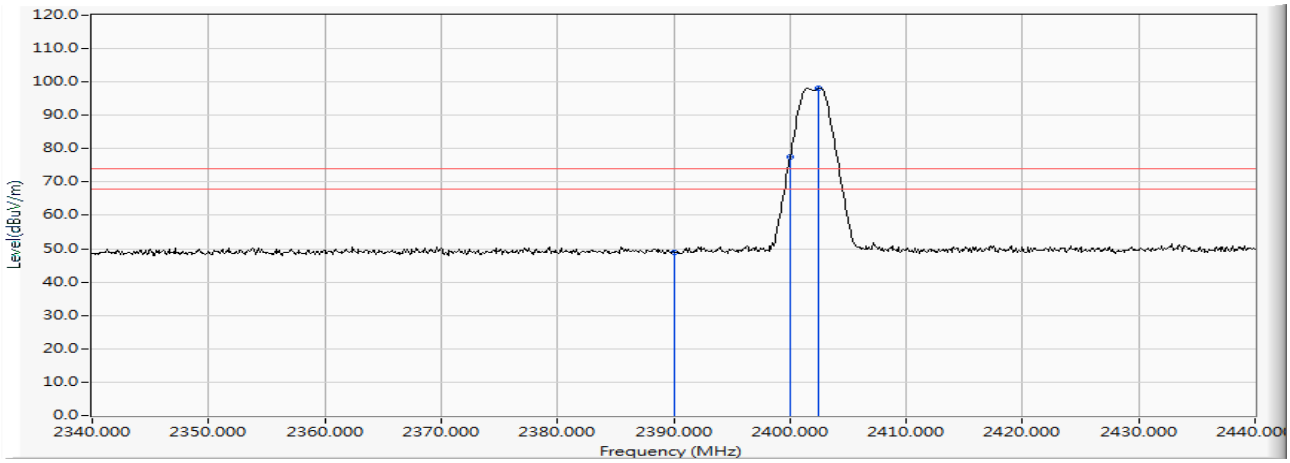
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2480.022	13.369	79.793	93.162	--	--	AVERAGE
2		2483.500	13.375	23.294	36.668	-17.332	54.000	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2402MHz)

Horizontal



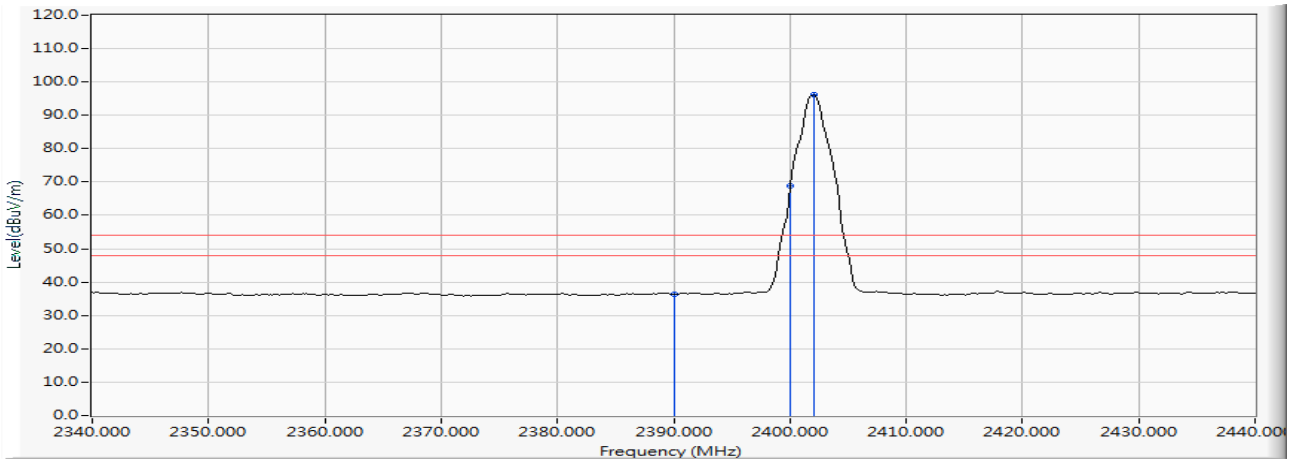
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	36.073	48.972	-25.028	74.000	PEAK
2		2400.000	12.961	64.455	77.416	--	--	PEAK
3	*	2402.500	12.978	85.255	98.233	--	--	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2402MHz)

Horizontal



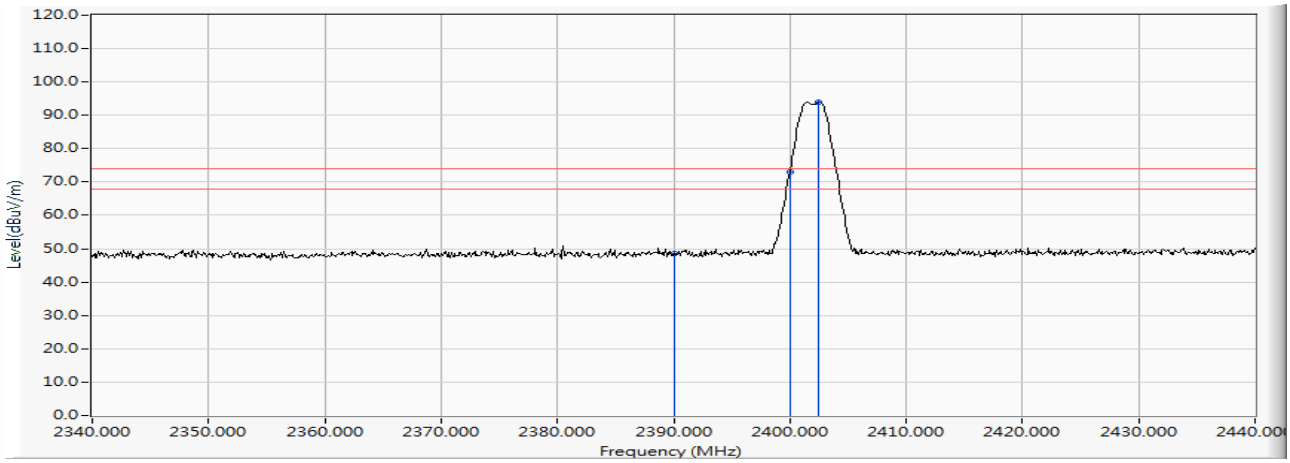
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	23.438	36.337	-17.663	54.000	AVERAGE
2		2400.000	12.961	55.833	68.794	--	--	AVERAGE
3	*	2402.029	12.975	83.131	96.106	--	--	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2402MHz)

Vertical



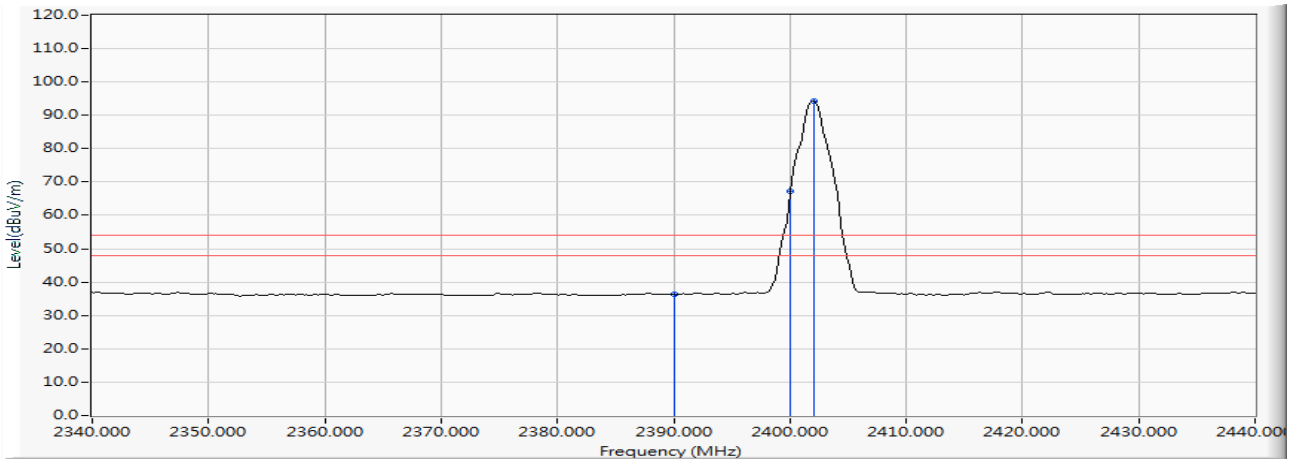
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	35.748	48.647	-25.353	74.000	PEAK
2		2400.000	12.961	60.010	72.971	--	--	PEAK
3	*	2402.500	12.978	80.964	93.942	--	--	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2402MHz)

Vertical



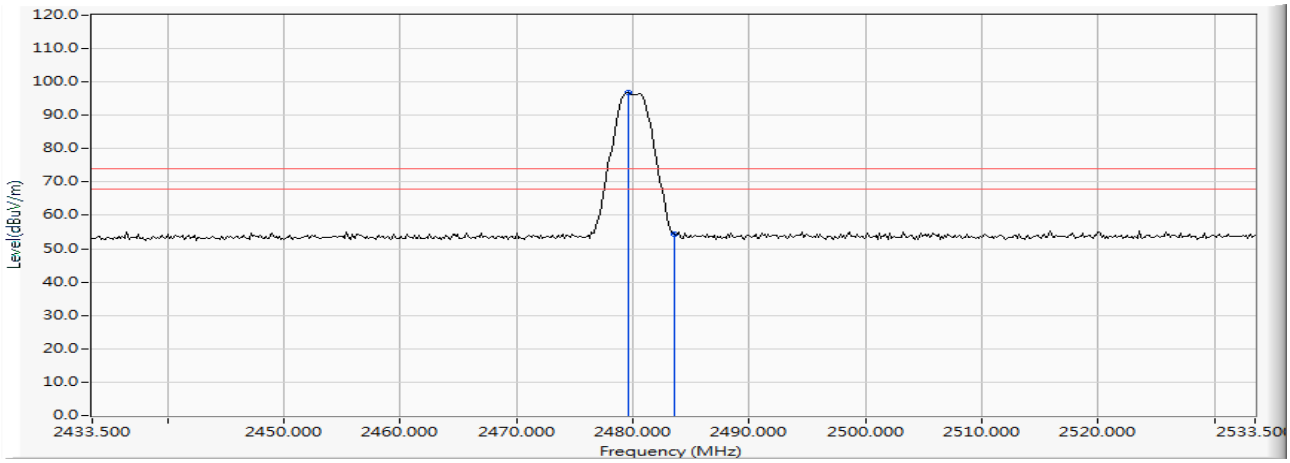
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2390.000	12.899	23.380	36.279	-17.721	54.000	AVERAGE
2		2400.000	12.961	54.117	67.078	--	--	AVERAGE
3	*	2402.029	12.975	81.282	94.257	--	--	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2480MHz)

Horizontal



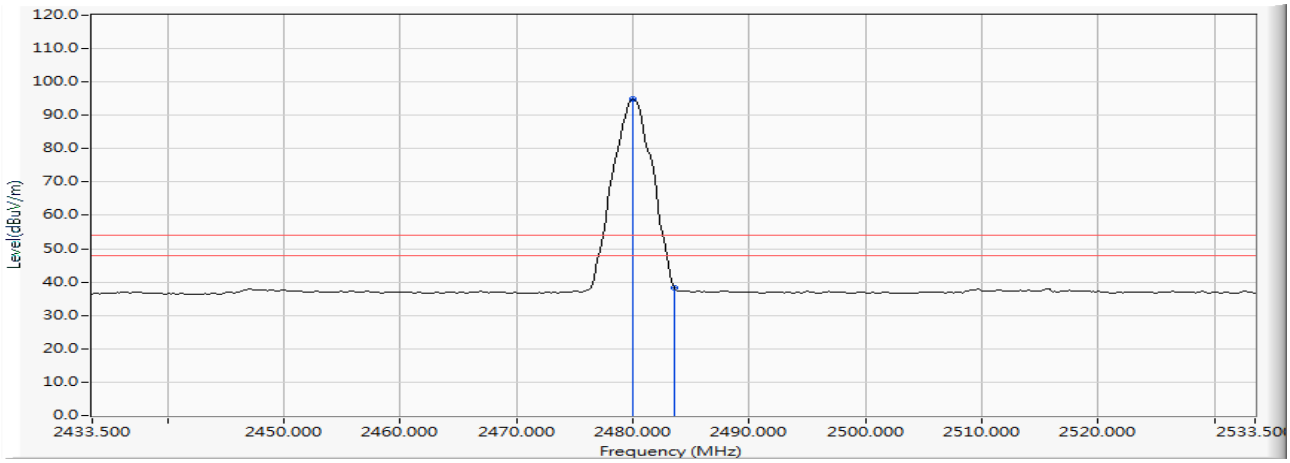
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.587	13.369	83.352	96.720	--	--	PEAK
2		2483.500	13.375	40.915	54.289	-19.711	74.000	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2480MHz)

Horizontal



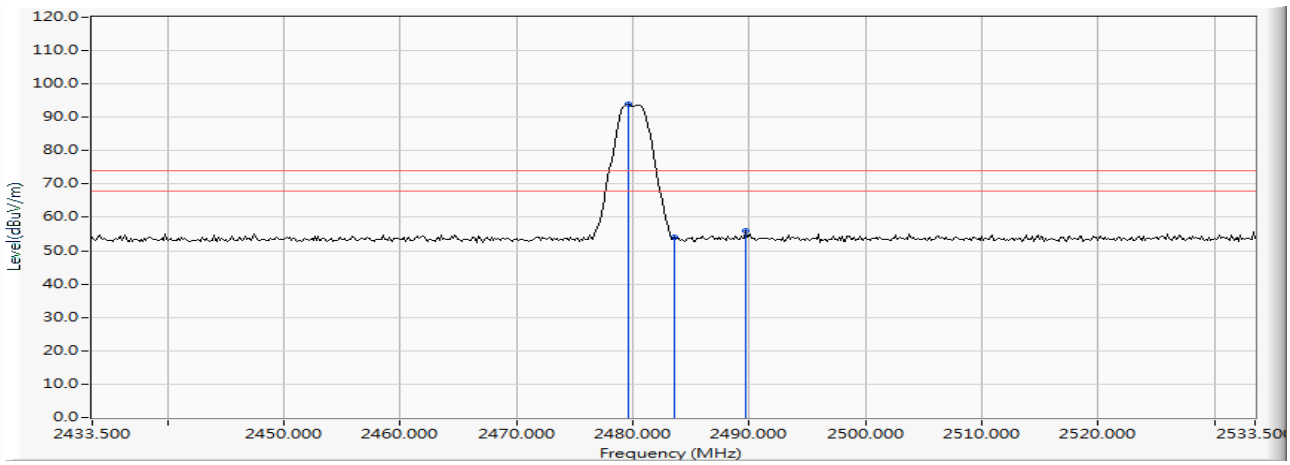
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2480.022	13.369	81.470	94.839	--	--	AVERAGE
2		2483.500	13.375	25.031	38.405	-15.595	54.000	AVERAGE

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2480MHz)

Vertical



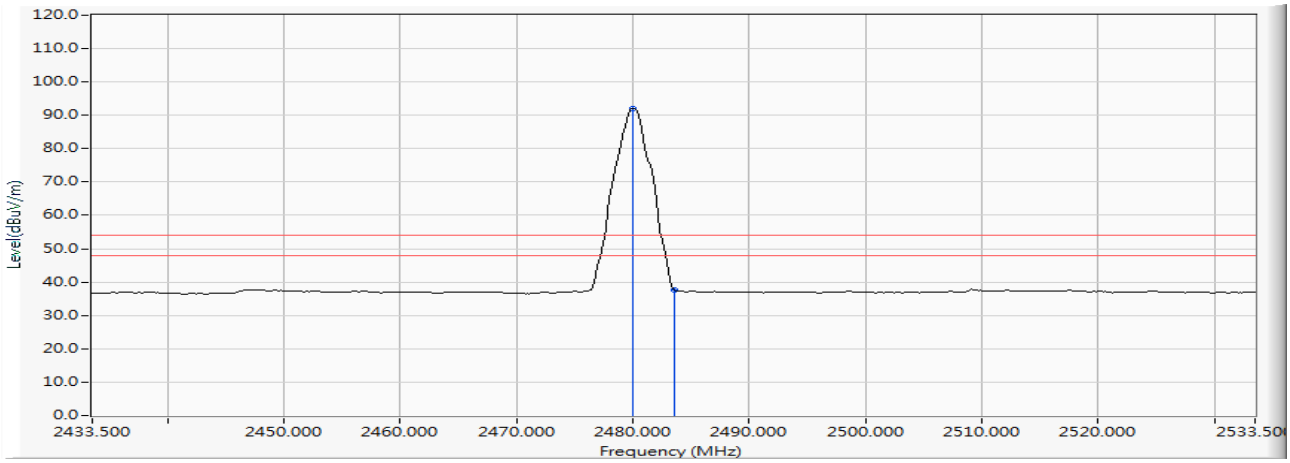
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2479.587	13.369	80.597	93.965	--	--	PEAK
2		2483.500	13.375	40.744	54.118	-19.882	74.000	PEAK
3		2489.732	13.384	42.464	55.848	-18.152	74.000	PEAK

Note:

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

Product	:	Humly Room Display One
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/10/30
Test Mode	:	Mode 4: Transmit - BLE (2Mbps)+NFC (2480MHz)

Vertical



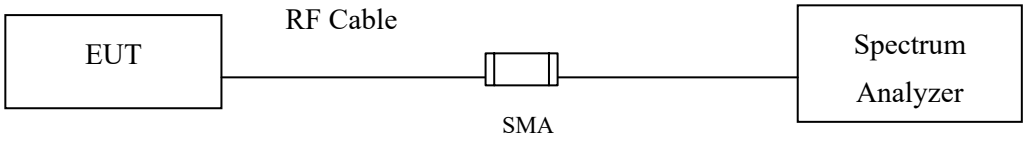
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2480.022	13.369	78.696	92.065	--	--	AVERAGE
2		2483.500	13.375	24.409	37.783	-16.217	54.000	AVERAGE

Note:

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

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 ANSI C63.10 Section 11.8 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1-5% of the emission bandwidth, VBW≥3*RBW

7.4. Uncertainty

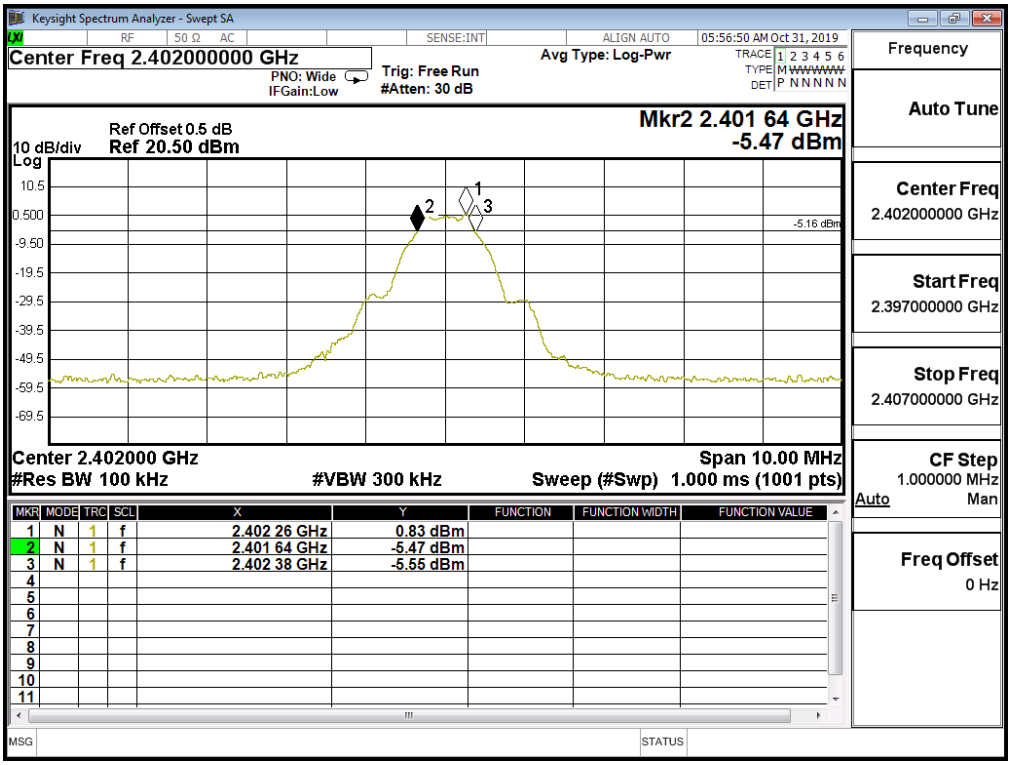
± 283Hz

7.5. Test Result of 6dB Bandwidth

Product : Humly Room Display One
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit - BLE (1Mbps) (2402MHz)

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

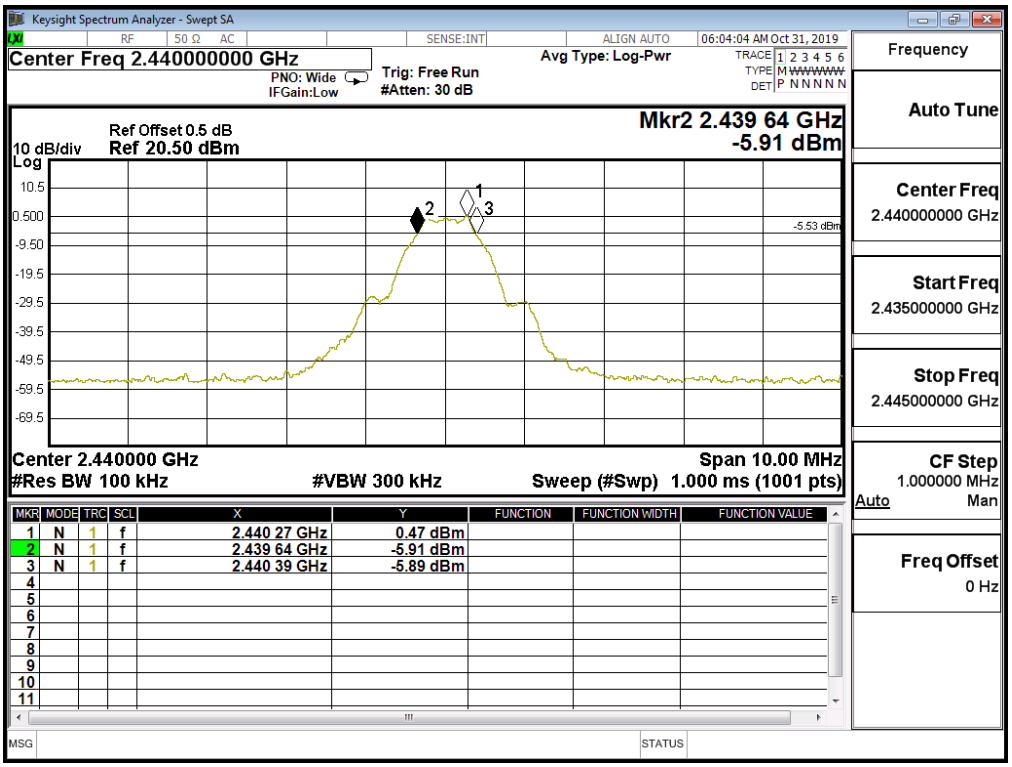
Figure Channel 00:



Product : Humly Room Display One
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit - BLE (1Mbps) (2440MHz)

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

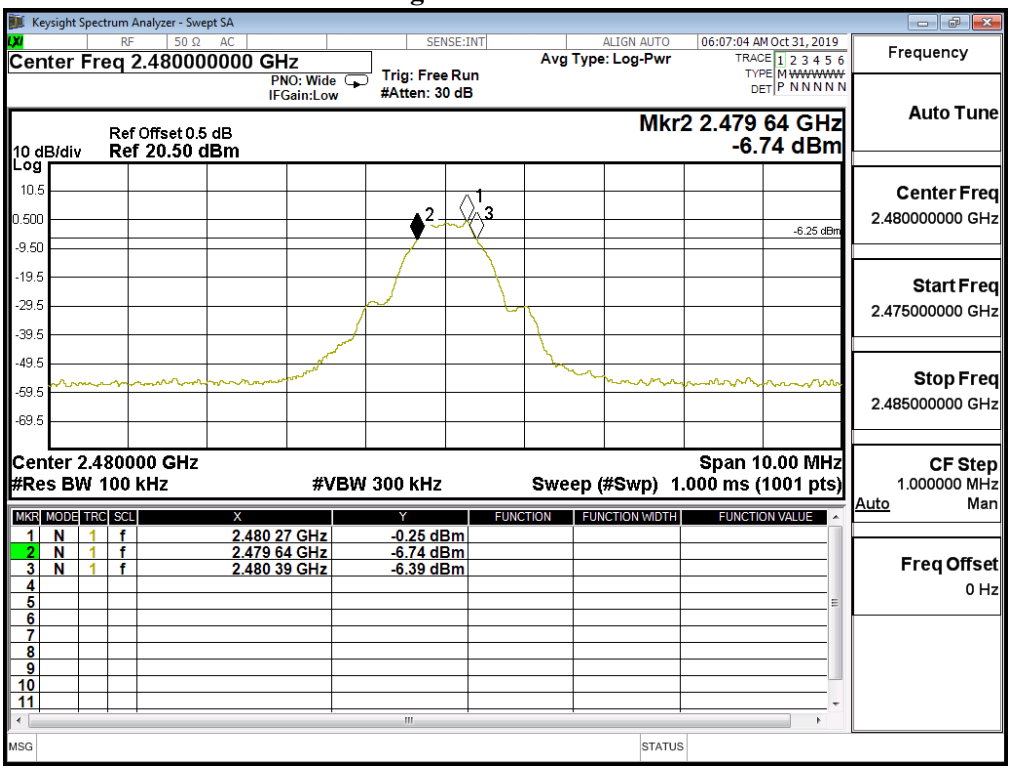
Figure Channel 19:



Product : Humly Room Display One
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit - BLE (1Mbps) (2480MHz)

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

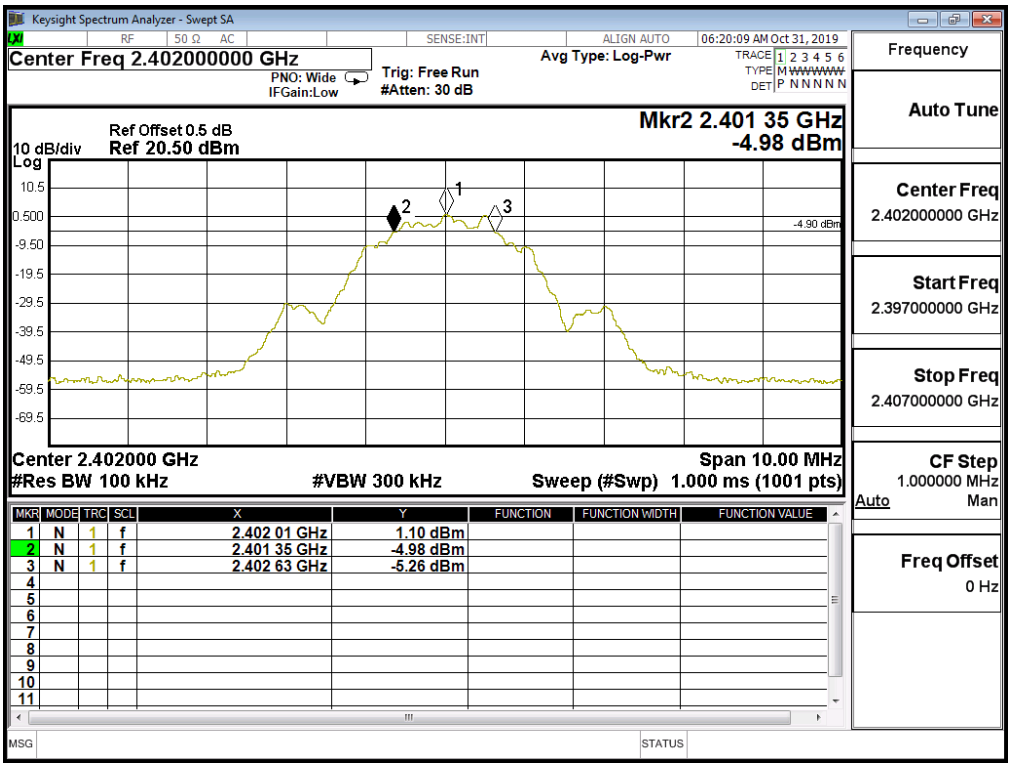
Figure Channel 39:



Product : Humly Room Display One
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1280	>500	Pass

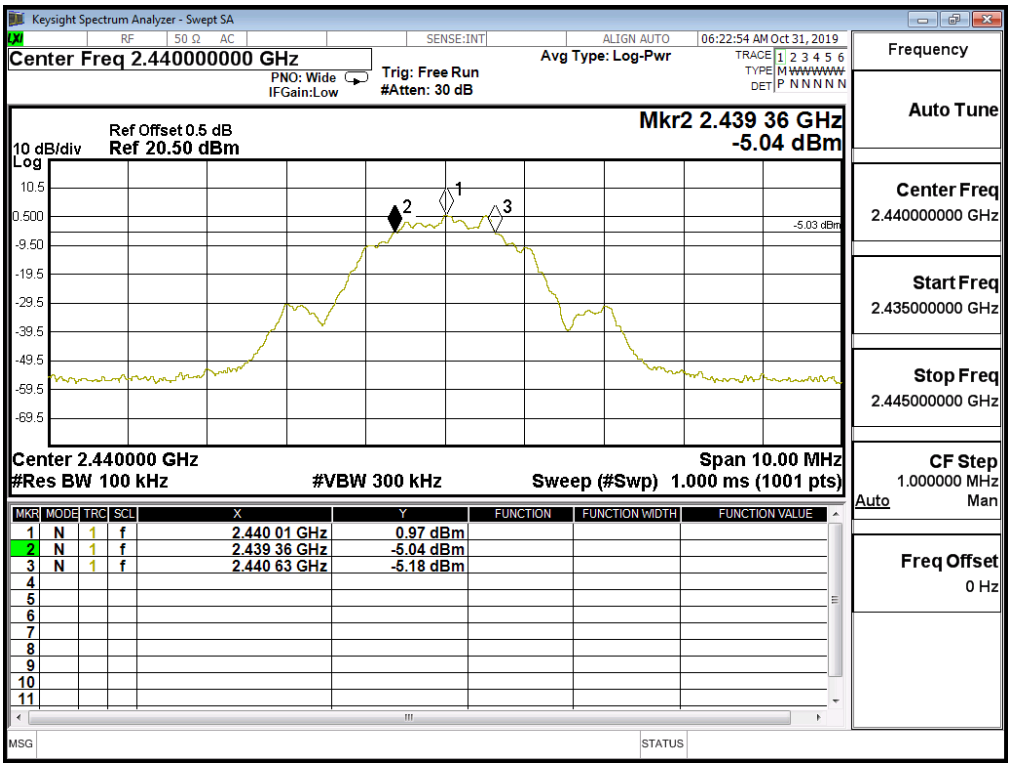
Figure Channel 00:



Product : Humly Room Display One
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
19	2440	1270	>500	Pass

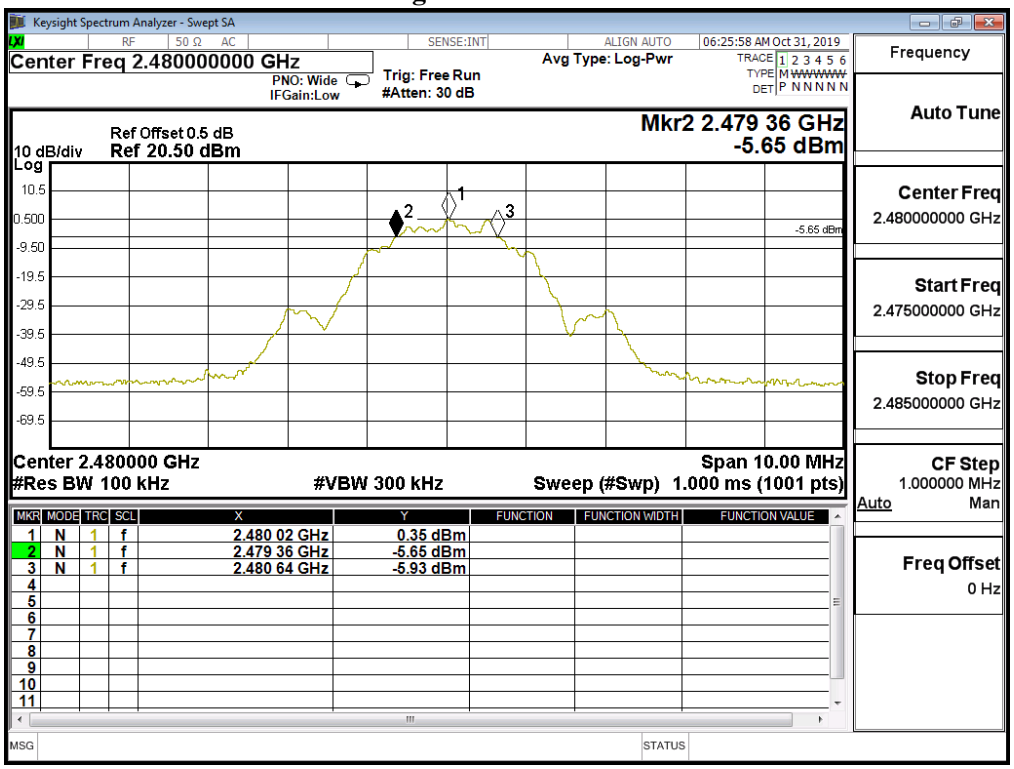
Figure Channel 19:



Product : Humly Room Display One
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2480MHz)

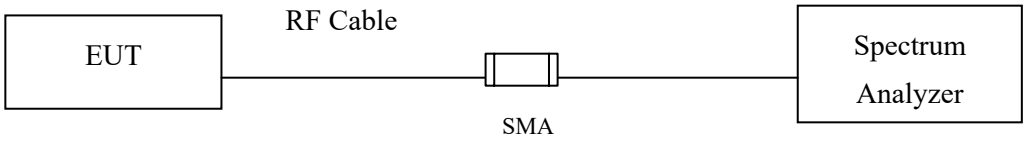
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2480	1280	>500	Pass

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 C63.10 Section 11.10.2 Method PKPSD (peak PSD)

.

8.4. Uncertainty

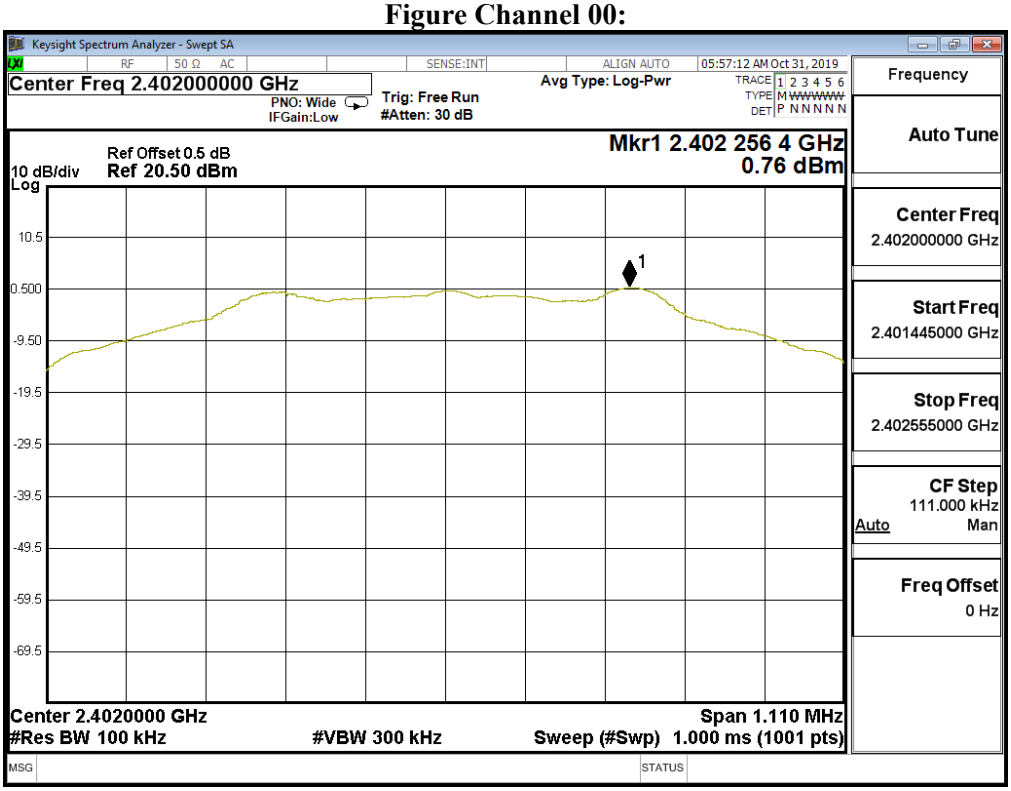
± 1.20 dB

8.5. Test Result of Power Density

Product : Humly Room Display One
Test Item : Power Density Data
Test Mode : Mode 1: Transmit - BLE (1Mbps) (2402MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	0.76	≦8dBm	Pass

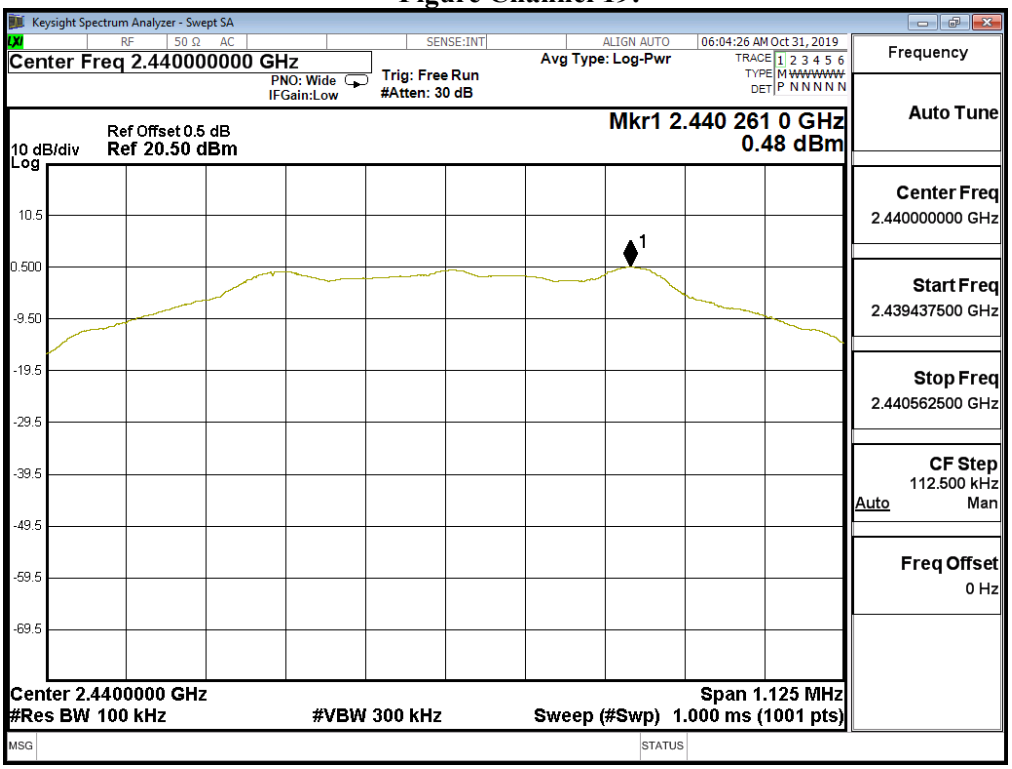
Figure Channel 00:



Product : Humly Room Display One
Test Item : Power Density Data
Test Mode : Mode 1: Transmit - BLE (1Mbps) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2440	0.48	≦8dBm	Pass

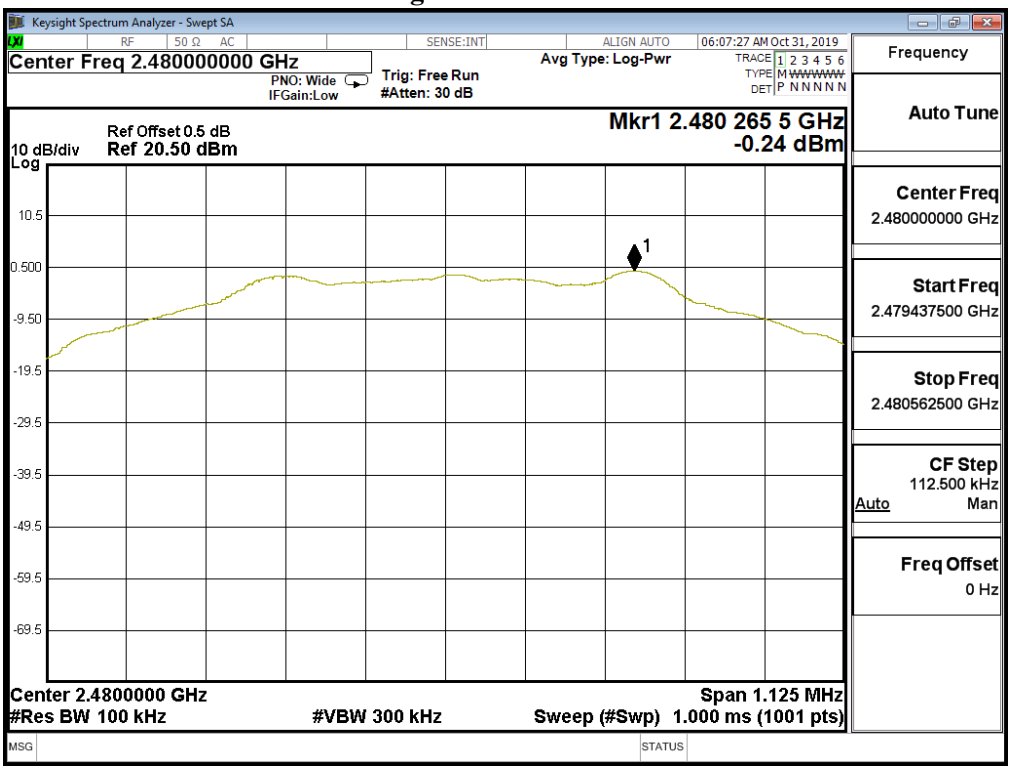
Figure Channel 19:



Product : Humly Room Display One
Test Item : Power Density Data
Test Mode : Mode 1: Transmit - BLE (1Mbps) (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	-0.24	≦8dBm	Pass

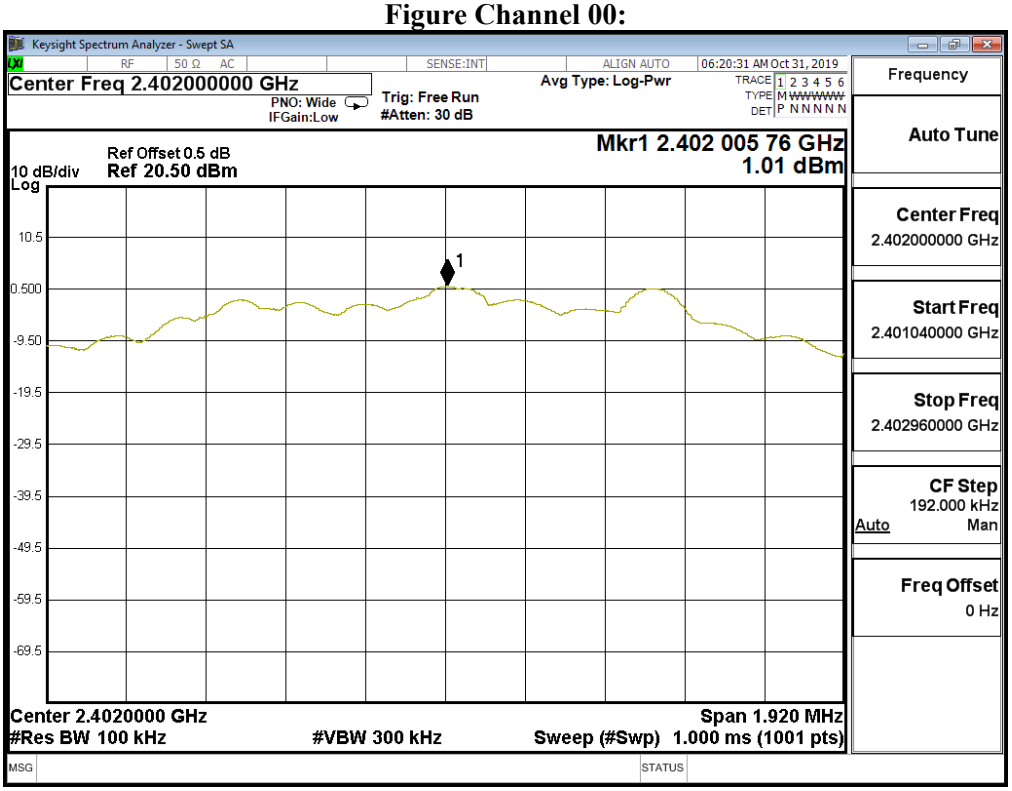
Figure Channel 39:



Product : Humly Room Display One
Test Item : Power Density Data
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2402MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	1.01	≦8dBm	Pass

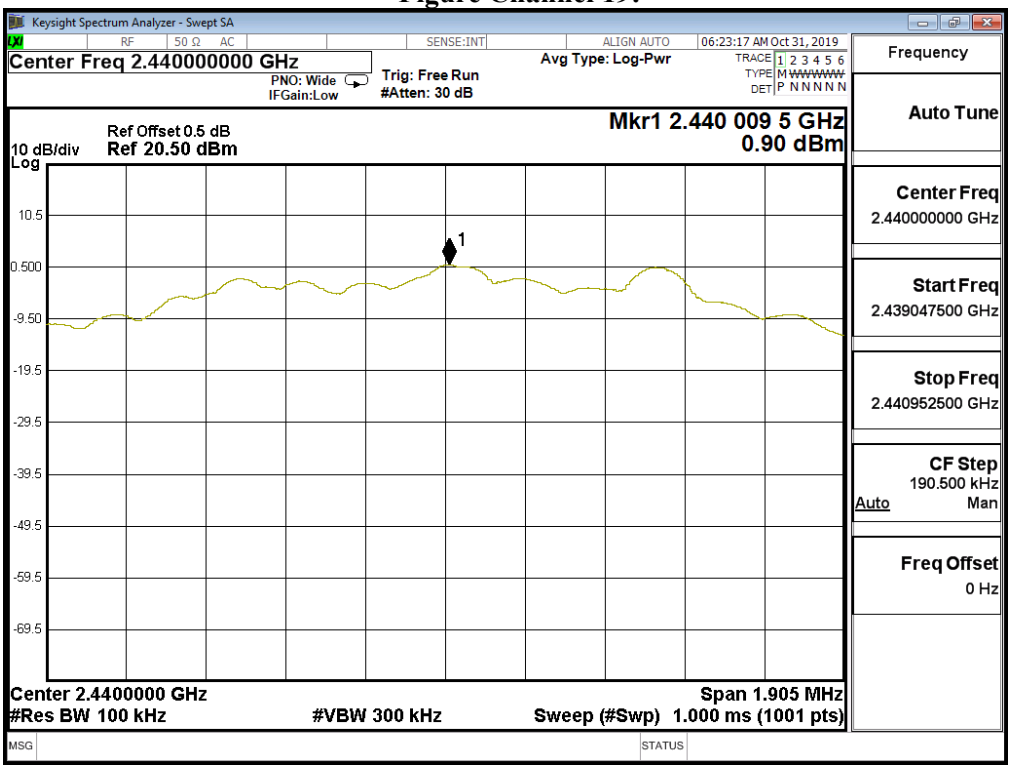
Figure Channel 00:



Product : Humly Room Display One
Test Item : Power Density Data
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2440	0.90	≦8dBm	Pass

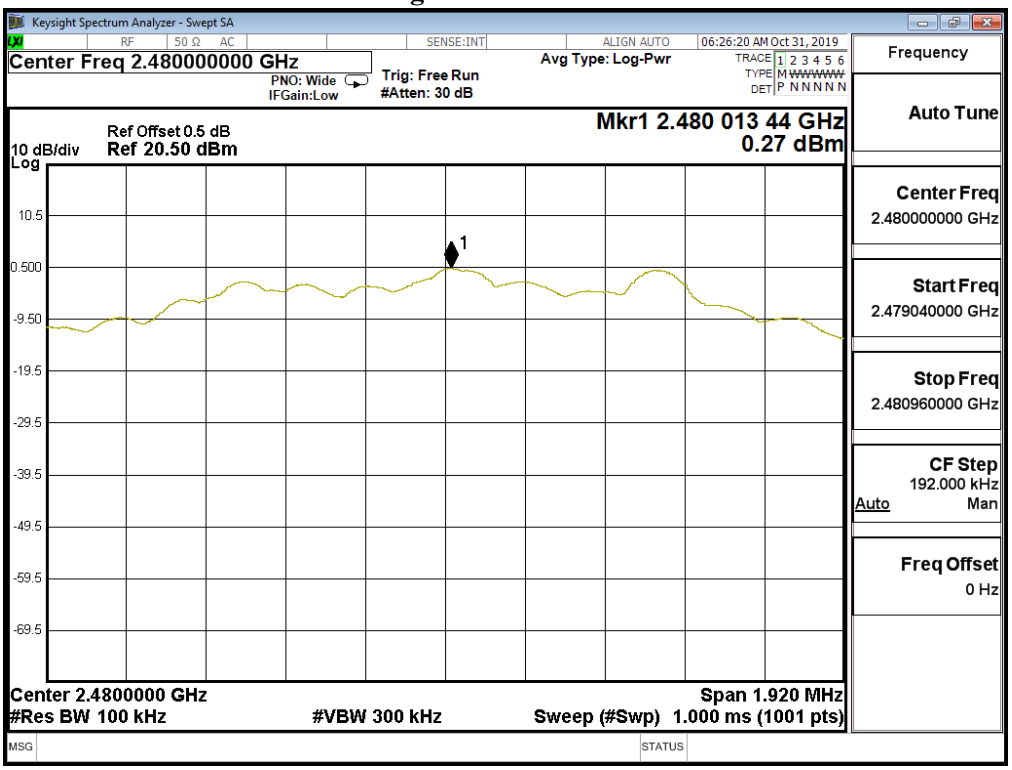
Figure Channel 19:



Product : Humly Room Display One
Test Item : Power Density Data
Test Mode : Mode 2: Transmit - BLE (2Mbps) (2480MHz)

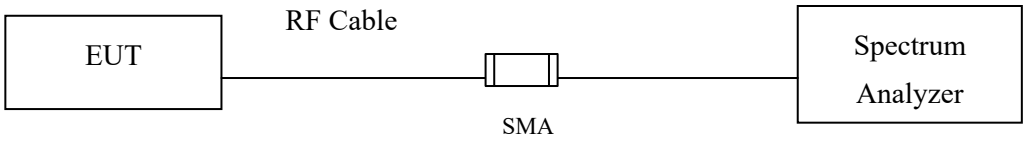
Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	0.27	≦8dBm	Pass

Figure Channel 39:



9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

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

9.3. Uncertainty

± 2.31msec

9.4. Test Result of Duty Cycle

Product : Humly Room Display One
Test Item : Duty Cycle
Test Mode : Mode 1: Transmit - BLE (1Mbps)

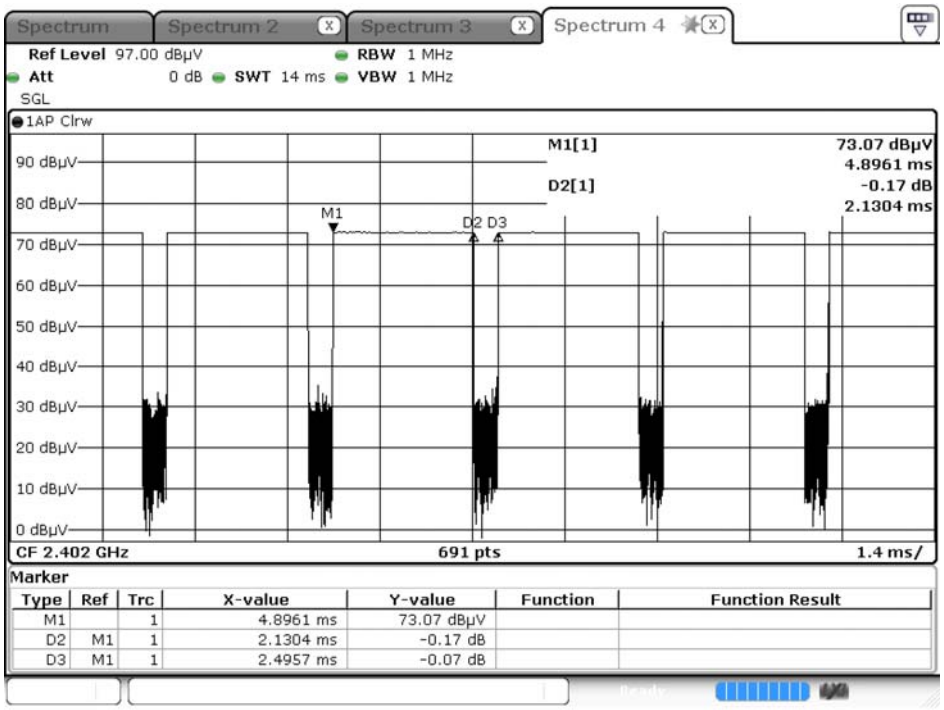
Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE-1Mpbs	2.1304	2.4957	85.36	0.69



Product : Humly Room Display One
Test Item : Duty Cycle
Test Mode : Mode 2: Transmit - BLE (2Mbps)

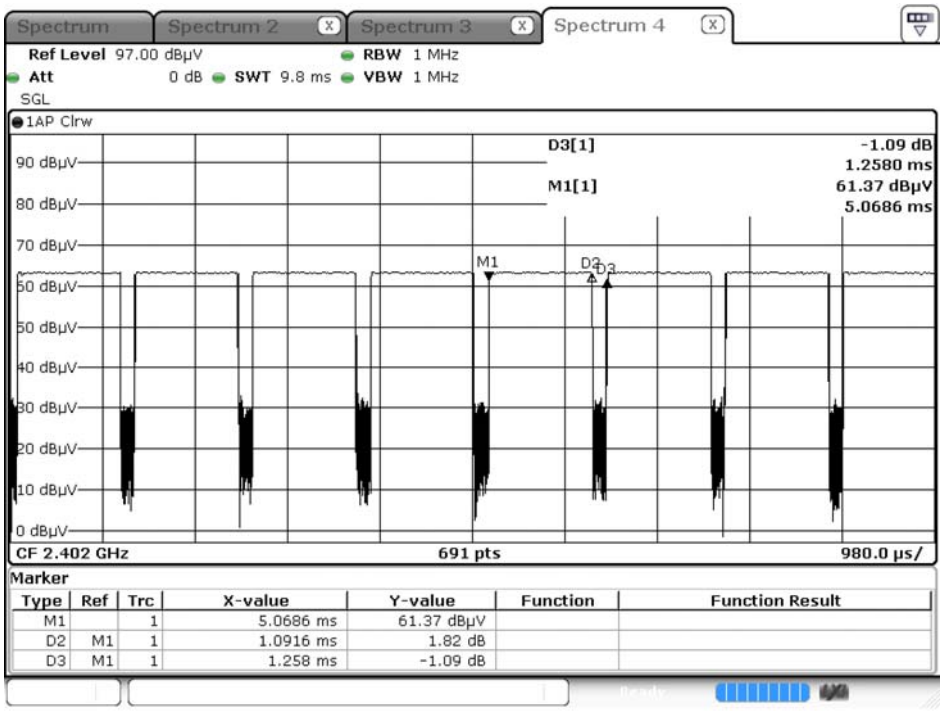
Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE-2Mpbs	1.0916	1.2580	86.77	0.62



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.