FCC Test Report

Product Name	VUZE-XR Camera
Model No.	HETVZ-XR
FCC ID.	2AKDRHETVZ-XR

Applicant	Humaneyes Technologies Ltd.
Address	Communication Center, Neve Ilan D.N. Harey Jerusalem , 9085000

Date of Receipt	Aug. 22, 2018
Issued Date	Oct. 02, 2018
Report No.	1880290R-RFUSP01V00
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.
This report must not be used to claim product endorsement by TAF or any agency of the government.
The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd..

Test Report

Issued Date: Oct. 02, 2018
Report No.: 1880290R-RFUSP01V00

Product Name	VUZE-XR Camera
Applicant	Humaneyes Technologies Ltd.
Address	Communication Center, Neve Ilan D.N. Harey Jerusalem , 9085000
Manufacturer	Humaneyes Technologies Ltd.
Model No.	HETVZ-XR
FCC ID.	2AKDRHETVZ-XR
EUT Rated Voltage	Battery DC 3.7V
EUT Test Voltage	AC 120V / 60Hz(adaptor) DC 3.7V
Trade Name	VUZE
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 : Peggy Tu

(Adm. Assistant / Peggy Tu)

Tested By :

(Assistant Engineer / Trista Huang)

Approved By :

(Director / Vincent Lin)

TABLE OF CONTENTS

	Description	Page
1.	**GENERAL INFORMATION**	**4**
1.1.	EUT Description	4
1.2.	Tested System Details	6
1.3.	Configuration of Tested System	6
1.4.	EUT Exercise Software	6
1.5.	Test Facility	7
1.6.	List of Test Equipment	8
2.	**CONDUCTED EMISSION**	**9**
2.1.	Test Setup	9
2.2.	Limits	10
2.3.	Test Procedure	10
2.4.	Uncertainty	10
2.5.	Test Result of Conducted Emission	11
3.	**PEAK POWER OUTPUT**	**15**
3.1.	Test Setup	15
3.2.	Limit	15
3.3.	Test Procedure	15
3.4.	Uncertainty	15
3.5.	Test Result of Peak Power Output	16
4.	**RADIATED EMISSION**	**17**
4.1.	Test Setup	17
4.2.	Limits	19
4.3.	Test Procedure	20
4.4.	Uncertainty	21
4.5.	Test Result of Radiated Emission	22
5.	**RF ANTENNA CONDUCTED TEST**	**27**
5.1.	Test Setup	27
5.2.	Limits	27
5.3.	Test Procedure	27
5.4.	Uncertainty	27
5.5.	Test Result of RF Antenna Conducted Test	28
6.	**BAND EDGE**	**29**
6.1.	Test Setup	29
6.2.	Limit	30
6.3.	Test Procedure	30
6.4.	Uncertainty	31
6.5.	Test Result of Band Edge	32
7.	**6DB BANDWIDTH**	**36**
7.1.	Test Setup	36
7.2.	Limits	36
7.3.	Test Procedure	36
7.4.	Uncertainty	36
7.5.	Test Result of 6dB Bandwidth	37
8.	**POWER DENSITY**	**40**
8.1.	Test Setup	40
8.2.	Limits	40
8.3.	Test Procedure	40
8.4.	Uncertainty	40
8.5.	Test Result of Power Density	41
9.	**DUTY CYCLE**	**44**
9.1.	Test Setup	44
9.2.	Test Procedure	44
9.3.	Uncertainty	44
9.4.	Test Result of Duty Cycle	45
10.	**EMI REDUCTION METHOD DURING COMPLIANCE TESTING**	**46**

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

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	VUZE-XR Camera
Trade Name	VUZE
Model No.	HETVZ-XR
FCC ID.	2AKDRHETVZ-XR
Frequency Range	2402 – 2480MHz
Channel Number	V4.0: 40CH
Type of Modulation	V4.0: GFSK(1Mbps)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
USB Cable	Shielded, 0.8m
Power Adapter	MFR: VUZE, M/N: KSA29B0500200D5 Input: AC 100-240V~50/60Hz, 0.5A Output: 5V⎓2.0A

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	LYNwave	N/A	PIFA	1.30dBi for 2.4 GHz

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

Center Frequency of Each Channel: (For V4.0)

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 VUZE-XR Camera with a built-in WLAN、Bluetooth V3.0, V2.1+EDR,V4.0 transceiver, this report for Bluetooth V4.0.
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.

Test Mode	Mode 1: Transmit - BLE (GFSK) Mode 2: Charge mode

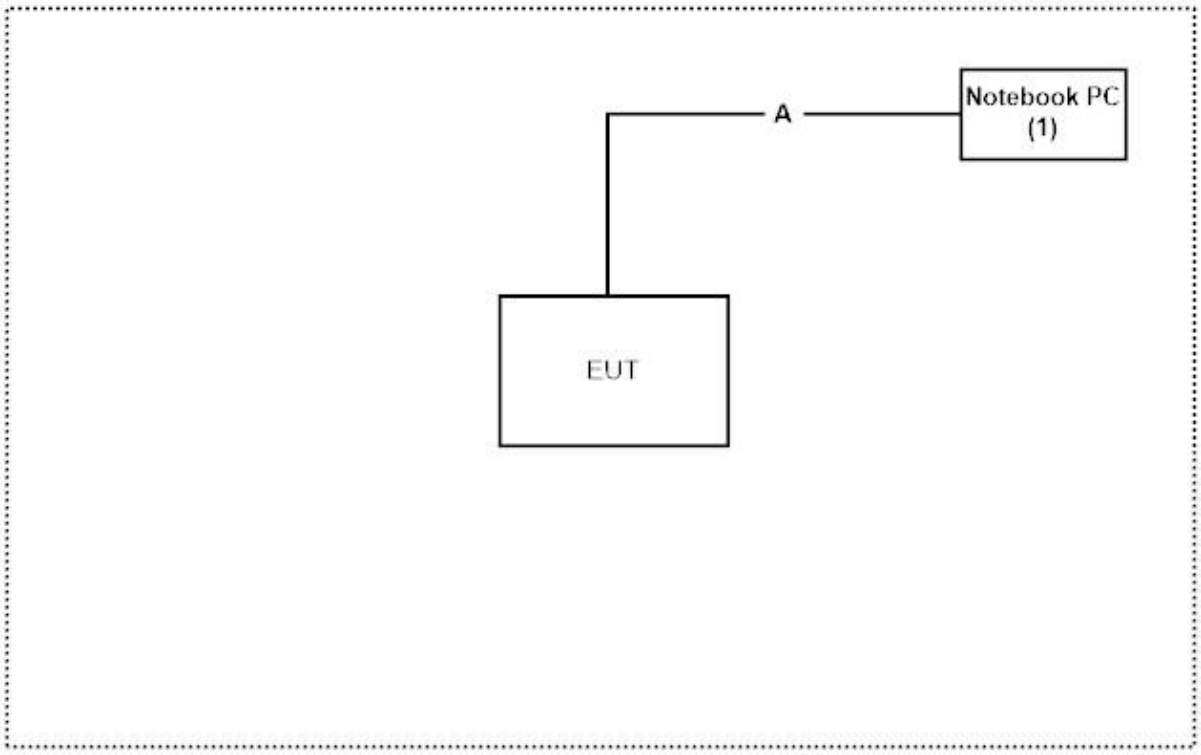
1.2. Tested System Details

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

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude E5440	B6TYTZ1	Non-Shielded, 0.8m

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 0.8m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software ” Tera Term v4.99” on the Notebook PC.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

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.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW3023

1.6. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2018/02/12	2019/02/11
X	Spectrum Analyzer	Agilent	N9010A	MY48030495	2017/10/13	2018/10/12
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	2017/11/07	2018/11/06
X	LISN	R&S	ESH3-Z5	836679/017	2018/02/09	2019/02/08
X	LISN	R&S	ENV216	100097	2018/02/09	2019/02/08
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2018/06/21	2019/06/20

For Radiated measurements /Site3/CB8

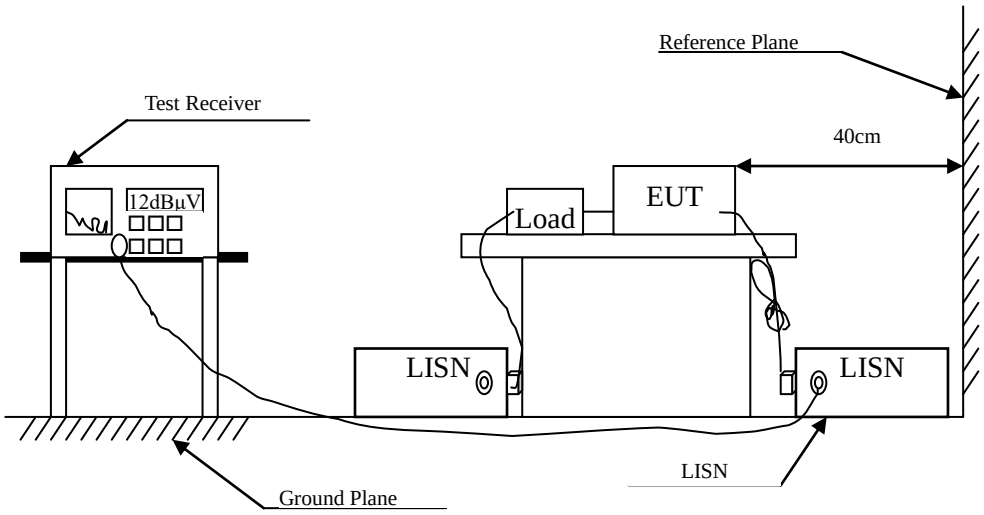
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2018/03/12	2019/03/11
	Loop Antenna	Teseq	HLA6121	37133	2017/10/13	2019/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2018/06/24	2019/06/23
X	Coaxial Cable	DEKRA	RG 214	LC003-RG	2018/06/14	2019/06/13
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	2017/11/30	2018/11/29
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2018/04/10	2019/04/09
	Horn Antenna	Com-Power	AH-840	101043	2018/01/09	2019/01/08
	Amplifier + Cable	EMCI	EMC184045SE	980370	2018/03/21	2019/03/20
X	Filter	MICRO-TRONICS	BRM50702	G270	2018/08/06	2019/08/05
	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 (dBµV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

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

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

The EUT 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 : VUZE-XR Camera
Test Item : Conducted Emission Test
Power Line : Line 1
Test date : 2018/09/04
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.158	9.746	37.920	47.666	-18.105	65.771
0.170	9.743	37.200	46.943	-18.486	65.429
0.212	9.738	29.820	39.558	-24.671	64.229
0.509	9.750	33.820	43.570	-12.430	56.000
3.556	9.881	19.840	29.721	-26.279	56.000
9.380	10.050	17.500	27.550	-32.450	60.000
Average					
0.158	9.746	15.780	25.526	-30.245	55.771
0.170	9.743	27.440	37.183	-18.246	55.429
0.212	9.738	19.200	28.938	-25.291	54.229
0.509	9.750	30.270	40.020	-5.980	46.000
3.556	9.881	12.210	22.091	-23.909	46.000
9.380	10.050	12.610	22.660	-27.340	50.000

Note:

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

Product : VUZE-XR Camera
Test Item : Conducted Emission Test
Power Line : Line 2
Test date : 2018/09/04
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.154	9.738	37.720	47.458	-18.428	65.886
0.162	9.736	35.880	45.616	-20.041	65.657
0.173	9.737	35.480	45.217	-20.126	65.343
0.205	9.738	29.200	38.938	-25.491	64.429
0.502	9.740	30.280	40.020	-15.980	56.000
3.572	9.871	23.980	33.851	-22.149	56.000
Average					
0.154	9.738	13.890	23.628	-32.258	55.886
0.162	9.736	27.150	36.886	-18.771	55.657
0.173	9.737	29.090	38.827	-16.516	55.343
0.205	9.738	10.460	20.198	-34.231	54.429
0.502	9.740	24.650	34.390	-11.610	46.000
3.572	9.871	10.790	20.661	-25.339	46.000

Note:

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

Product : VUZE-XR Camera
Test Item : Conducted Emission Test
Power Line : Line 1
Test date : 2018/09/04
Test Mode : Mode 2: Charge mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.166	9.744	26.100	35.844	-29.699	65.543
0.185	9.738	25.040	34.778	-30.222	65.000
0.228	9.739	21.040	30.779	-32.992	63.771
0.439	9.748	22.060	31.808	-25.935	57.743
0.521	9.751	29.980	39.731	-16.269	56.000
0.865	9.775	19.060	28.835	-27.165	56.000
Average					
0.166	9.744	16.640	26.384	-29.159	55.543
0.185	9.738	14.120	23.858	-31.142	55.000
0.228	9.739	13.310	23.049	-30.722	53.771
0.439	9.748	16.390	26.138	-21.605	47.743
0.521	9.751	25.650	35.401	-10.599	46.000
0.865	9.775	15.010	24.785	-21.215	46.000

Note:

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

Product : VUZE-XR Camera
Test Item : Conducted Emission Test
Power Line : Line 2
Test date : 2018/09/04
Test Mode : Mode 2: Charge mode

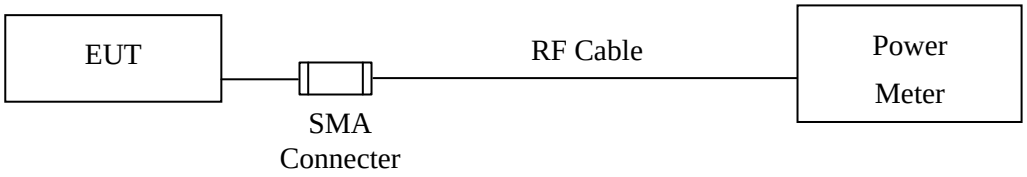
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.177	9.737	22.600	32.337	-32.892	65.229
0.193	9.738	23.040	32.778	-31.993	64.771
0.252	9.740	18.960	28.700	-34.386	63.086
0.283	9.740	18.500	28.240	-33.960	62.200
0.517	9.741	20.900	30.641	-25.359	56.000
0.861	9.765	15.520	25.285	-30.715	56.000
Average					
0.177	9.737	11.260	20.997	-34.232	55.229
0.193	9.738	13.310	23.048	-31.723	54.771
0.252	9.740	4.440	14.180	-38.906	53.086
0.283	9.740	13.780	23.520	-28.680	52.200
0.517	9.741	15.110	24.851	-21.149	46.000
0.861	9.765	9.480	19.245	-26.755	46.000

Note:

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

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

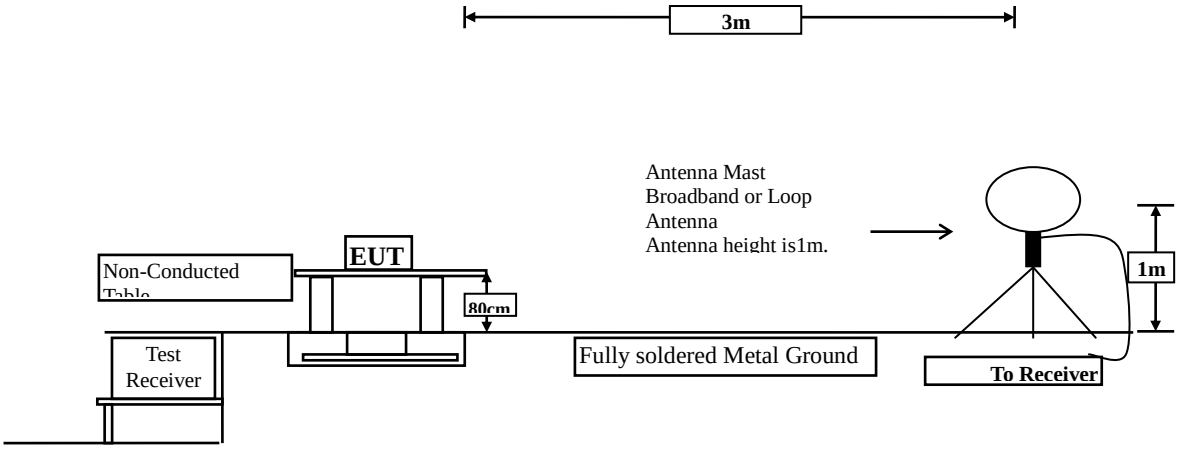
Product : VUZE-XR Camera
Test Item : Peak Power Output
Test Site : No.3 OATS
Test date : 2018/09/17
Test Mode : Mode 1: Transmit - BLE (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	3.12	1 Watt= 30 dBm	Pass
Channel 19	2440.00	3.06	1 Watt= 30 dBm	Pass
Channel 39	2480.00	3.62	1 Watt= 30 dBm	Pass

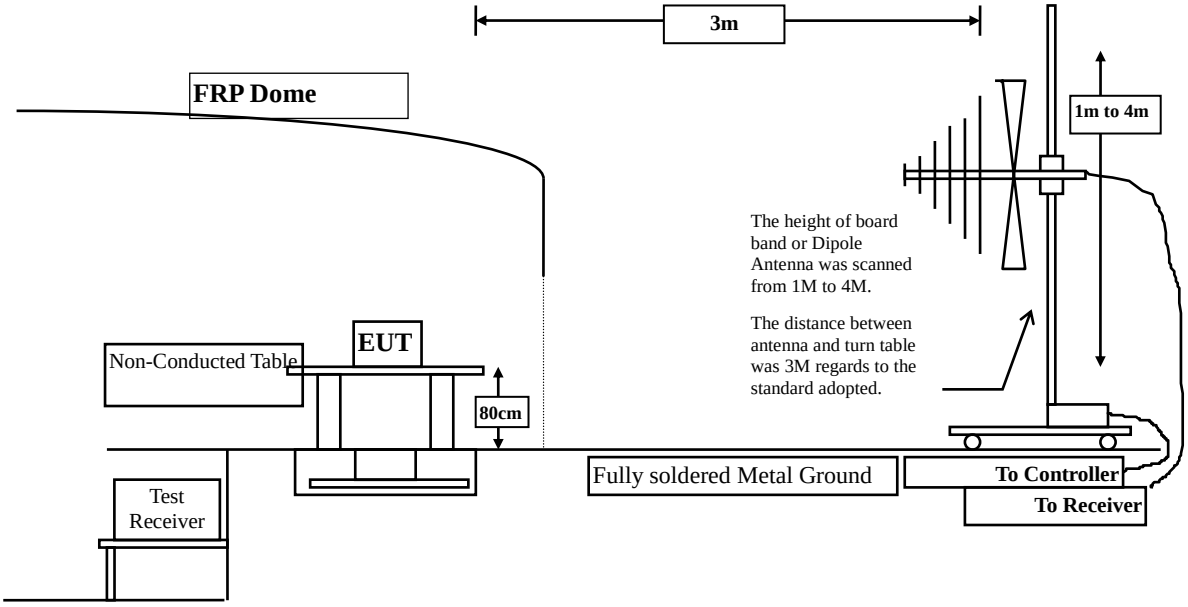
4. Radiated Emission

4.1. Test Setup

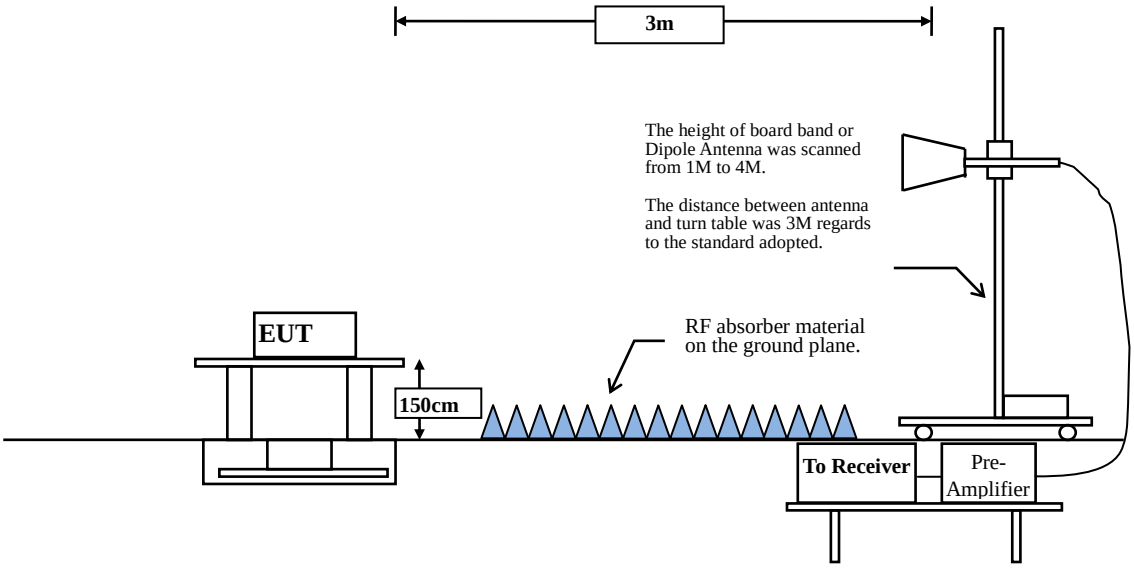
Under 30MHz



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 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 form 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 ≥ 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 KDB 558074 section 12.2.5. Average power 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	62.03	0.3920	2551	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 : VUZE-XR Camera
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2018/09/04
Test Mode : Mode 1: Transmit - BLE (GFSK)(2402MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4804.000	2.511	44.190	46.700	-27.300	74.000
7206.000	9.511	42.650	52.161	-21.839	74.000
9608.000	10.394	42.290	52.684	-21.316	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	2.923	43.300	46.222	-27.778	74.000
7206.000	9.988	43.070	53.059	-20.941	74.000
9608.000	10.847	42.450	53.297	-20.703	74.000
Average Detector:					
--					

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 : VUZE-XR Camera
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2018/09/04
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4880.000	2.038	43.920	45.958	-28.042	74.000
7320.000	9.699	43.140	52.839	-21.161	74.000
9760.000	9.665	41.390	51.055	-22.945	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4880.000	2.499	44.410	46.909	-27.091	74.000
7320.000	10.303	43.100	53.403	-20.597	74.000
9760.000	10.299	42.480	52.780	-21.220	74.000
Average Detector:					
--					

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 : VUZE-XR Camera
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2018/09/04
Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4960.000	2.582	43.930	46.512	-27.488	74.000
7440.000	10.555	41.050	51.605	-22.395	74.000
9920.000	10.206	43.070	53.276	-20.724	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	3.398	43.530	46.929	-27.071	74.000
7440.000	11.214	40.930	52.144	-21.856	74.000
9920.000	11.245	42.400	53.645	-20.355	74.000
Average Detector:					
--					

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 : VUZE-XR Camera
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test date : 2018/09/04
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
108.725	-7.559	32.882	25.324	-18.176	43.500
419.406	-0.249	35.872	35.623	-10.377	46.000
491.101	1.527	32.686	34.213	-11.787	46.000
565.609	1.958	26.988	28.946	-17.054	46.000
713.217	3.793	26.961	30.755	-15.245	46.000
791.942	6.389	34.947	41.336	-5.064	46.000
Vertical					
59.522	-11.334	41.818	30.485	-9.515	40.000
179.014	-0.878	26.799	25.922	-17.578	43.500
382.855	0.271	27.212	27.483	-18.517	46.000
540.304	2.156	24.179	26.335	-19.665	46.000
614.812	1.709	25.421	27.130	-18.870	46.000
791.942	2.684	29.084	31.768	-14.232	46.000

Note:

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

Product : VUZE-XR Camera
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test date : 2018/09/04
Test Mode : Mode 2: Charge mode

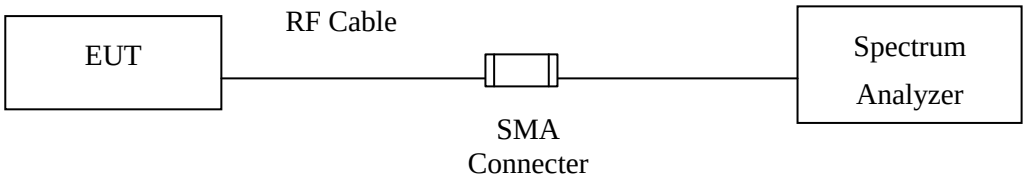
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
299.913	-4.722	29.052	24.330	-21.670	46.000
419.406	-0.249	36.481	36.232	-9.768	46.000
467.203	3.297	27.358	30.655	-15.345	46.000
614.812	3.005	24.731	27.736	-18.264	46.000
713.217	3.793	26.823	30.617	-15.383	46.000
791.942	6.389	30.026	36.415	-9.585	46.000
Vertical					
59.522	-11.334	42.950	31.617	-8.383	40.000
381.449	0.721	26.893	27.615	-18.385	46.000
540.304	2.156	25.284	27.440	-18.560	46.000
614.812	1.709	24.189	25.898	-20.102	46.000
791.942	2.684	28.467	31.151	-14.849	46.000
900.188	1.948	24.752	26.700	-19.300	46.000

Note:

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

5. RF Antenna Conducted Test

5.1. Test Setup



5.2. Limits

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

5.3. Test Procedure

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

5.4. Uncertainty

± 1.20dB

5.5. Test Result of RF Antenna Conducted Test

Product	:	VUZE-XR Camera
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test date	:	2018/09/14
Test Mode	:	Mode 1: Transmit - BLE (GFSK)

Figure Channel 00:

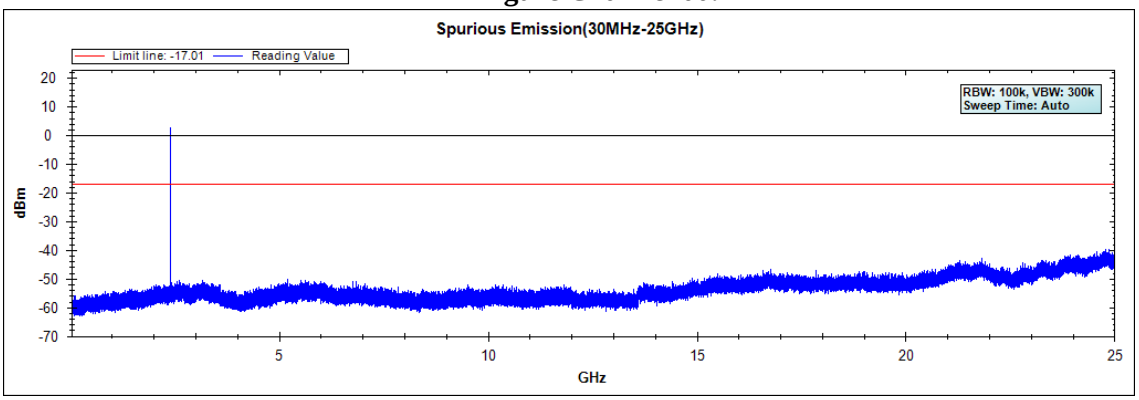


Figure Channel 19:

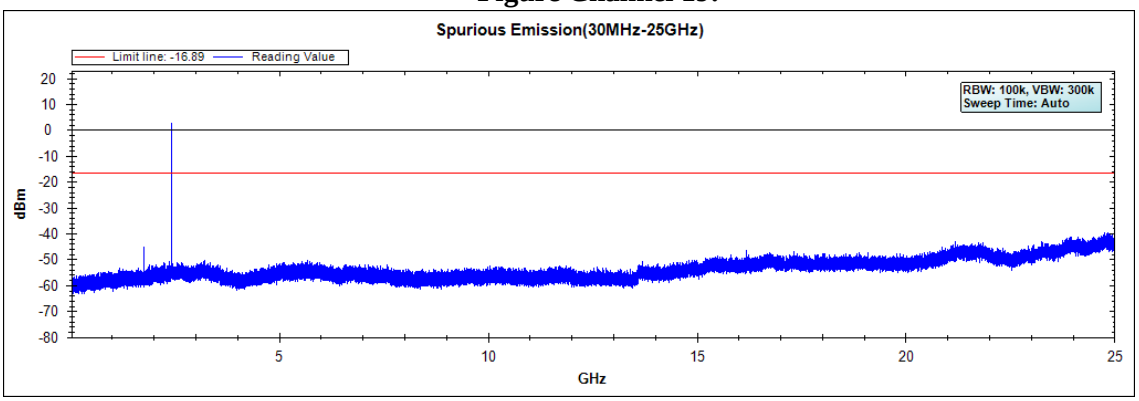
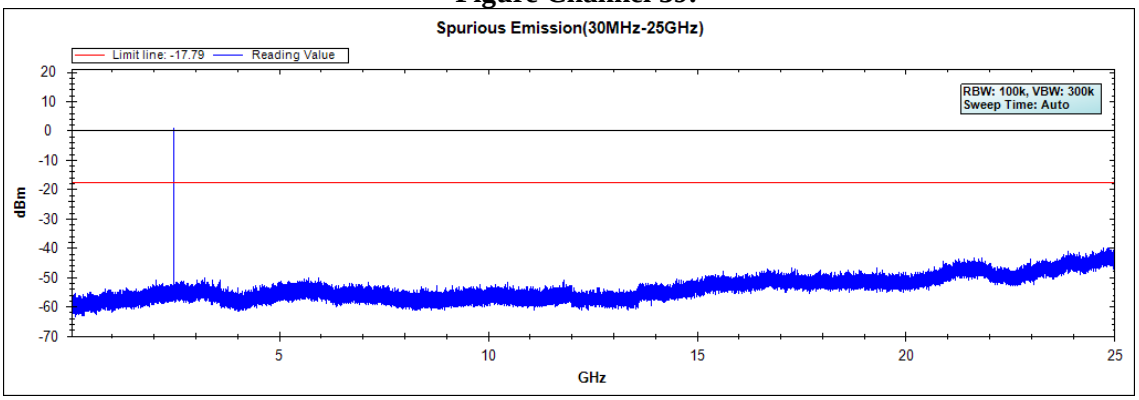


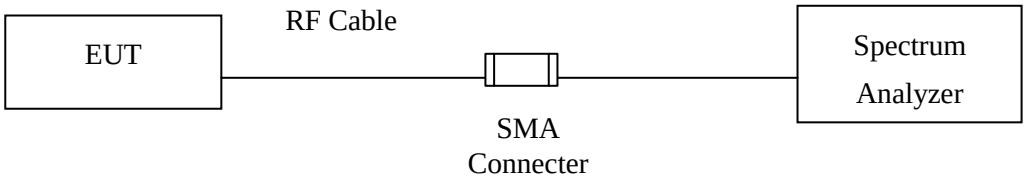
Figure Channel 39:



6. Band Edge

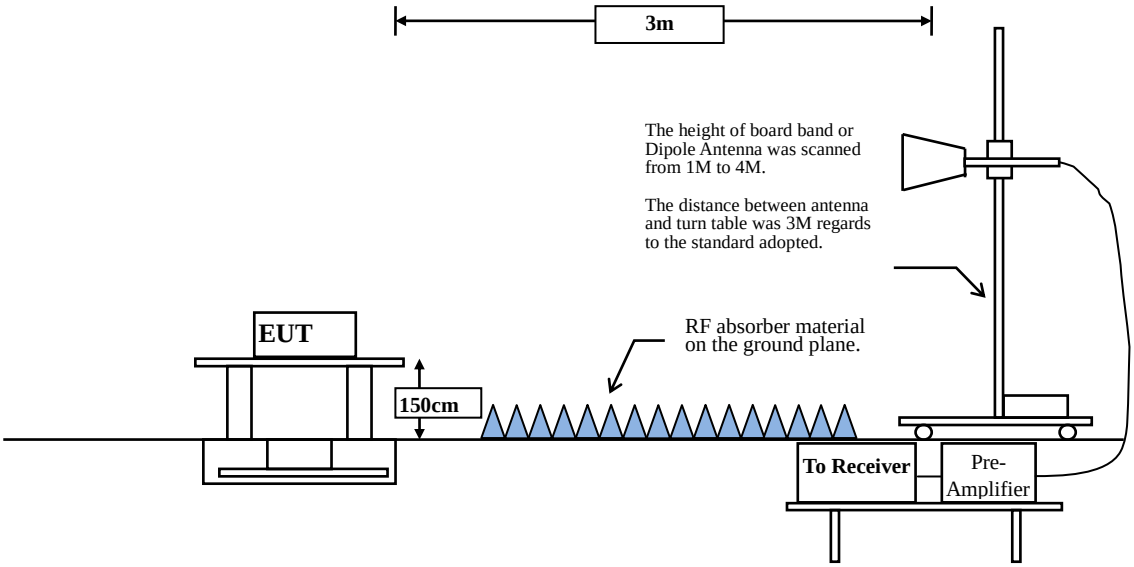
6.1. Test Setup

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 ≥ 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 KDB 558074 section 12.2.5. Average power 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	62.03	0.3920	2551	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 : VUZE-XR Camera
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2018/09/08
Test Mode : Mode 1: Transmit - BLE (GFSK)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
00 (Peak)	2390.000	-2.687	49.398	46.711	74.00	54.00	Pass
00 (Peak)	2400.000	-2.660	69.092	66.432	--	--	--
00 (Peak)	2401.700	-2.658	97.807	95.149	--	--	--
00 (Average)	2390.000	-2.687	38.471	35.784	74.00	54.00	Pass
00 (Average)	2400.000	-2.660	55.353	52.693	--	--	--
00 (Average)	2402.100	-2.657	97.276	94.619	--	--	--

Figure Channel 00: Horizontal (Peak)

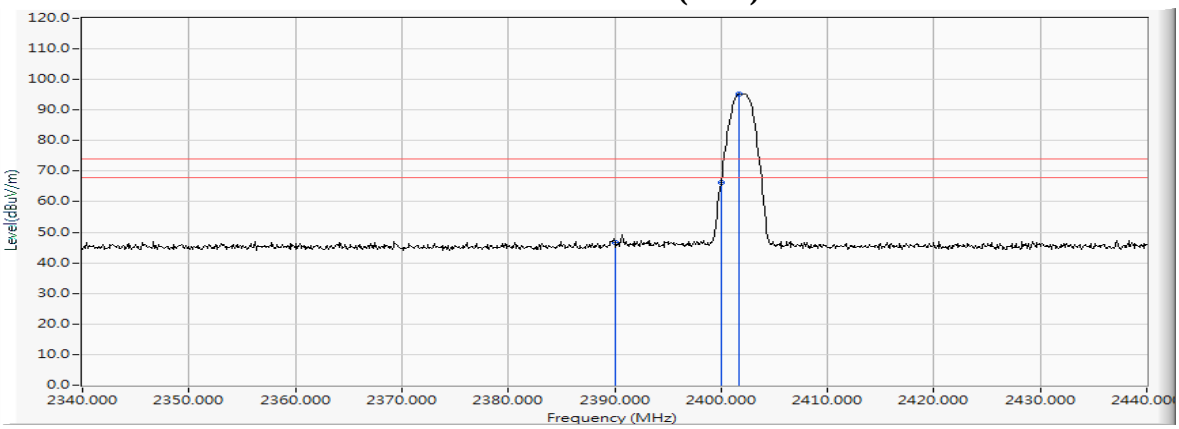
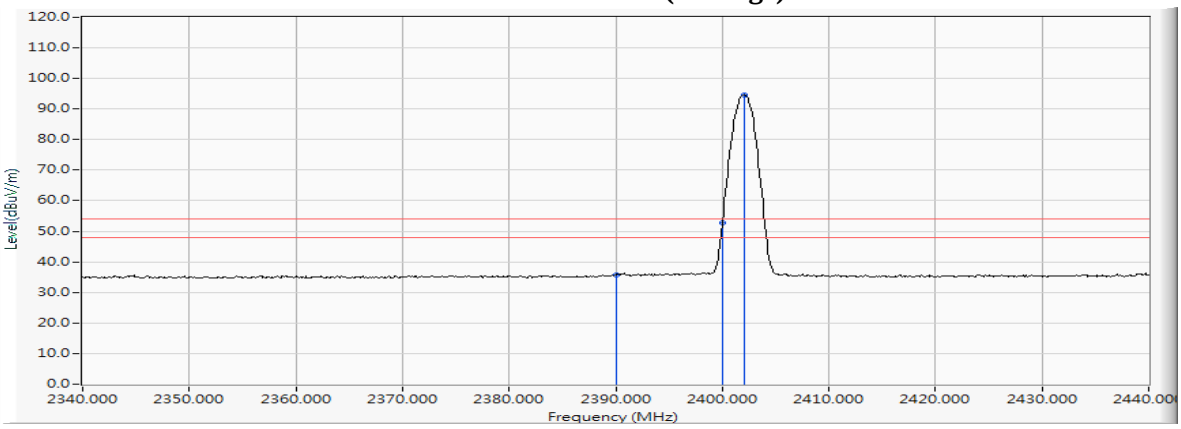


Figure Channel 00: Horizontal (Average)



Note:

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

Product	:	VUZE-XR Camera
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2018/09/08
Test Mode	:	Mode 1: Transmit - BLE (GFSK)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
00 (Peak)	2390.000	-4.159	48.661	44.502	74.00	54.00	Pass
00 (Peak)	2400.000	-4.171	67.900	63.729	--	--	--
00 (Peak)	2401.700	-4.171	95.825	91.654	--	--	--
00 (Average)	2390.000	-4.159	38.079	33.920	74.00	54.00	Pass
00 (Average)	2400.000	-4.171	53.445	49.274	--	--	--
00 (Average)	2402.100	-4.171	95.264	91.093	--	--	--

Figure Channel 00: Vertical (Peak)

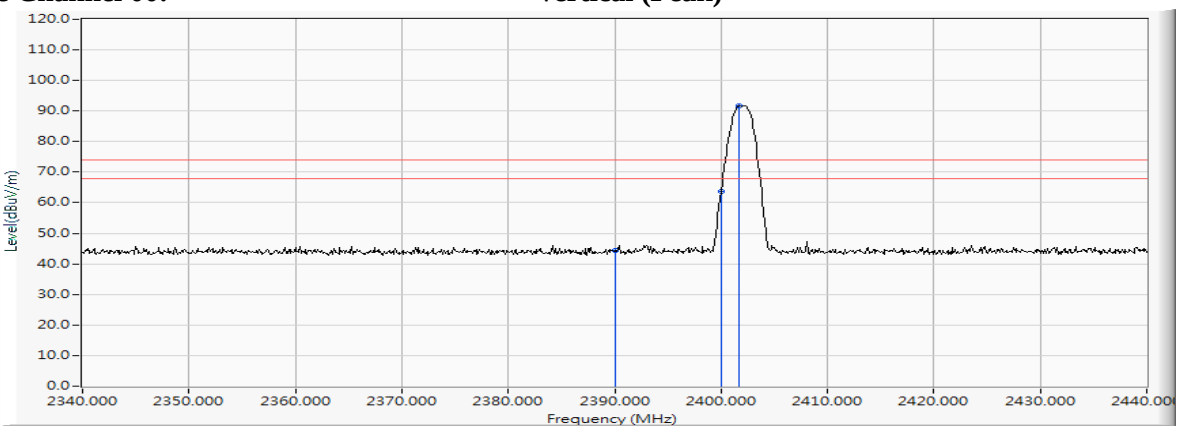
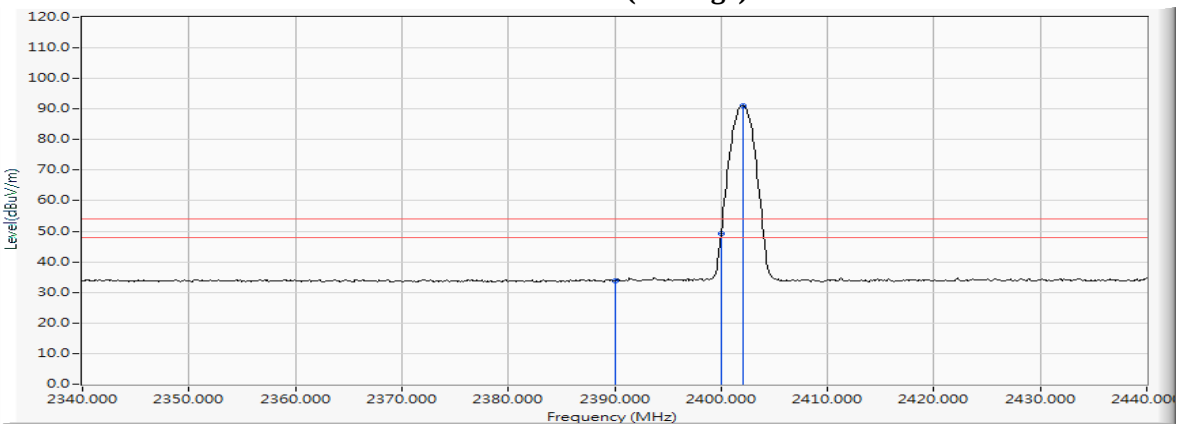


Figure Channel 00: Vertical (Average)



Note:

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

Product	:	VUZE-XR Camera
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2018/09/08
Test Mode	:	Mode 1: Transmit - BLE (GFSK)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
39 (Peak)	2479.800	-2.605	97.530	94.925	--	--	--
39 (Peak)	2483.500	-2.601	47.489	44.887	74.00	54.00	Pass
39 (Average)	2480.000	-2.605	96.841	94.236	--	--	--
39 (Average)	2483.500	-2.601	37.825	35.223	74.00	54.00	Pass

Figure Channel 39: Horizontal (Peak)

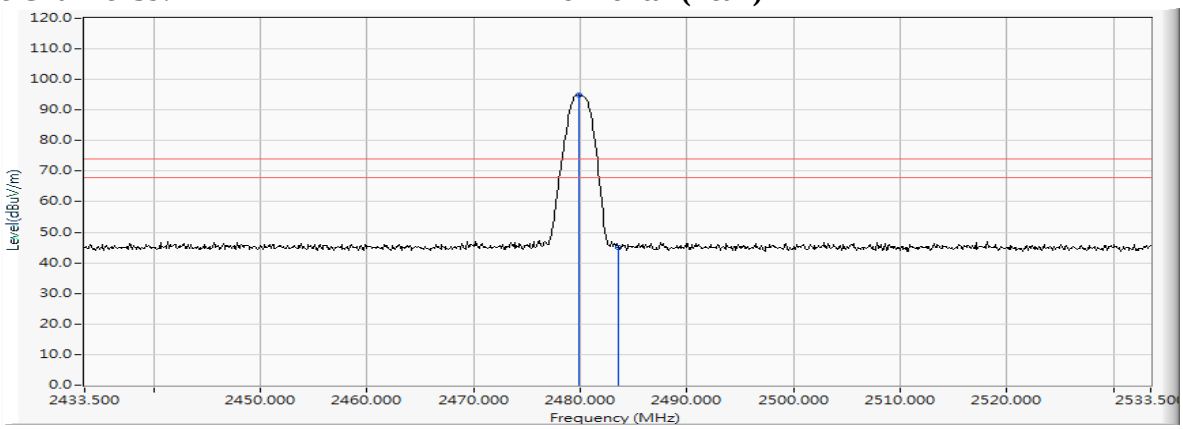
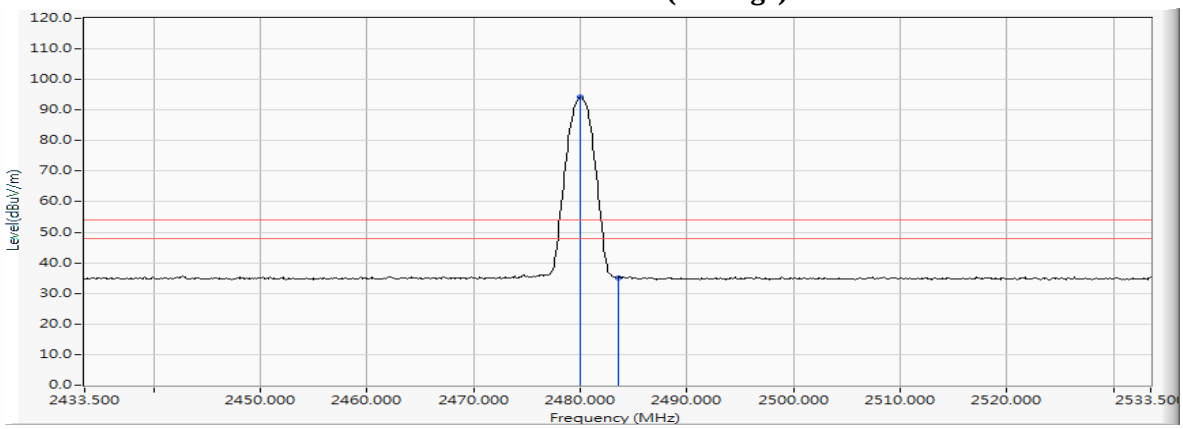


Figure Channel 39: Horizontal (Average)



Note:

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

Product	:	VUZE-XR Camera
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2018/09/08
Test Mode	:	Mode 1: Transmit - BLE (GFSK)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
39 (Peak)	2479.700	-3.978	95.513	91.534	--	--	--
39 (Peak)	2483.500	-3.966	48.292	44.325	74.00	54.00	Pass
39 (Average)	2480.100	-3.977	94.820	90.843	--	--	--
39 (Average)	2483.500	-3.966	37.812	33.845	74.00	54.00	Pass

Figure Channel 39: Vertical (Peak)

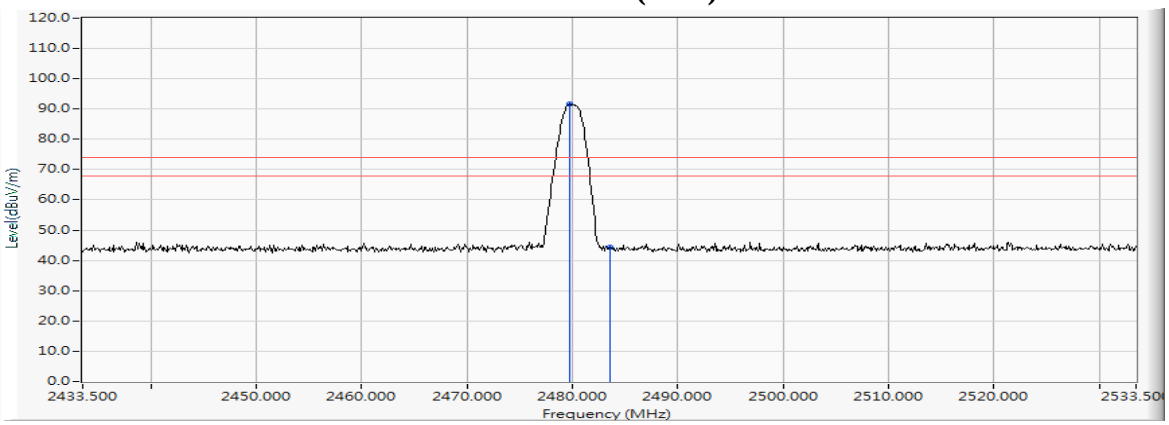
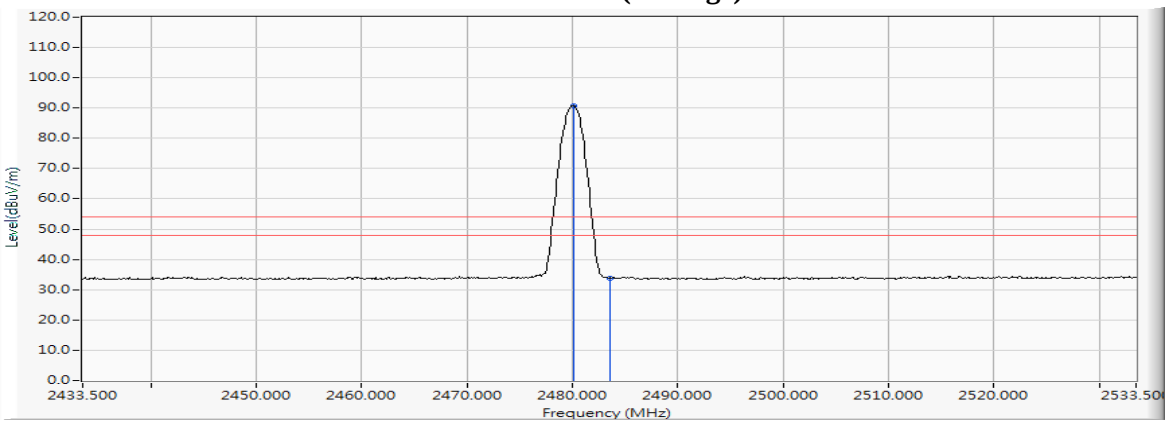


Figure Channel 39: Vertical (Average)

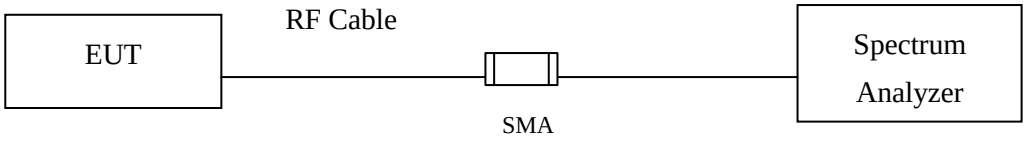


Note:

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

7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

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

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

7.4. Uncertainty

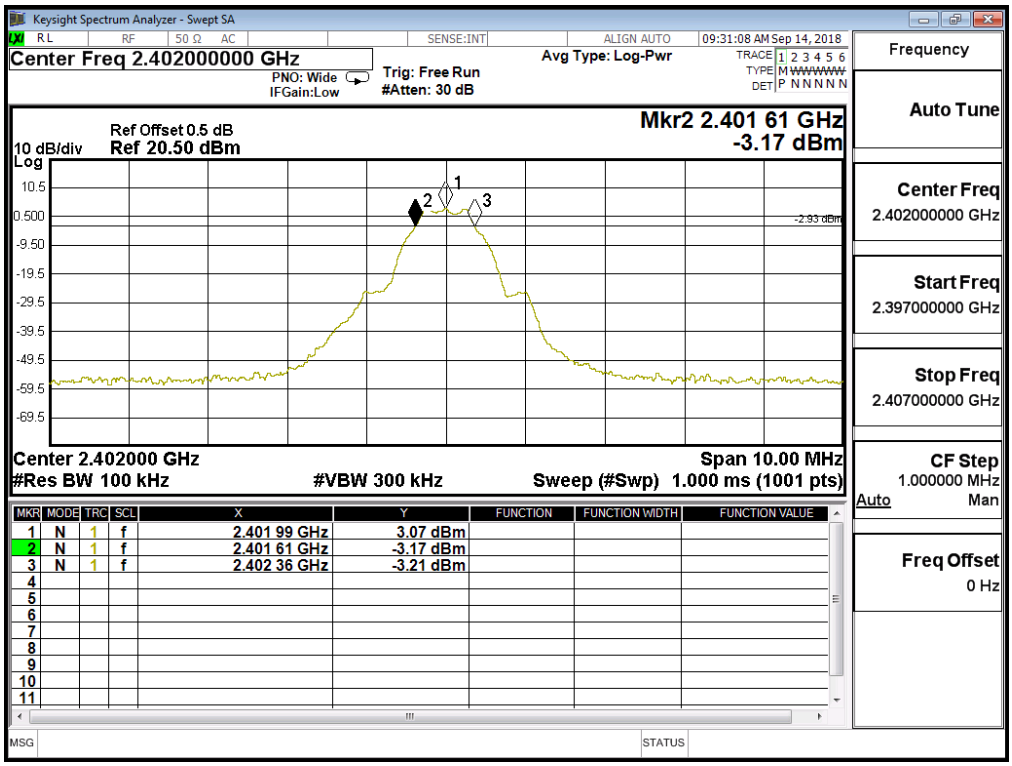
± 283Hz

7.5. Test Result of 6dB Bandwidth

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

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

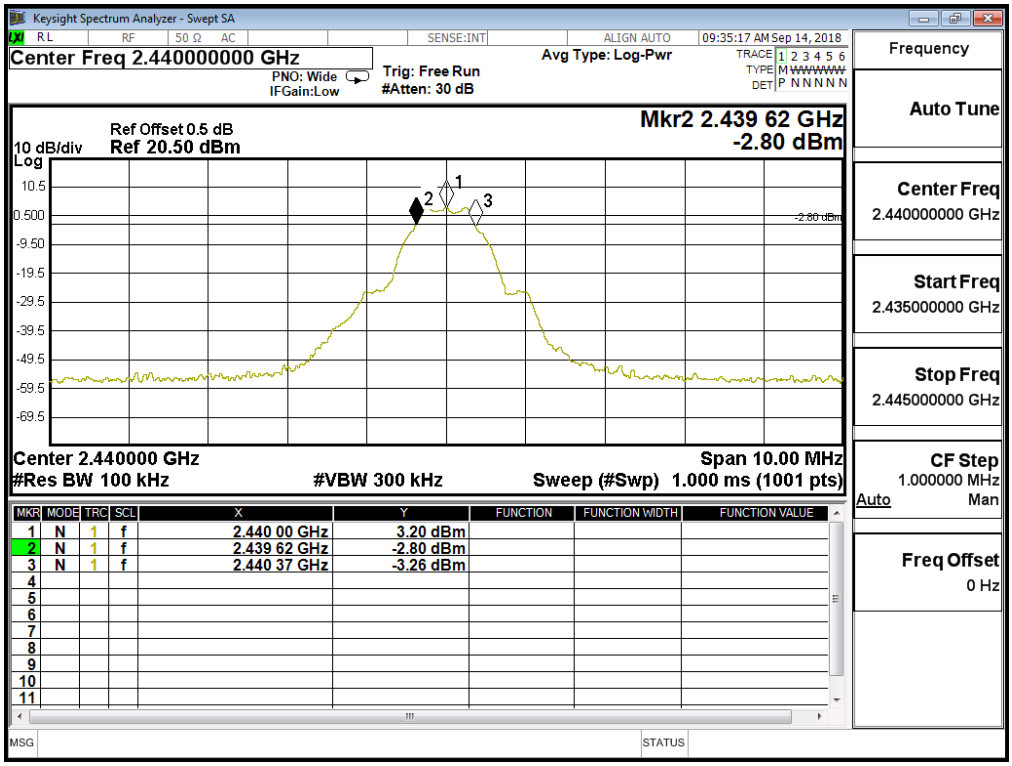
Figure Channel 00:



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

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

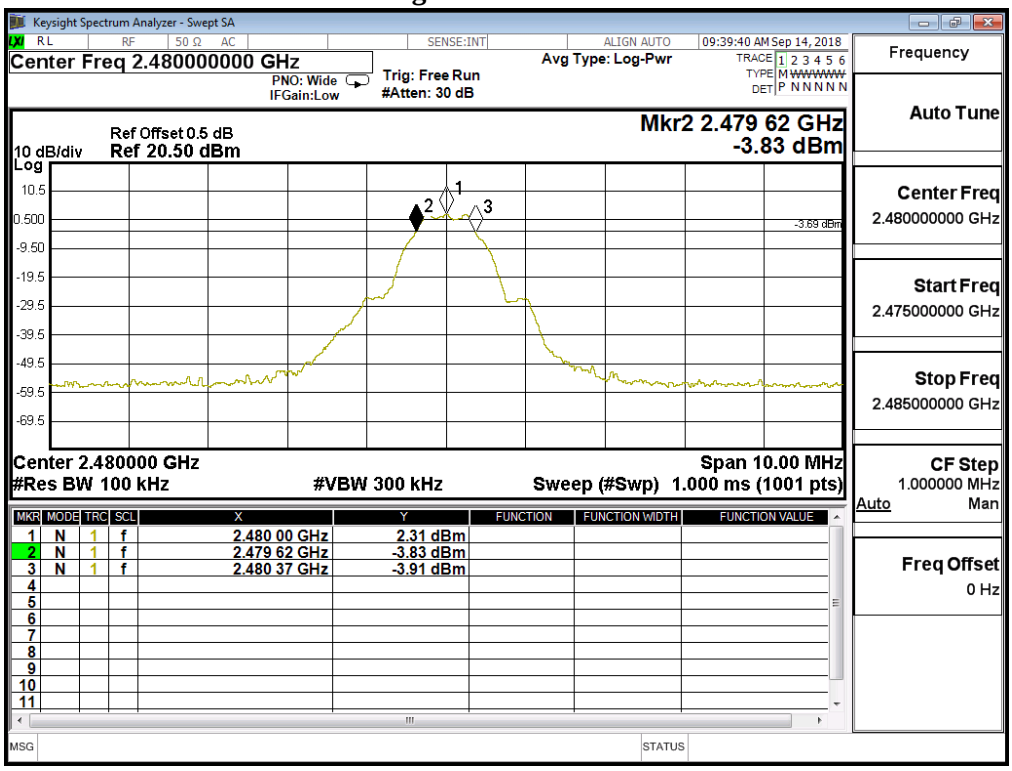
Figure Channel 19:



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

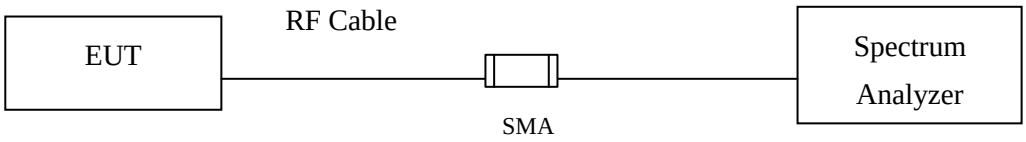
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2480	750	>500	Pass

Figure Channel 39:



8. Power Density

8.1. Test Setup



8.2. Limits

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

8.3. Test Procedure

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

8.4. Uncertainty

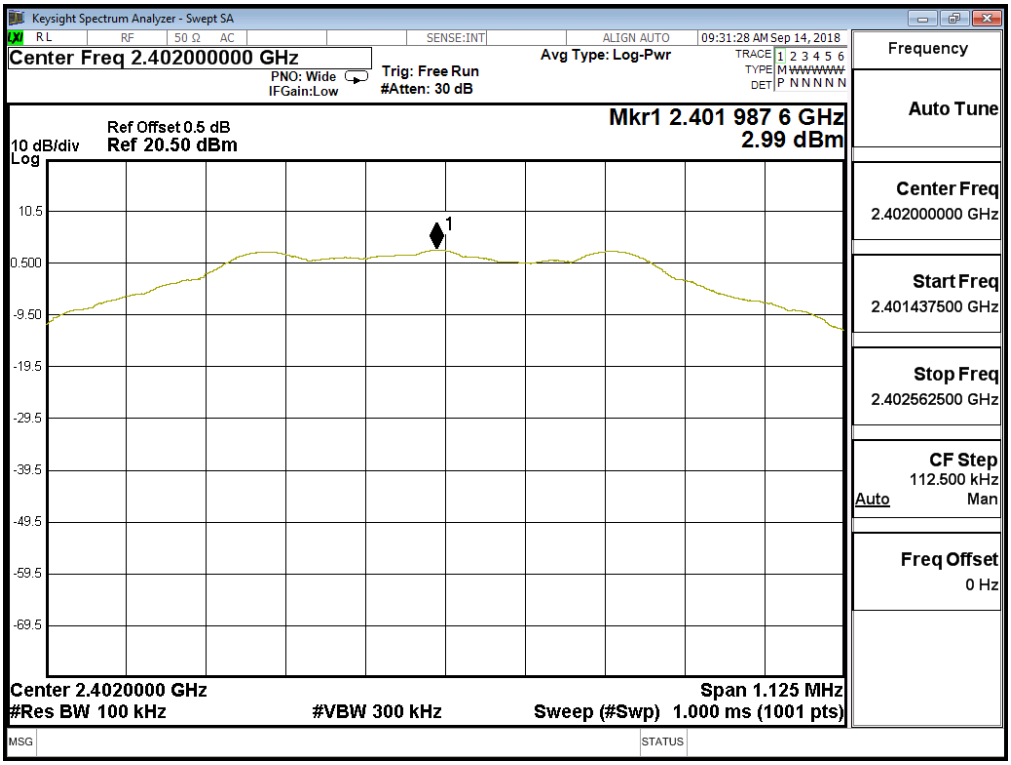
± 1.20 dB

8.5. Test Result of Power Density

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

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	2.990	≦8dBm	Pass

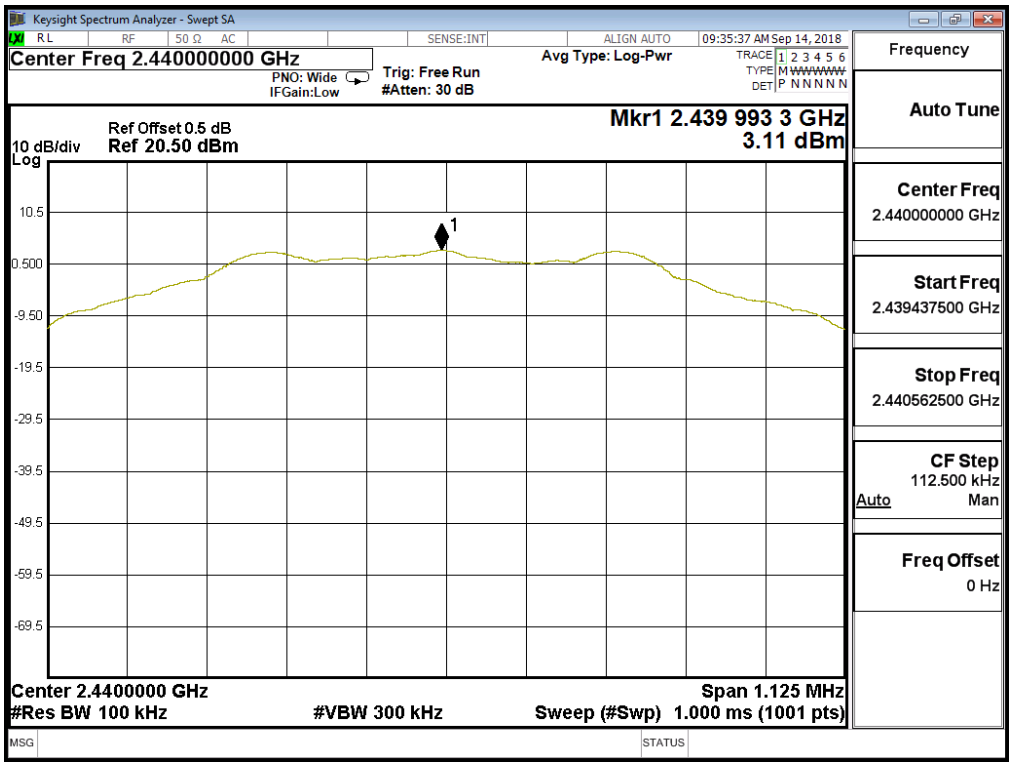
Figure Channel 00:



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

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2440	3.110	≦8dBm	Pass

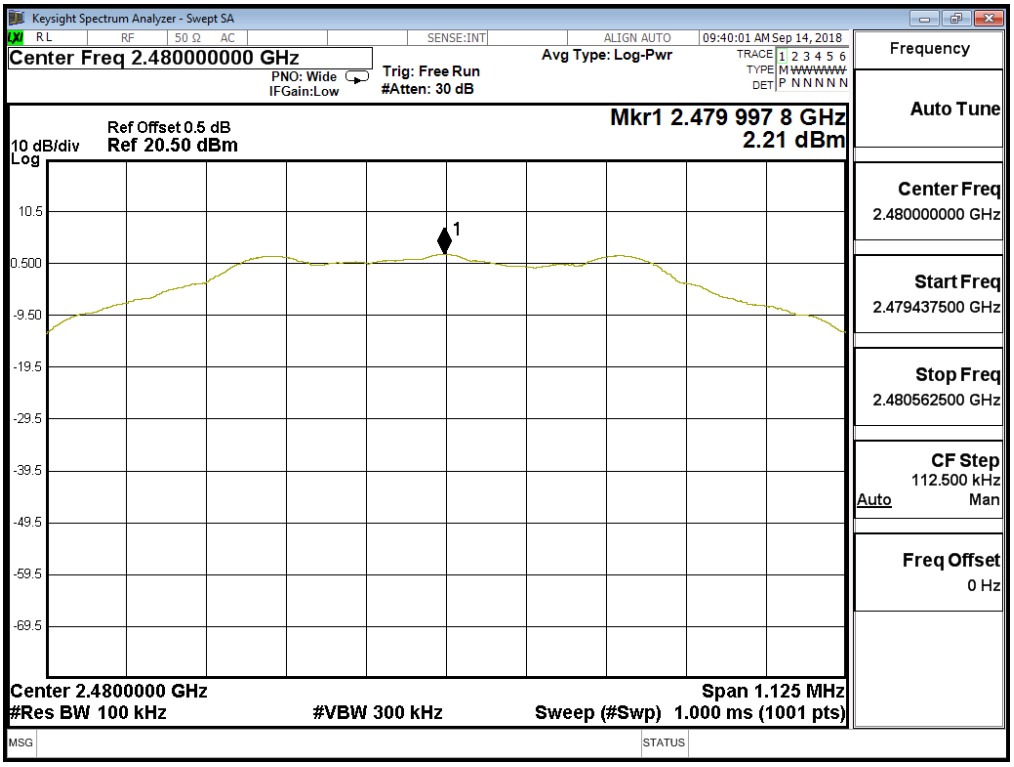
Figure Channel 19:



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

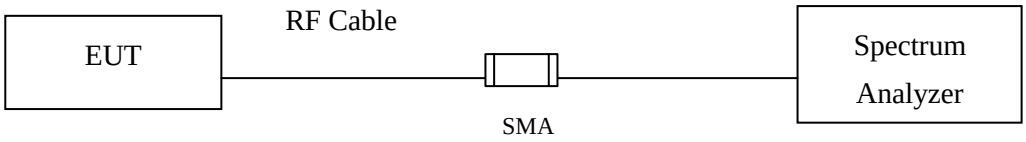
Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	2.210	≦8dBm	Pass

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

± 2.31msec

9.4. Test Result of Duty Cycle

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

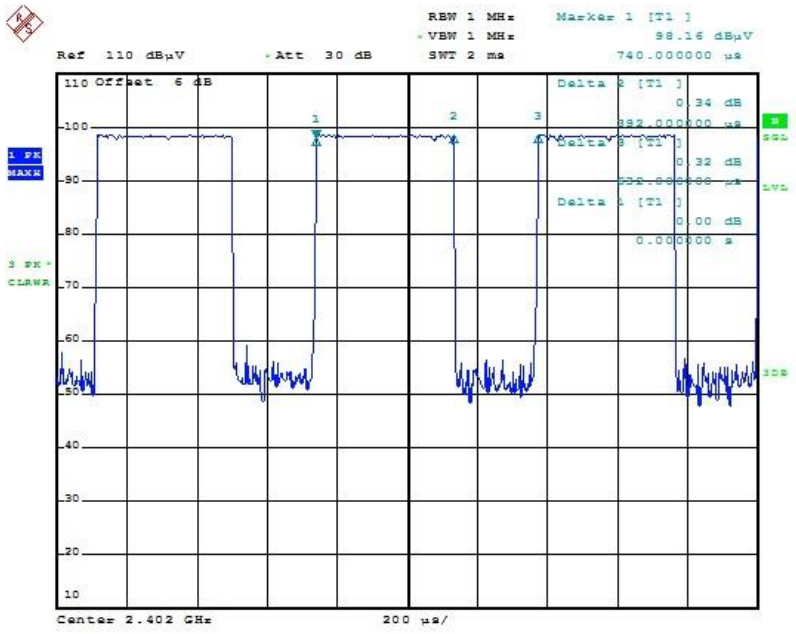
Duty Cycle Formula:

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	0.3920	0.6320	62.03	2.07



Date: 8.SEP.2018 00:37:37

10. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs