SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

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TEST REPORT

Application No.:	SZEM1709009366CR
Applicant:	Kandao lightforge Co., Ltd
Address of Applicant:	Unit 5D, Block M7, SinoSteel Building, Nanshan, Shenzhen, China
Manufacturer:	Kandao lightforge Co., Ltd
Address of Manufacturer:	Unit 5D, Block M7, SinoSteel Building, Nanshan, Shenzhen, China
Factory:	SKY Light Electronic (Shenzhen) Limited
Address of Factory:	No.1, 5 & 6 Building, JinBi Industrial Area, HuangTian, Bao'An, Shenzhen, China.
Equipment Under Test (EUT):	
EUT Name:	3D VR Digital Camera
Model No.:	Obsidian GO
Trade mark:	KanDao
FCC ID:	2AMZV-KDOG
Standard(s) :	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2017-09-01
Date of Test:	2017-09-05 to 2017-09-12
Date of Issue:	2017-10-31
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

This report supersedes our previous report SZEM170900936603, issued on 2017-09-18, which is hereby deemed null and void.

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	***Chapter***	***Date***	***Modifier***	***Remark***
01		*2017-09-18*		*Original*
02		*2017-10-31*		*New*

Authorized for issue by:				
		Edison Li **Edison Li /Project Engineer**		
		Eric Fu **Eric Fu /Reviewer**		

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass

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4 General Information

4.1 Details of E.U.T.

Power supply: DC 12.0V or powered by DC 7.4V*2 batteries
Frequency Range: 2.404 GHz to 2.476 GHz
Number of Channels: 73
Modulation Type: GFSK
Antenna Type: Integral
Antenna Gain: 3dBi

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2404.00	20	2423.00	39	2442.00	58	2461.00
2	2405.00	21	2424.00	40	2443.00	59	2462.00
3	2406.00	22	2425.00	41	2444.00	60	2463.00
4	2407.00	23	2426.00	42	2445.00	61	2464.00
5	2408.00	24	2427.00	43	2446.00	62	2465.00
6	2409.00	25	2428.00	44	2447.00	63	2466.00
7	2410.00	26	2429.00	45	2448.00	64	2467.00
8	2411.00	27	2430.00	46	2449.00	65	2468.00
9	2412.00	28	2431.00	47	2450.00	66	2469.00
10	2413.00	29	2432.00	48	2451.00	67	2470.00
11	2414.00	30	2433.00	49	2452.00	68	2471.00
12	2415.00	31	2434.00	50	2453.00	69	2472.00
13	2416.00	32	2435.00	51	2454.00	70	2473.00
14	2417.00	33	2436.00	52	2455.00	71	2474.00
15	2418.00	34	2437.00	53	2456.00	72	2475.00
16	2419.00	35	2438.00	54	2457.00	73	2476.00
17	2420.00	36	2439.00	55	2458.00		
18	2421.00	37	2440.00	56	2459.00		
19	2422.00	38	2441.00	57	2460.00		

Selected Test Channel	
Channel	Frequency
The lowest channel (CH1)	2404MHz
The middle channel (CH43)	2446MHz
The highest channel (CH73)	2476MHz

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4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC power	ZHAOXIN	RXN-305D	REF. No.SEA2700

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25×10^{-8}
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
9	Temperature test	1℃
10	Humidity test	3%
11	Supply voltages	1.5%
12	Time	3%

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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

20dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2017-04-14	2018-04-13
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09
RF cable	SGS	RF1	N/A	2016-10-09	2017-10-09

Field Strength of the Fundamental Signal (15.249(a))					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-02	2020-05-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna(15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A
Cable	SGS	RE2	N/A	2016-10-09	2017-10-09

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Restricted Band Around Fundamental Frequency					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-02	2020-05-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A
Cable	SGS	RE2	N/A	2016-10-09	2017-10-09

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Radiated Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-02	2020-05-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna(15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A
Cable	SGS	RE1	N/A	2016-10-09	2017-10-09

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-18

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

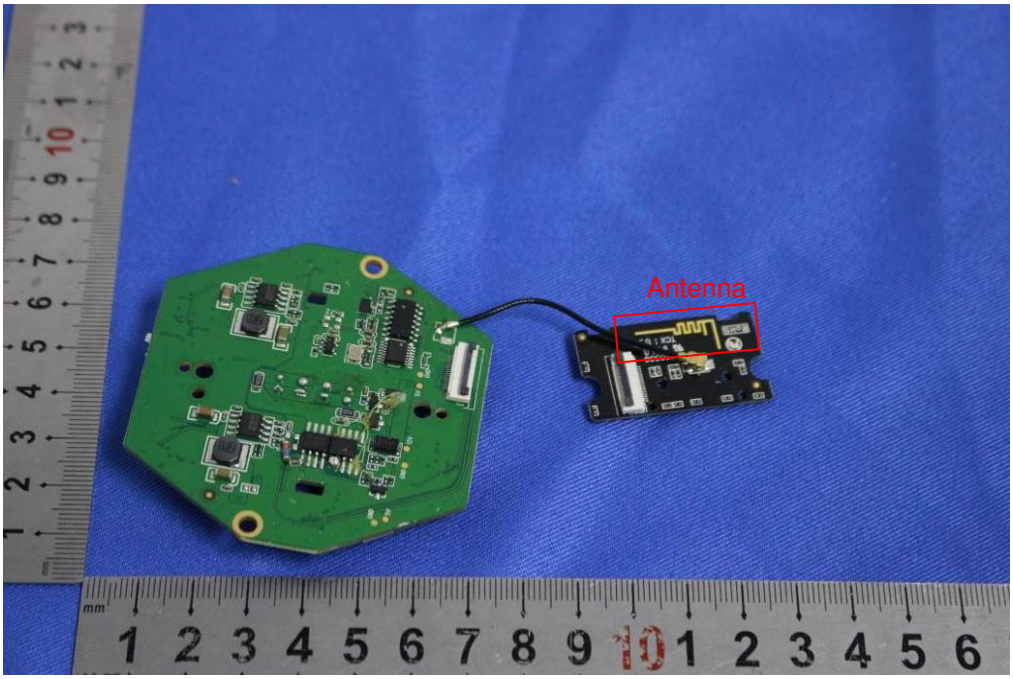
6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently

attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.

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7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9
Limit: N/A

7.1.1 E.U.T. Operation

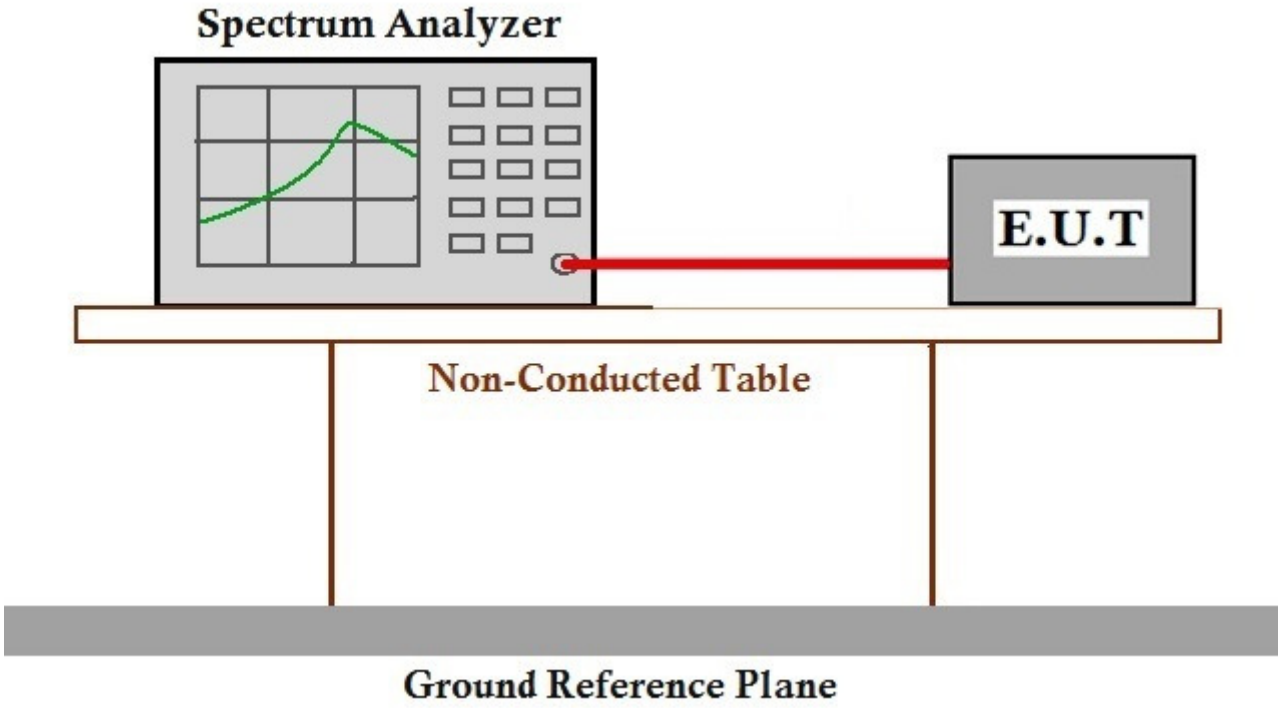
Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: c: Tx mode, Keep the EUT in transmitting mode with battery.
d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

The worst case for final test: d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

7.1.2 Test Setup Diagram



7.1.3 Measurement Data

Test Channel	20dB bandwidth (MHz)	Results
Lowest	2.5321	Pass
Middle	1.8990	Pass
Highest	1.9310	Pass

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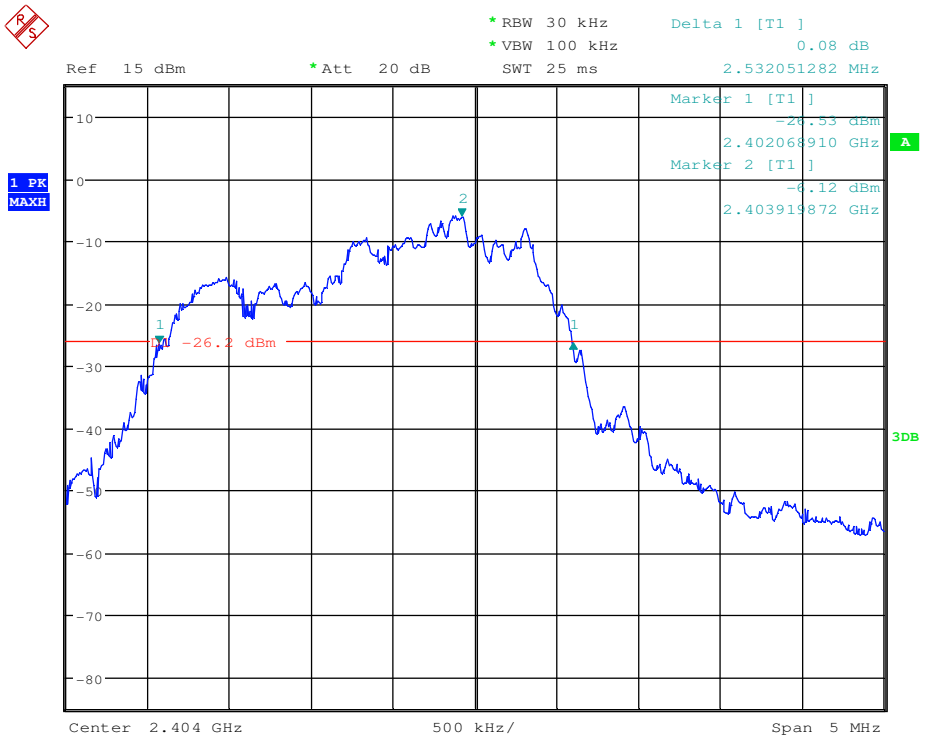
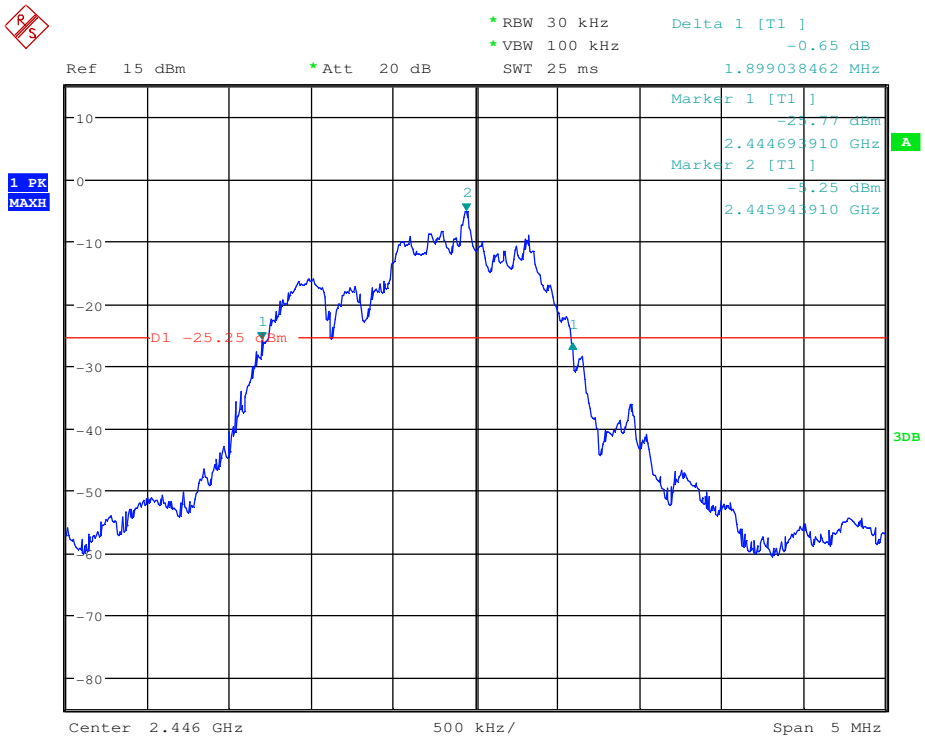
Mode:c; Modulation Type:GFSK; Channel:Low



Mode:c; Modulation Type:GFSK; Channel:middle



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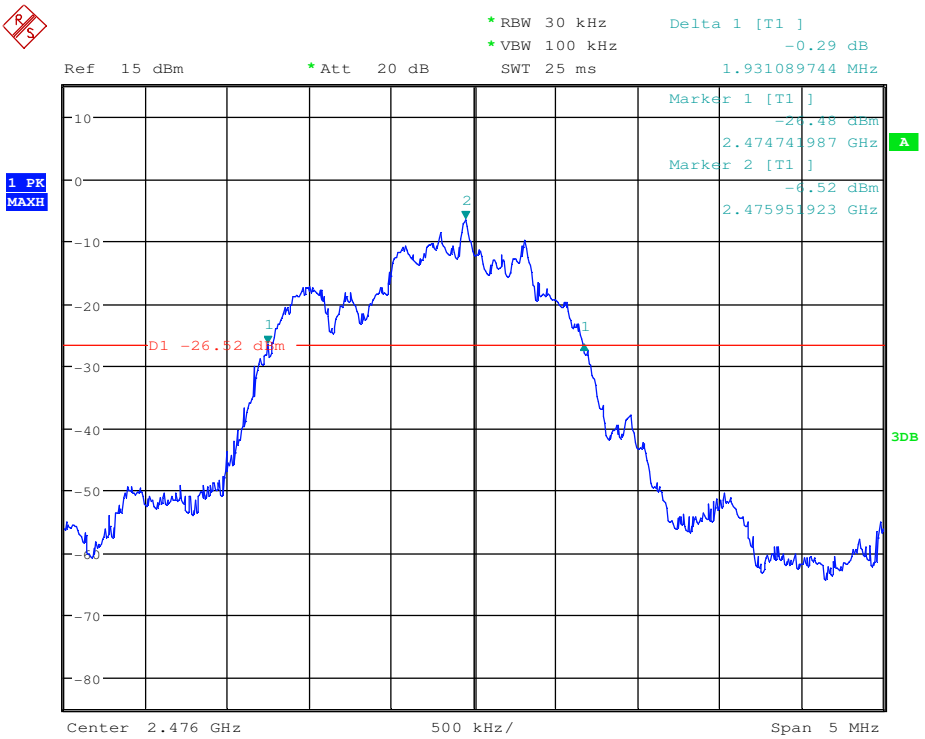
Mode:c; Modulation Type:GFSK; Channel High



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7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)
Test Method: ANSI C63.10 (2013) Section 6.5&6.6
Measurement Distance: 3m
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

7.2.1 E.U.T. Operation

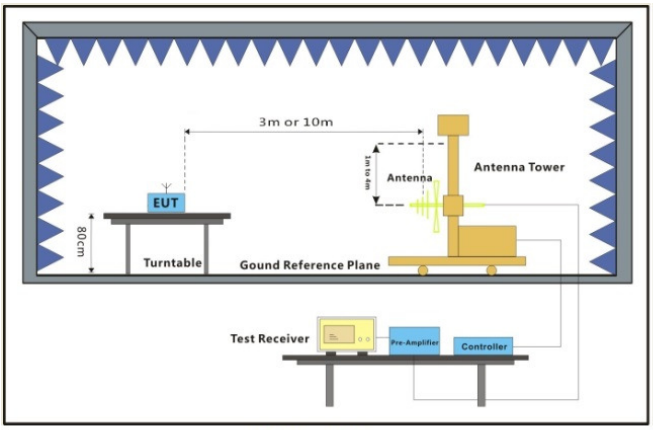
Operating Environment:

Temperature: 24 °C Humidity: 56 % RH Atmospheric Pressure: 1005 mbar

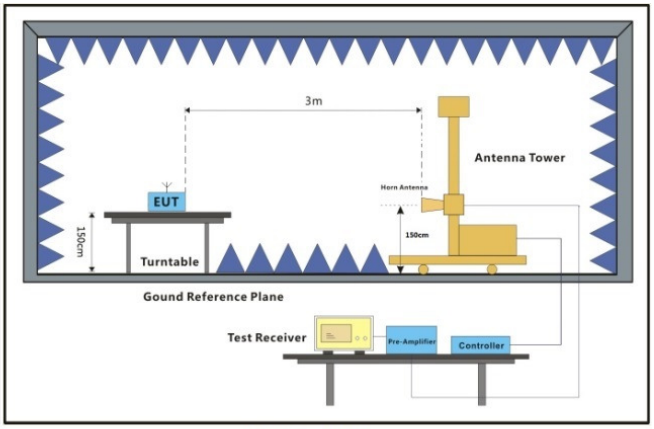
Pretest these mode to find the worst case: c: Tx mode, Keep the EUT in transmitting mode with battery.
d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

The worst case for final test: d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

7.2.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

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7.2.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel,the middle channel,the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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Peak value:

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2406.530	29.13	5.50	37.95	99.76	96.44	114.00	-17.56	Horizontal
2405.816	29.12	5.50	37.95	96.53	93.20	114.00	-20.80	Vertical
2446.300	29.24	5.55	37.95	100.67	97.51	114.00	-16.49	Horizontal
2445.260	29.24	5.55	37.95	94.23	91.07	114.00	-22.93	Vertical
2476.270	29.33	5.59	37.95	99.11	96.08	114.00	-17.92	Horizontal
2475.104	29.33	5.59	37.95	95.43	92.40	114.00	-21.60	Vertical

Average value:

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2406.530	29.13	5.50	37.95	74.75	71.43	94.00	-22.57	Horizontal
2446.300	29.24	5.55	37.95	75.67	72.51	94.00	-21.49	Horizontal
2476.270	29.33	5.59	37.95	74.11	71.08	94.00	-22.92	Horizontal

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

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7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value
Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.		

7.3.1 E.U.T. Operation

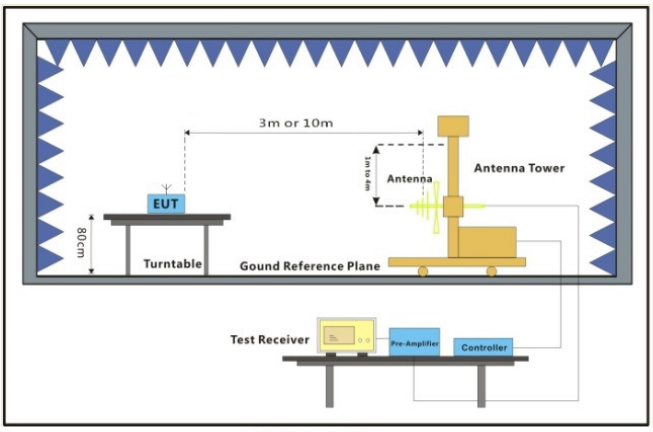
Operating Environment:

Temperature: 24 °C Humidity: 56 % RH Atmospheric Pressure: 1005 mbar

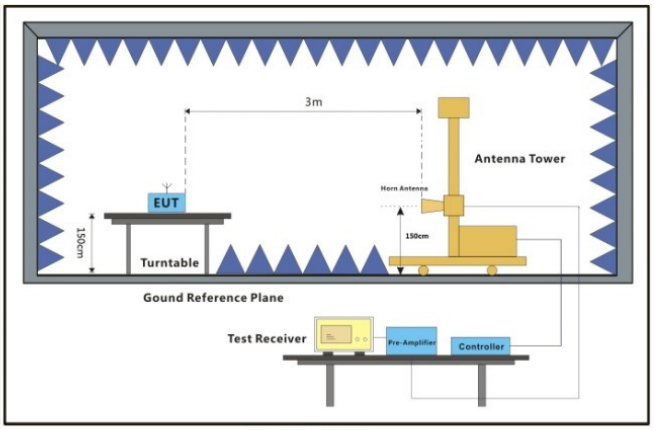
Pretest these mode to find the worst case: c: Tx mode, Keep the EUT in transmitting mode with battery.
d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

The worst case for final test: d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

7.3.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

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7.3.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel,the middle channel,the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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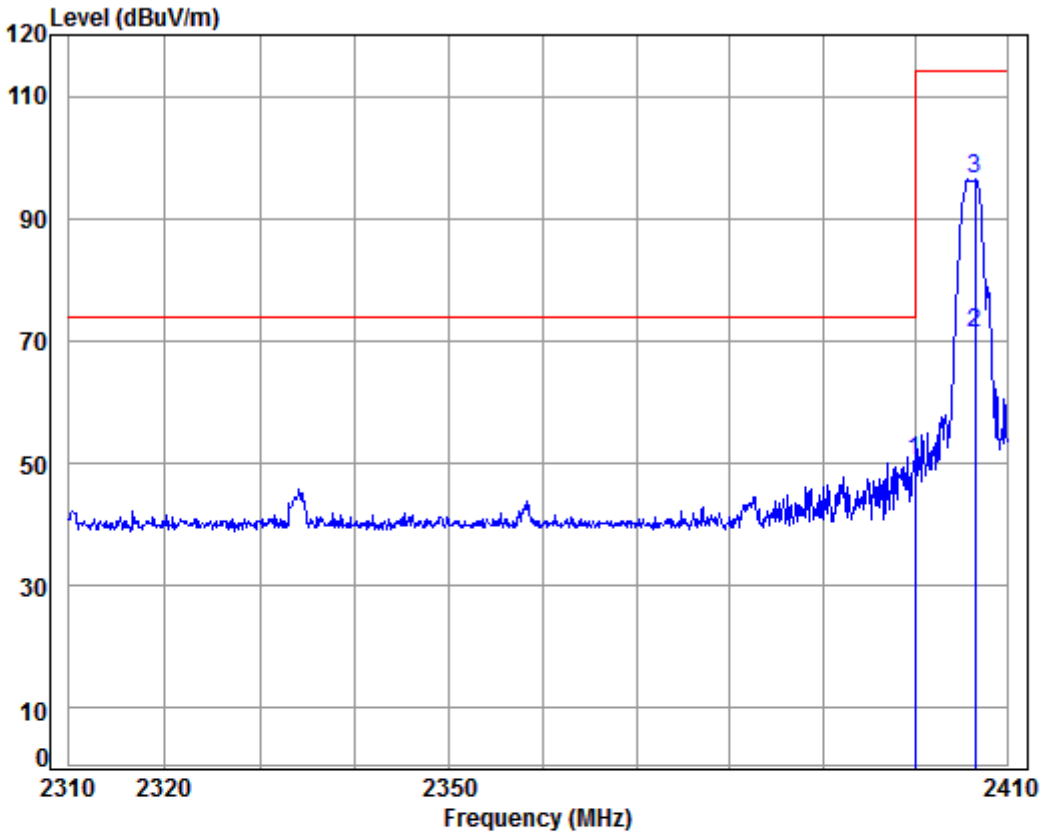
Mode:d; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No : 09366CR
Mode : 2404 Band edge
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2400.000	5.49	29.11	37.96	53.75	50.39	74.00	-23.61	Peak
2 av	2406.530	5.50	29.13	37.95	74.75	71.43	94.00	-22.57	Average
3 pp	2406.530	5.50	29.13	37.95	99.76	96.44	114.00	-17.56	Peak

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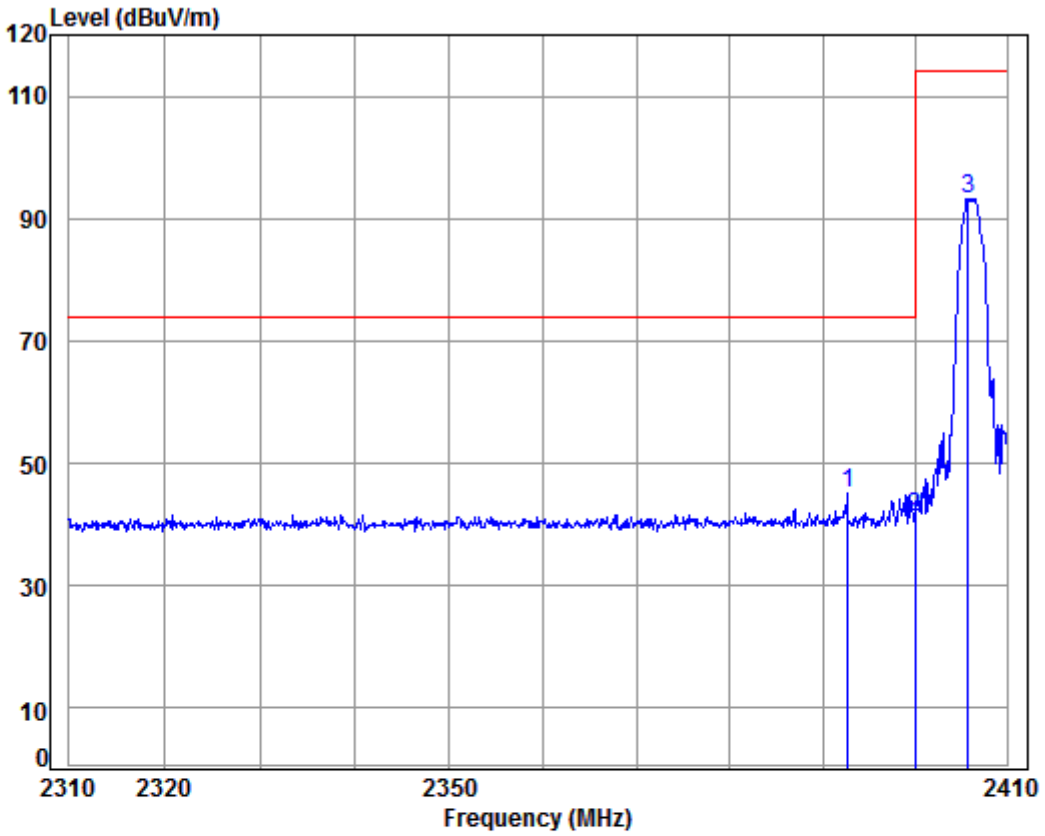
Mode:d; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No : 09366CR
Mode : 2404 Band edge
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2392.700	5.48	29.09	37.96	48.63	45.24	74.00	-28.76	Peak
2	2400.000	5.49	29.11	37.96	44.69	41.33	74.00	-32.67	Peak
3 pp	2405.816	5.50	29.12	37.95	96.53	93.20	114.00	-20.80	Peak

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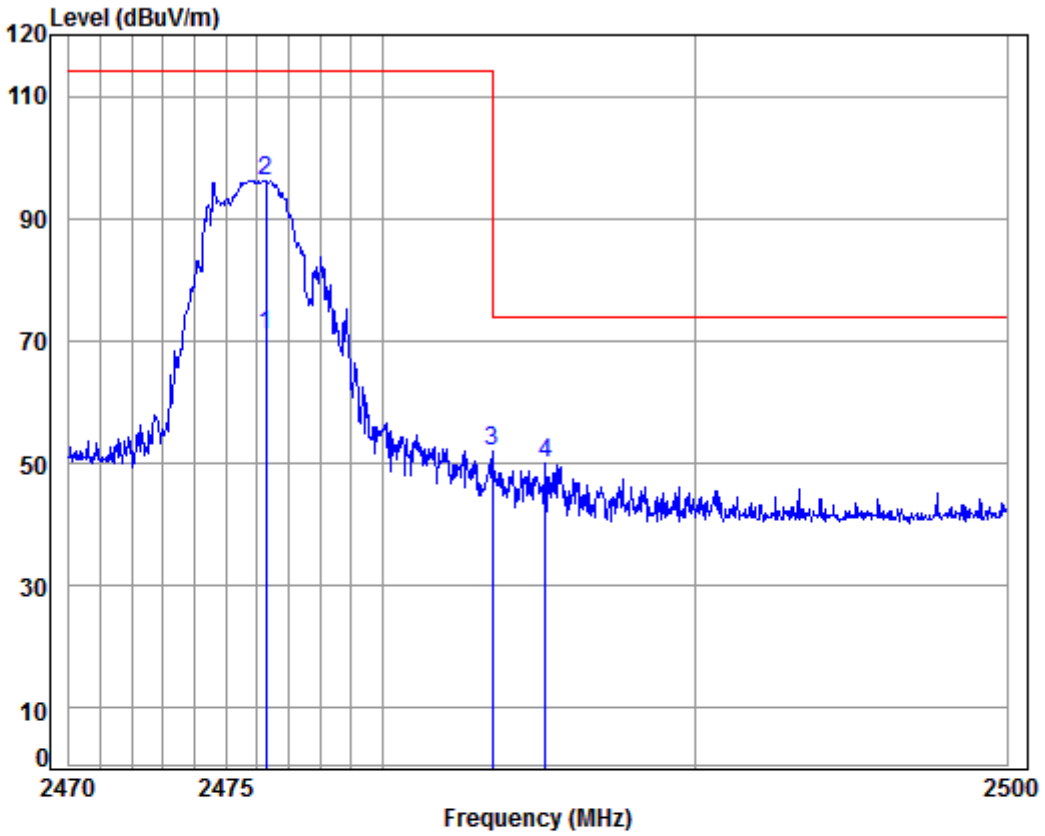
Mode:d; Polarization:Horizontal; Modulation Type:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No : 09366CR
Mode : 2476 Band edge
Note : Camera

		Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	av	2476.270	5.59	29.33	37.95	74.11	71.08	94.00	-22.92	Average
2	pp	2476.270	5.59	29.33	37.95	99.11	96.08	114.00	-17.92	peak
3		2483.500	5.60	29.35	37.95	55.13	52.13	74.00	-21.87	peak
4		2485.195	5.60	29.36	37.95	52.87	49.88	74.00	-24.12	peak

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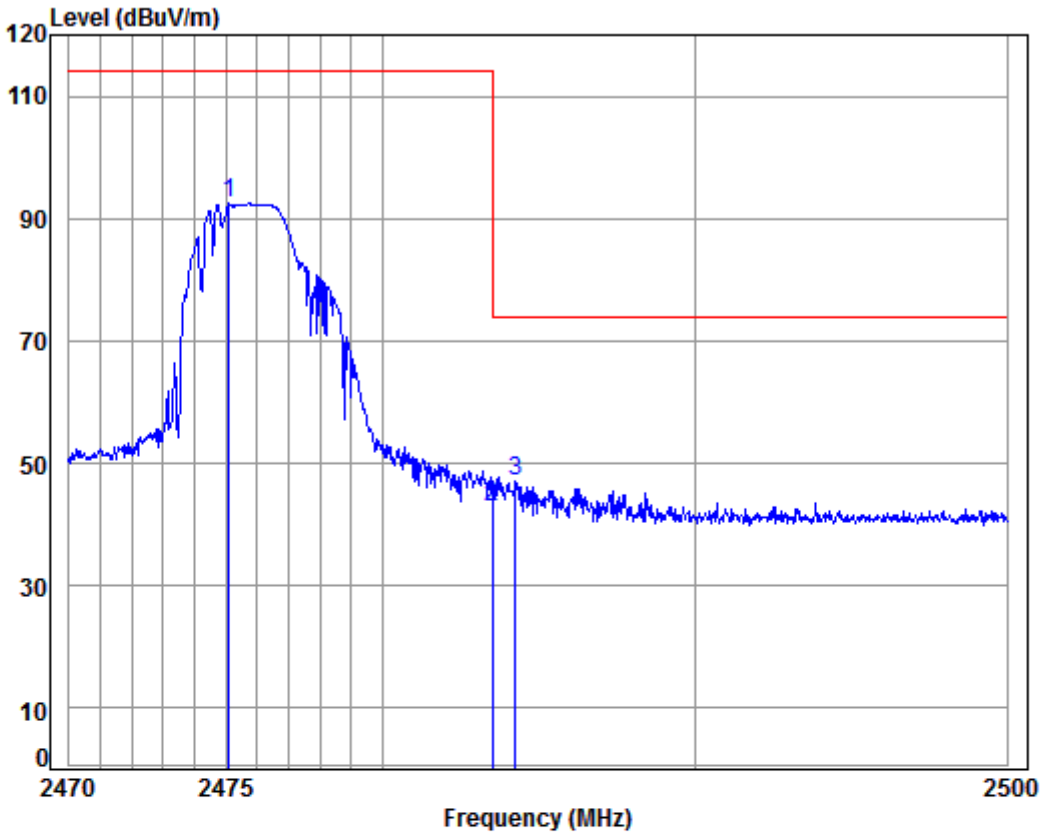
Mode:d; Polarization:Vertical; Modulation Type:GFSK; Channel:High



Condition: 3m VERTICAL
Job No : 09366CR
Mode : 2476 Band edge
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2475.104	5.59	29.33	37.95	95.43	92.40	114.00	-21.60	peak
2	2483.500	5.60	29.35	37.95	45.95	42.95	74.00	-31.05	peak
3	2484.235	5.60	29.35	37.95	50.05	47.05	74.00	-26.95	peak

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Remark:

1). The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2). As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the above measurement data were shown in the report.

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7.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 56 % RH Atmospheric Pressure: 1005 mbar

Pretest these mode to find the worst case: c: Tx mode, Keep the EUT in transmitting mode with battery.
d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

The worst case for final test: d: Tx mode +Charging, Keep the EUT in transmitting mode with DC Power.

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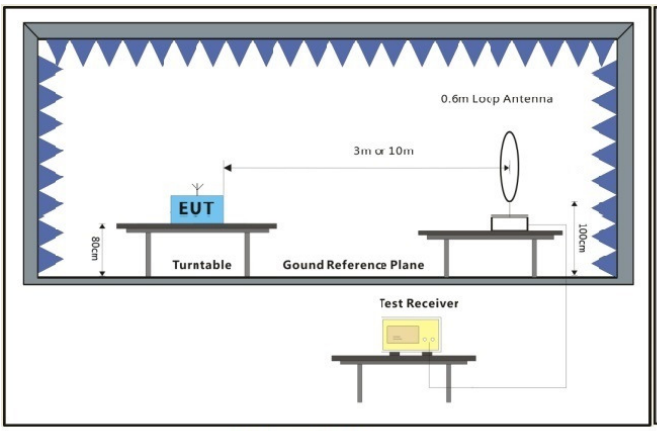
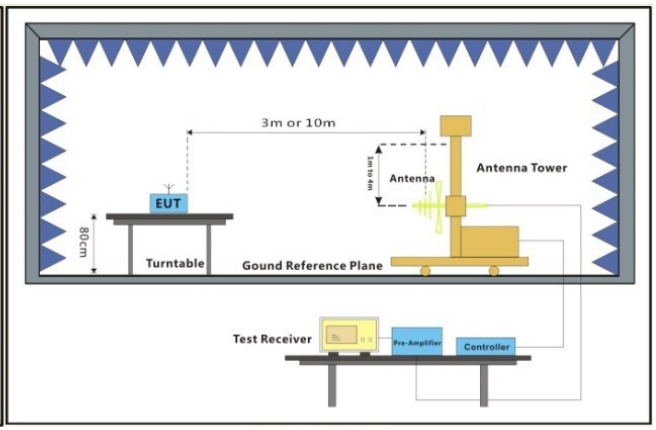
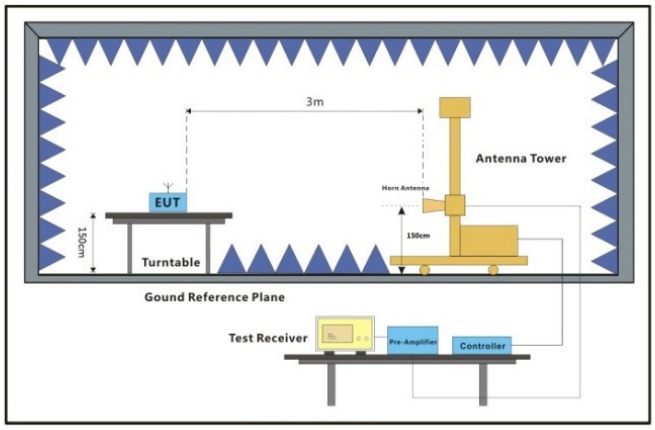
7.4.2 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

7.4.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

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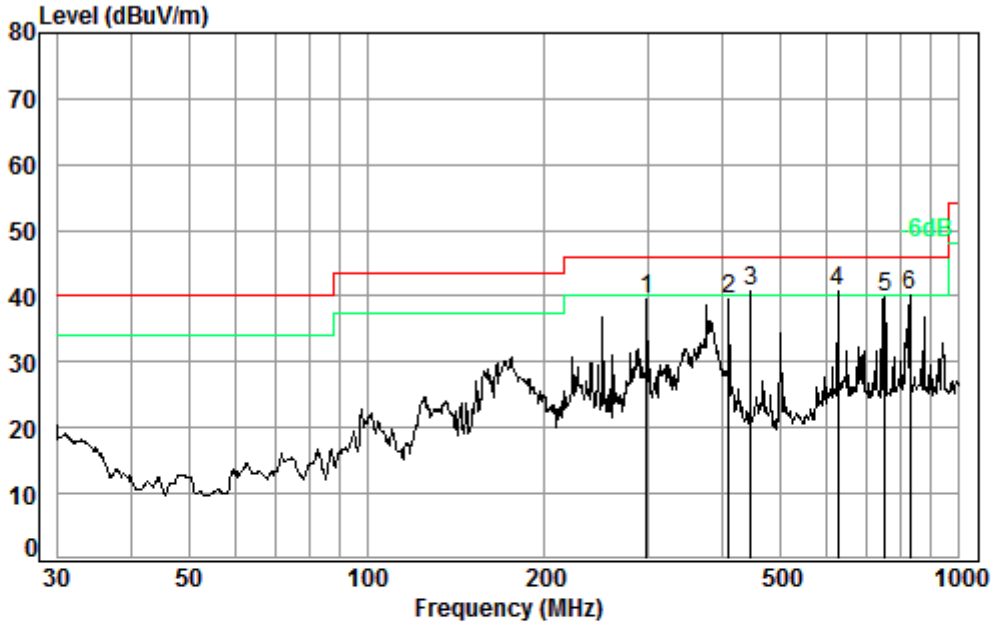
Below 1GHz:

For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

Mode:d; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No. : 09366CR
Test mode: d

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	297.22	1.89	13.78	26.41	50.37	39.63	46.00	-6.37
2	408.95	2.24	16.34	27.19	48.00	39.39	46.00	-6.61
3	444.85	2.39	16.80	27.42	48.90	40.67	46.00	-5.33
4 pp	625.08	2.75	20.50	27.51	45.09	40.83	46.00	-5.17
5	750.11	3.06	21.70	27.35	42.46	39.87	46.00	-6.13
6	827.49	3.32	22.40	27.13	41.52	40.11	46.00	-5.89

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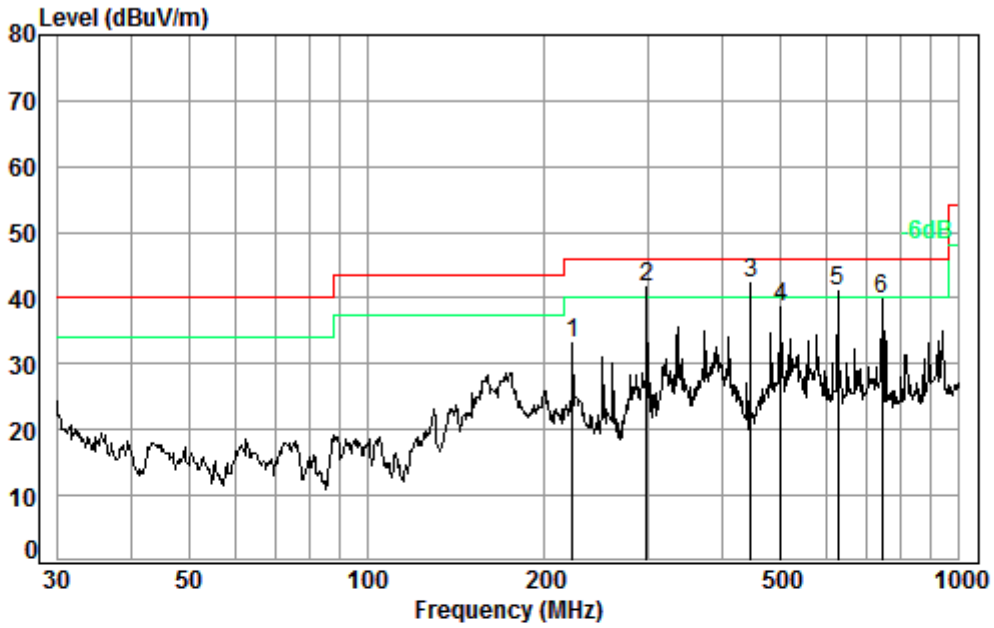
Mode:d; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No. : 09366CR
Test mode: d

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	222.95	1.53	11.39	26.62	46.98	33.28	46.00	-12.72
2	297.22	1.89	13.78	26.41	52.32	41.58	46.00	-4.42
3 pp	444.85	2.39	16.80	27.42	50.40	42.17	46.00	-3.83
4	501.18	2.60	17.83	27.69	45.82	38.56	46.00	-7.44
5	625.08	2.75	20.50	27.51	45.33	41.07	46.00	-4.93
6	742.26	3.03	21.67	27.36	42.59	39.93	46.00	-6.07

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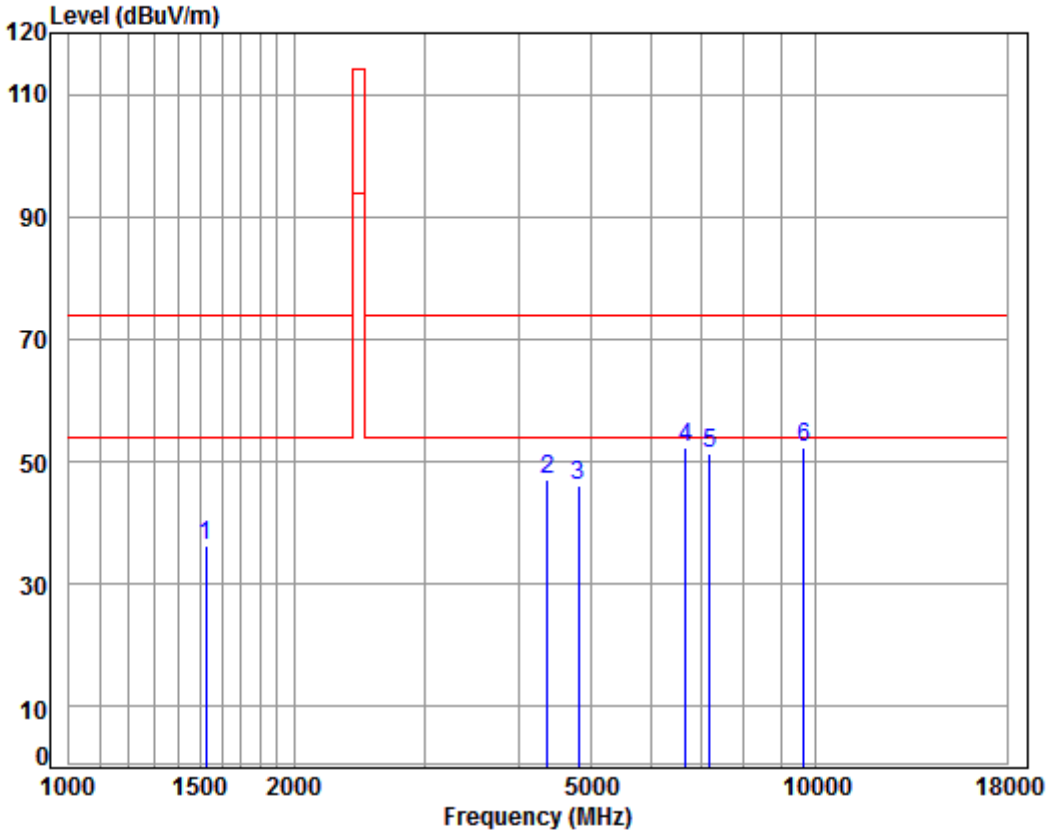
Above 1GHz:

Mode:d; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No : 09366CR
Mode : 2404 TX SE
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1525.000	5.45	25.91	38.04	43.04	36.36	74.00	-37.64	peak
2	4367.058	7.41	33.60	38.20	44.11	46.92	74.00	-27.08	peak
3	4808.000	7.89	34.17	38.41	42.43	46.08	74.00	-27.92	peak
4	6679.040	11.02	35.61	37.60	43.15	52.18	74.00	-21.82	peak
5	7212.000	10.07	36.41	37.10	41.80	51.18	74.00	-22.82	peak
6 pp	9616.000	10.75	37.52	35.09	39.27	52.45	74.00	-21.55	peak

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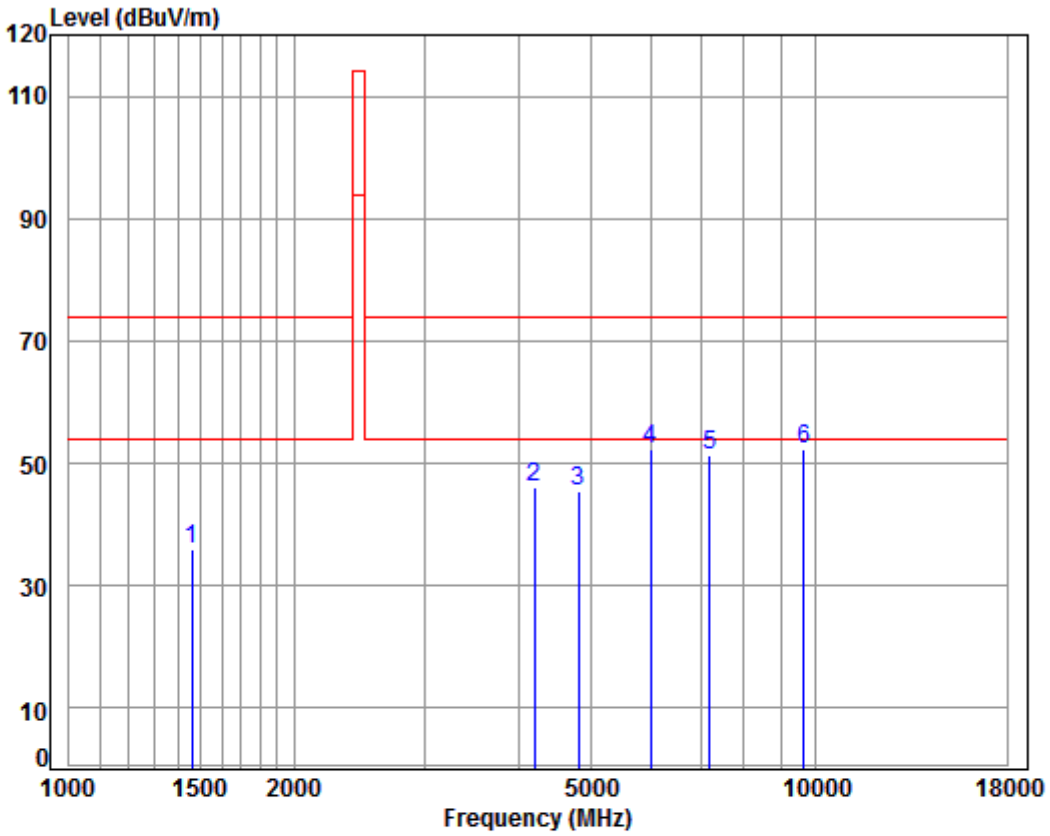
Mode:d; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No : 09366CR
Mode : 2404 TX SE
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1460.295	5.35	25.64	38.05	43.12	36.06	74.00	-37.94	peak
2	4193.872	7.21	33.60	38.11	43.34	46.04	74.00	-27.96	peak
3	4808.000	7.89	34.17	38.41	41.87	45.52	74.00	-28.48	peak
4	6001.626	10.57	34.70	38.30	45.21	52.18	74.00	-21.82	peak
5	7212.000	10.07	36.41	37.10	41.95	51.33	74.00	-22.67	peak
6 pp	9616.000	10.75	37.52	35.09	39.03	52.21	74.00	-21.79	peak

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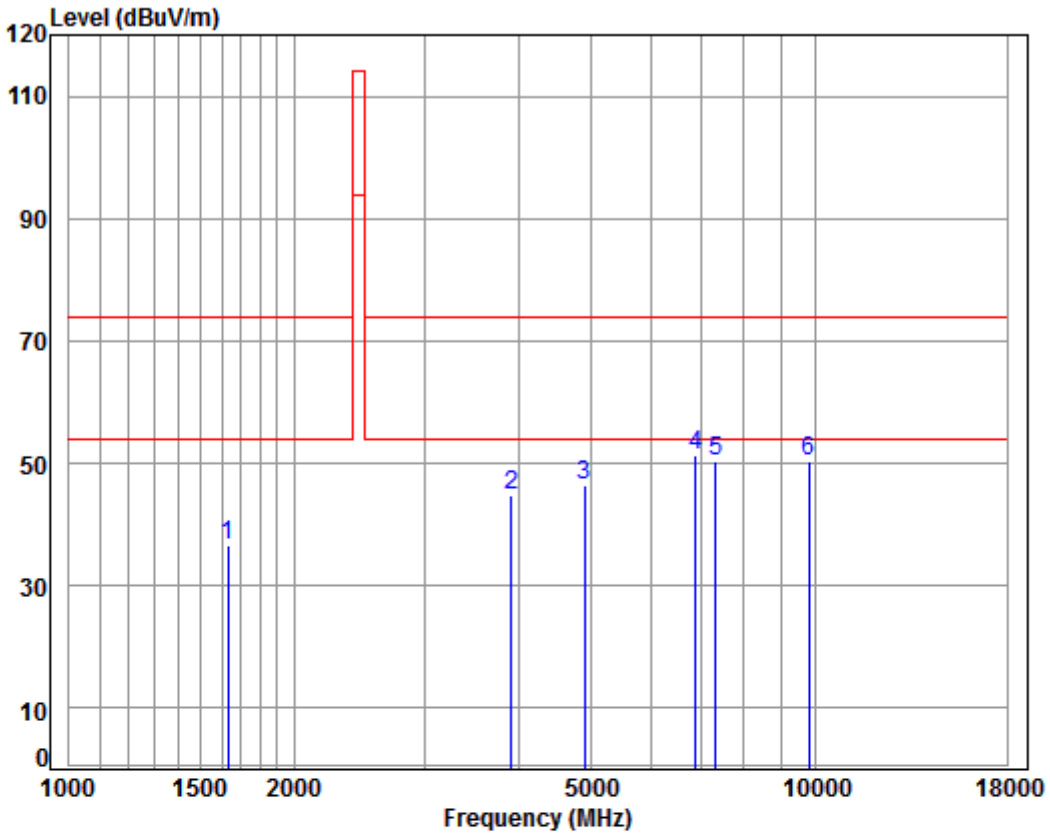
Mode:d; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle



Condition: 3m HORIZONTAL
Job No : 09366CR
Mode : 2446 TX SE
Note : Camera

		Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1634.543	5.31	26.40	38.03	42.89	36.57	74.00	-37.43	peak
2		3912.809	6.89	33.37	37.99	42.63	44.90	74.00	-29.10	peak
3		4892.000	7.98	34.31	38.45	42.62	46.46	74.00	-27.54	peak
4	pp	6894.806	10.42	36.21	37.40	42.13	51.36	74.00	-22.64	peak
5		7338.000	10.04	36.36	36.98	41.07	50.49	74.00	-23.51	peak
6		9784.000	10.83	37.56	35.00	37.08	50.47	74.00	-23.53	peak

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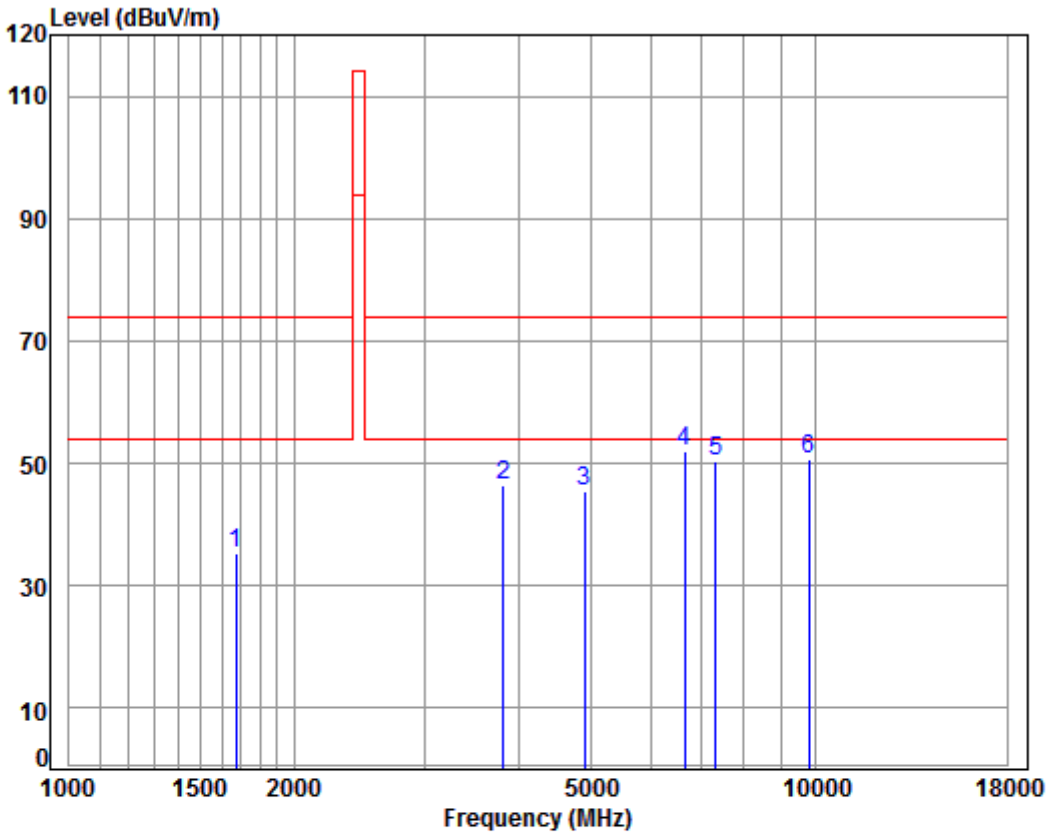
Mode:d; Polarization:Vertical; Modulation Type:GFSK; Channel:middle



Condition: 3m VERTICAL
Job No : 09366CR
Mode : 2446 TX SE
Note : Camera

		Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1672.779	5.26	26.56	38.03	41.65	35.44	74.00	-38.56	peak
2		3812.336	6.79	33.10	37.98	44.66	46.57	74.00	-27.43	peak
3		4892.000	7.98	34.31	38.45	41.63	45.47	74.00	-28.53	peak
4	pp	6659.763	11.08	35.56	37.62	43.00	52.02	74.00	-21.98	peak
5		7338.000	10.04	36.36	36.98	40.95	50.37	74.00	-23.63	peak
6		9784.000	10.83	37.56	35.00	37.13	50.52	74.00	-23.48	peak

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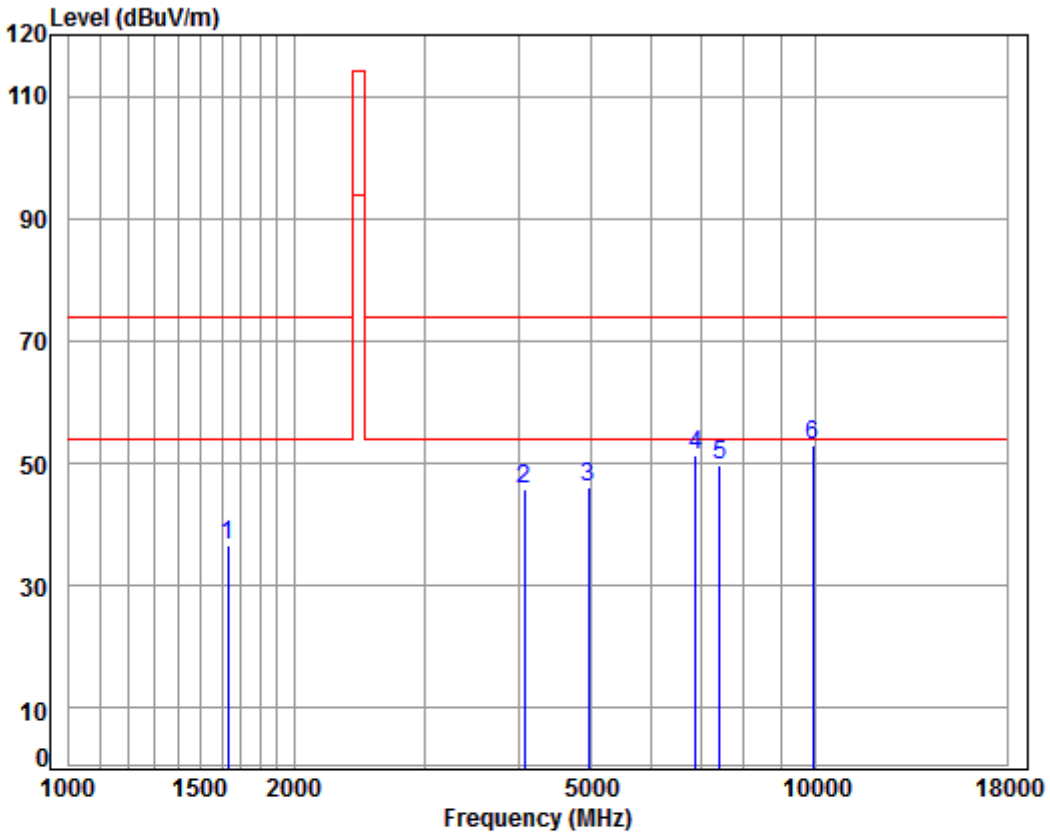
Mode:d; Polarization:Horizontal; Modulation Type:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No : 09366CR
Mode : 2476 TX SE
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1634.543	5.31	26.40	38.03	42.89	36.57	74.00	-37.43	peak
2	4074.388	7.07	33.60	38.04	43.22	45.85	74.00	-28.15	peak
3	4952.000	8.04	34.42	38.48	42.19	46.17	74.00	-27.83	peak
4	6894.806	10.42	36.21	37.40	42.13	51.36	74.00	-22.64	peak
5	7428.000	10.02	36.33	36.90	40.14	49.59	74.00	-24.41	peak
6 pp	9904.000	10.89	37.58	34.95	39.43	52.95	74.00	-21.05	peak

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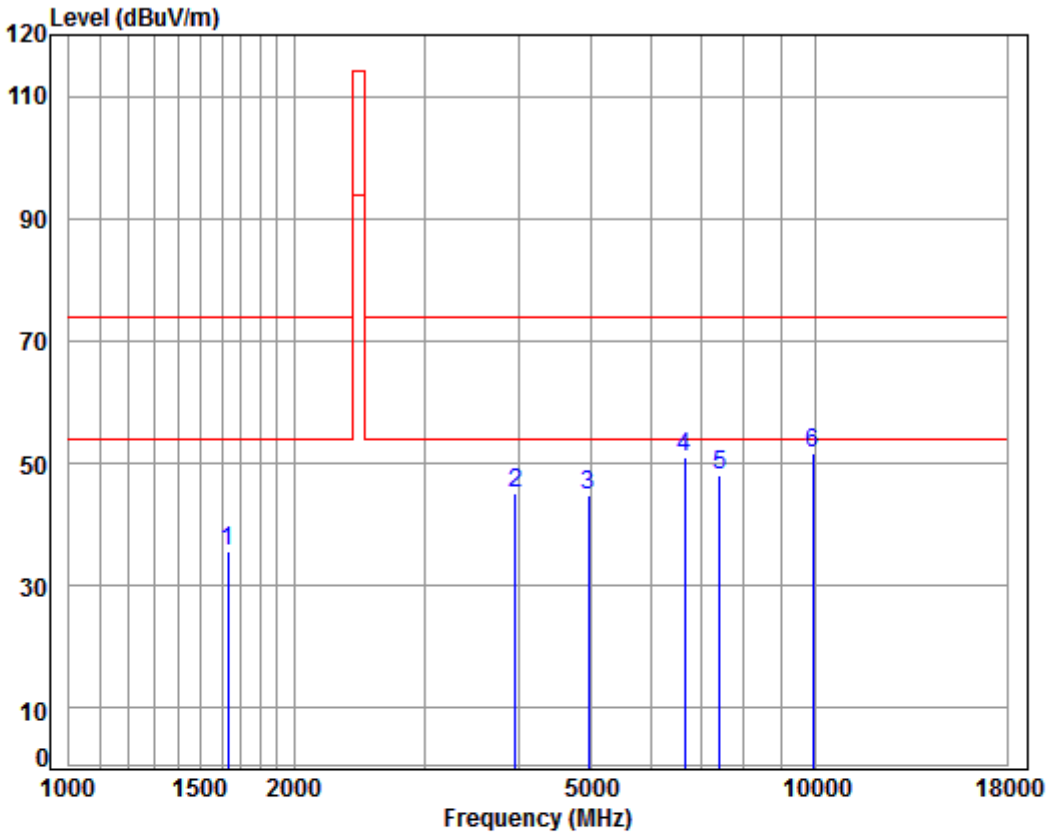
Mode:d; Polarization:Vertical; Modulation Type:GFSK; Channel:High



Condition: 3m VERTICAL
Job No : 09366CR
Mode : 2476 TX SE
Note : Camera

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1629.825	5.31	26.38	38.03	42.05	35.71	74.00	-38.29	peak
2	3958.309	6.94	33.49	38.00	42.74	45.17	74.00	-28.83	peak
3	4952.000	8.04	34.42	38.48	40.93	44.91	74.00	-29.09	peak
4	6659.763	11.08	35.56	37.62	42.13	51.15	74.00	-22.85	peak
5	7428.000	10.02	36.33	36.90	38.62	48.07	74.00	-25.93	peak
6 pp	9904.000	10.89	37.58	34.95	38.09	51.61	74.00	-22.39	peak

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Remark:

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

4) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the above measurement data were shown in the report.

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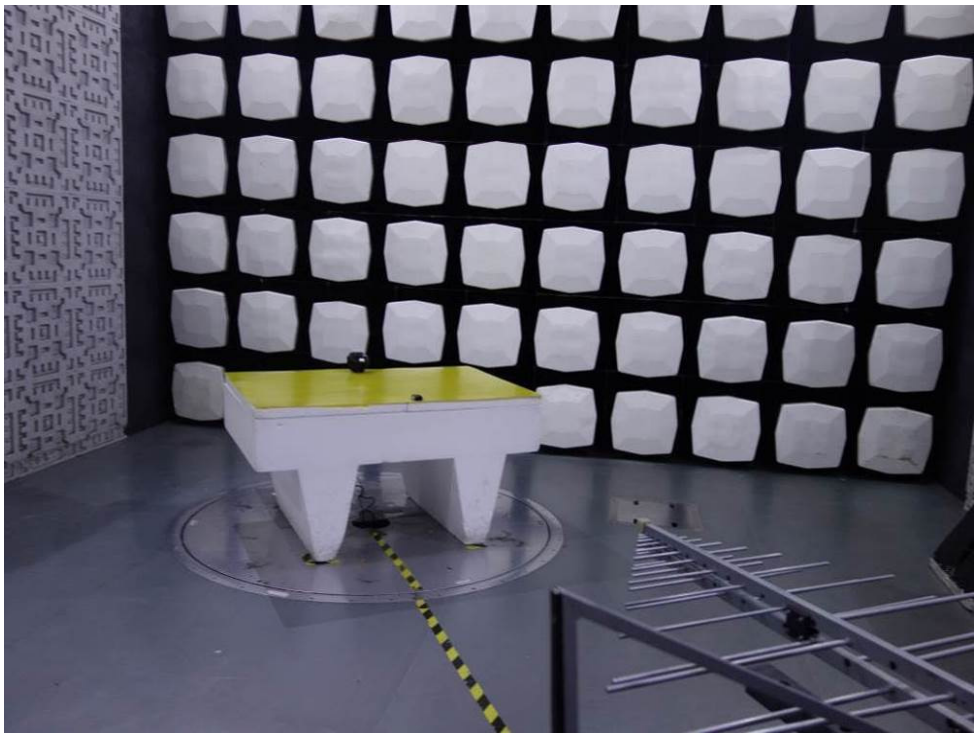
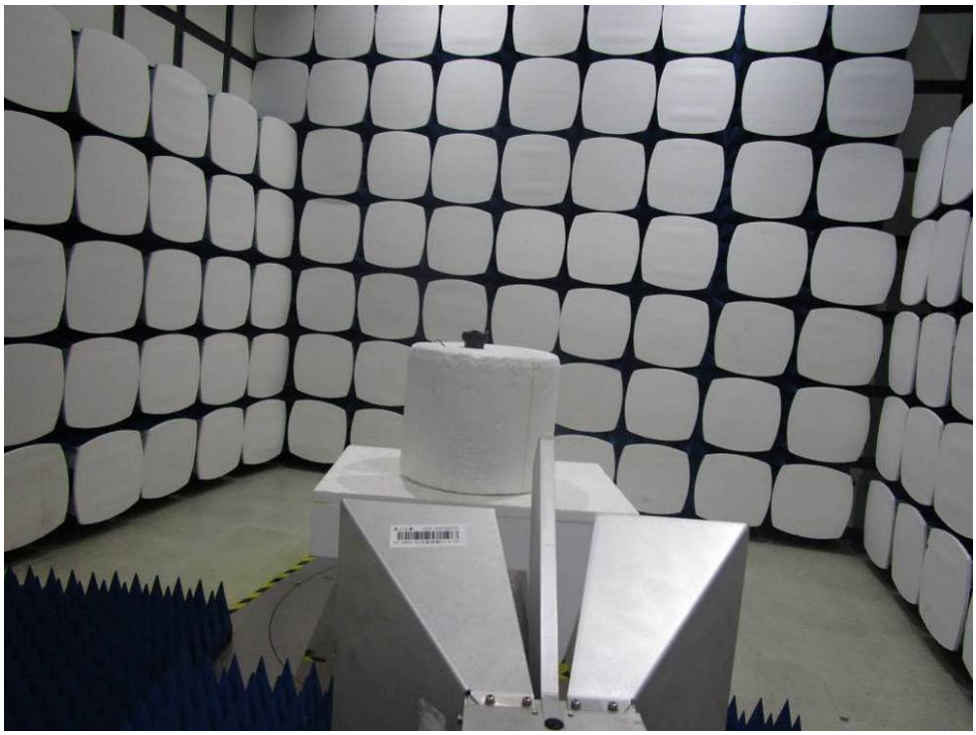
8 Photographs

8.1 Radiated Emissions Test Setup





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8.2 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1709009366CR.

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