

FCC Test Report

Report No.: AGC01519210408FE03

FCC ID	:	2AZWZ-S6C
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Camera
BRAND NAME	:	KAWA
MODEL NAME	:	S6-C
APPLICANT	:	KAWA ELECTRONICS COMPANY LIMITED
DATE OF ISSUE	:	May 28, 2021
STANDARD(S)	:	FCC Part 15.247
REPORT VERSION	:	V1.0



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 28, 2021	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	KAWA ELECTRONICS COMPANY LIMITED
Address	FLAT A 21/F CHEUNG LEE IND BLDG 9 CHEUNG LEE ST CHAI WAN HONG KONG
Manufacturer	KAWA ELECTRONICS COMPANY LIMITED
Address	FLAT A 21/F CHEUNG LEE IND BLDG 9 CHEUNG LEE ST CHAI WAN HONG KONG
Factory	Dongguan Apical Electronics Co., Ltd
Address	6#, Shunxing 5 Rd, No.2 Industrial zone, Dajingtou, Dalang Town, Dongguang City, China
Product Designation	Camera
Brand Name	KAWA
Test Model	S6-C
Date of test	Apr. 27, 2021 to May 28, 2021
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC PART 15.247.

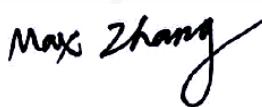
Prepared By



Kelly Cheng
(Project Engineer)

May 28, 2021

Reviewed By



Max Zhang
(Reviewer)

May 28, 2021

Approved By



Forrest Lei
(Authorized Officer)

May 28, 2021

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "Camera". It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2410MHz to 2477MHz
RF Output Power	7.880dBm(Max)
Modulation	GFSK
Number of channels	20 Channels
Hardware Version	CJ1001-TX-MAIN-01B
Software Version	V1.0.0_2105271740
Antenna Designation	BRASS Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	4.1dBi
Power Supply	DC 5V by adapter

2.2. TABLE OF CARRIER FREQUENCIES

Channel Number	Frequency(MHz)	Channel Number	Frequency(MHz)
1	2410	11	2445
2	2413.5	12	2448.5
3	2417	13	2452
4	2420.5	14	2455.5
5	2424	15	2459
6	2427.5	16	2462.5
7	2431	17	2466
8	2434.5	18	2469.5
9	2438	19	2473
10	2441.5	20	2477

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2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHz, in every connection one device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single or multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.4. EXAMPLE OF A HOPPING SEQUENCE IN DATA MODE

Example of a hopping sequence in data mode:

10, 14, 16, 01, 05, 09, 11, 08, 17, 18, 13, 02, 15, 03, 12, 04, 07, 06, 19, 20.

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection.
2. Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every unit. The UAP (upper address part) are the 24MSB's of the 48BD_ADDRESS. The internal clock of a unit is derived from a free running clock which is never adjusted and is never turned off. For behavior action with other units only offset is used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30).

In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire. LAP (24 bits), 4LSB's (4bits) (Input 1) and the 27MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5us). The hopping sequence will always differ from the first one.

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2.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AZWZ-S6C** filing to comply with the FCC PART 15.247 requirements.

2.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.10. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, $U_c = \pm 3.2 \text{ dB}$
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9 \text{ dB}$
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8 \text{ dB}$
- Uncertainty of total RF power, conducted, $U_c = \pm 0.8 \text{ dB}$
- Uncertainty of spurious emissions, conducted, $U_c = \pm 2.7 \text{ dB}$
- Uncertainty of Occupied Channel Bandwidth: $U_c = \pm 2 \%$
- Uncertainty of Dwell Time: $U_c = \pm 2 \%$
- Uncertainty of Frequency: $U_c = \pm 2 \%$

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK(2410MHz)
2	Middle channel GFSK(2441.5MHz)
3	High channel GFSK(2477MHz)
4	Hopping mode GFSK

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacturer.
4. The EUT into the individual test modes no test software.

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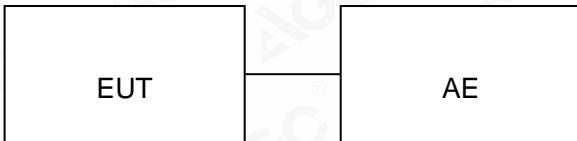
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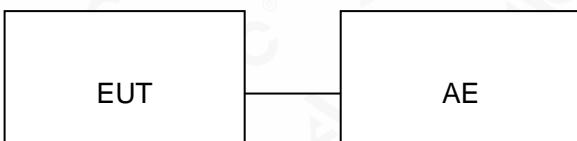
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Camera	S6-C	2AZWZ-S6C	EUT
2	Adapter(Camera)	TEKA-UCA10UN	Input:100-240V, 50/60Hz, 0.2A Output:5.0A,1.0A	Accessory
3	Adapter(Monitor)	TEKA-UCA20UN	Input:100-240V, 50/60Hz, 0.35A Output:5.0A,2.0A	Accessory
4	USB line	N/A	2.5m unshielded	Accessory
5	Monitor	S6-M	N/A	Accessory

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	Compliant
15.207	Conducted Emission	Compliant

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
TEST RECEIVER	Rohde & Schwarz	ESPI	101206	May 11, 2021	May 10, 2022
LISN	R&S	ESH2-Z5	100086	Jul. 03,2020	Jul. 02, 2021
Test software	FARA	EZ-EMC(Ver. AGC-CON03A1)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	Rohde & Schwarz	ESCI	10096	Apr. 14, 2021	Apr. 13, 2022
EXA Signal Analyzer	Agilent	N9010A	MY53470504	Dec. 07, 2020	Dec. 06, 2021
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	N/A	N/A
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 09, 2019	Sep. 08, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03,2020	Sep. 02,2022
ANTENNA	SCHWARZBECK	VULB9168	494	Sep. 20, 2019	Sep. 19, 2021
Test software	FARA	EZ-EMC(Ver.RA-03A)	N/A	N/A	N/A

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7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

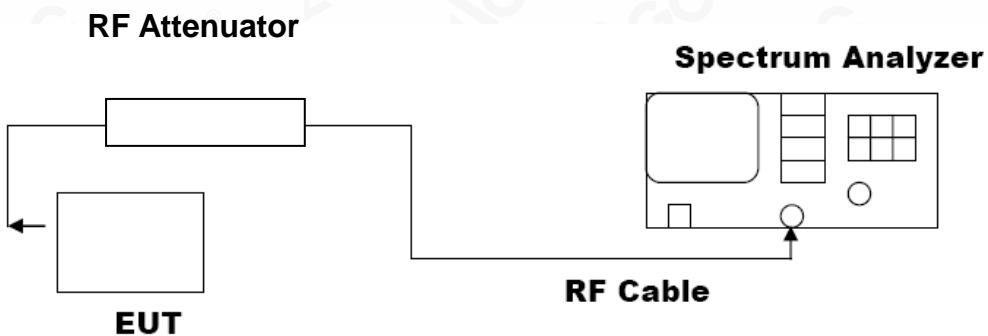
For peak power test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
3. RBW > 20 dB bandwidth of the emission being measured.
4. VBW \geq RBW.
5. Sweep: Auto.
6. Detector function: Peak.
7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

PEAK POWER TEST SETUP



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7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION			
Frequency (MHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2410	7.302	21	Pass
2441.5	7.880	21	Pass
2477	7.487	21	Pass



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CH09



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8. 20DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

6dB bandwidth:

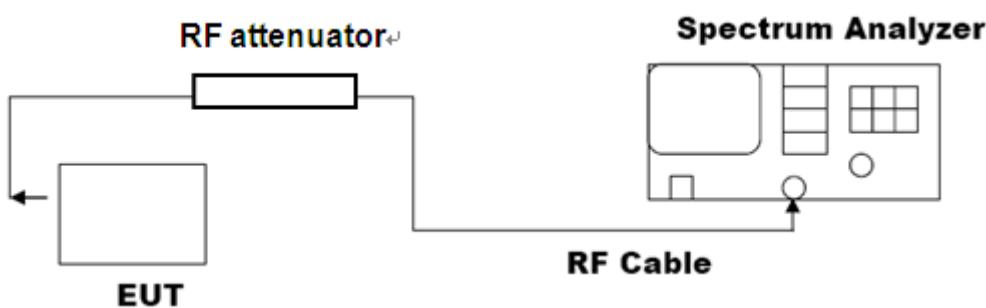
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW $\geq 3 \times$ RBW.
4. Set SPA Trace 1 Max hold, then View.

Occupied bandwidth:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to RSS-247 requirements.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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8.3. LIMITS AND MEASUREMENT RESULTS

MEASUREMENT RESULT FOR GFSK MOUDULATION			
Applicable Limits	Measurement Result		
	Test Data	20DB BANDWIDTH (MHz)	Criteria
N/A	Low Channel	4.314	PASS
	Middle Channel	4.292	PASS
	High Channel	4.245	PASS

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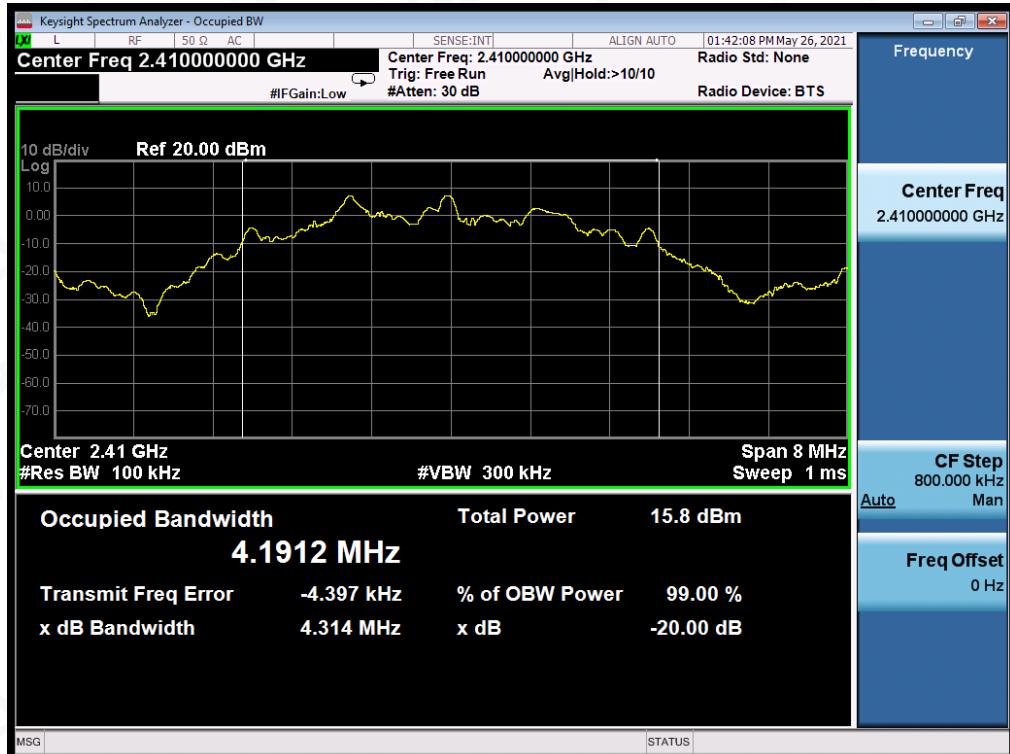
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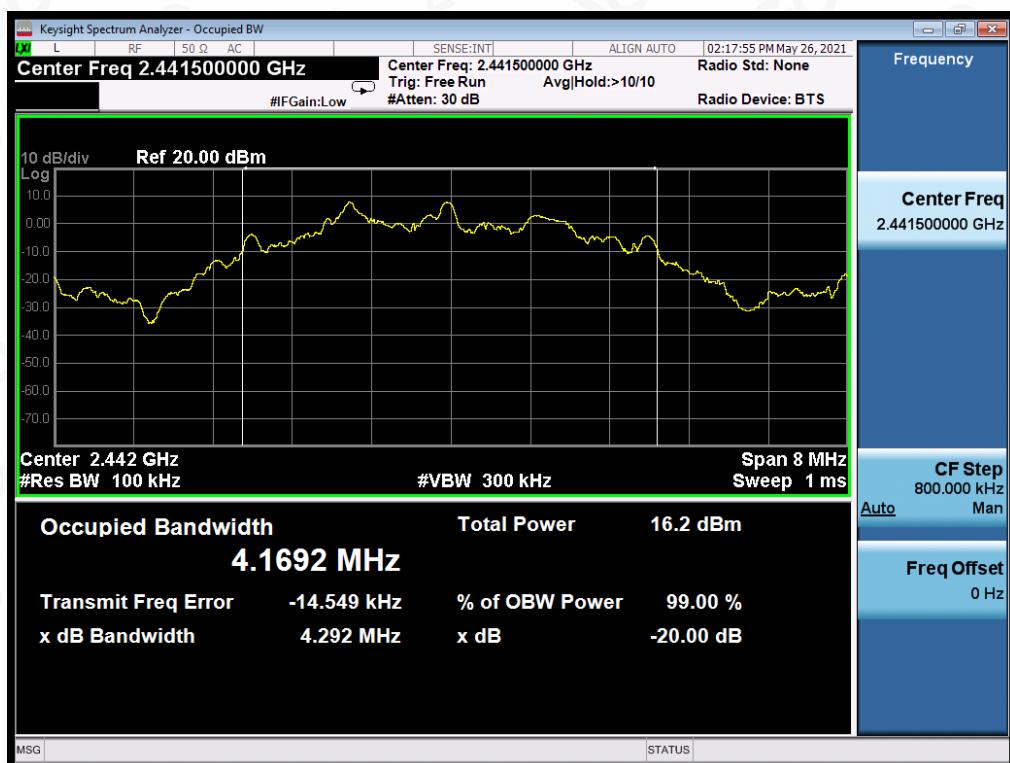
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TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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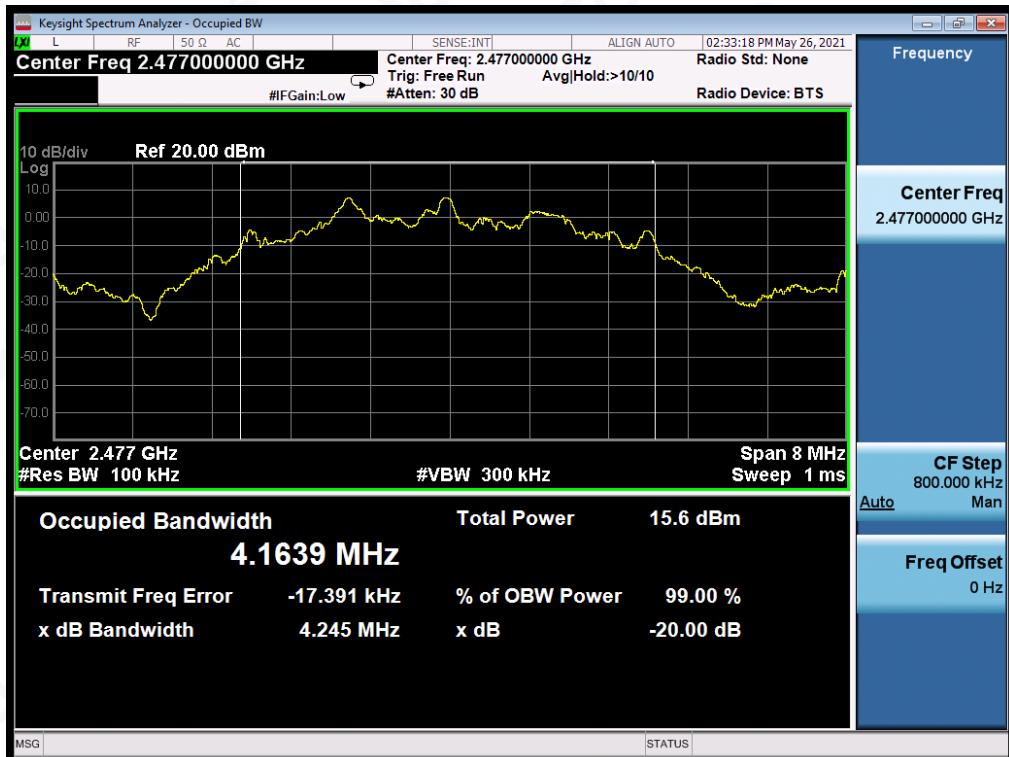
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TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
RBW = 100 kHz; VBW= 300 kHz; Sweep = auto; Detector function = peak.
4. Set SPA Trace 1 Max hold, then View.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2

9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a)	At least -20dBc than the limit Specified on the TOP Channel	PASS

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TEST RESULT FOR ENTIRE FREQUENCY RANGE
TEST PLOT OF OUT OF BAND EMISSIONS
OF GFSK MODULATION IN LOW CHANNEL



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TEST PLOT OF OUT OF BAND EMISSIONS
 OF GFSK MODULATION IN MIDDLE CHANNEL

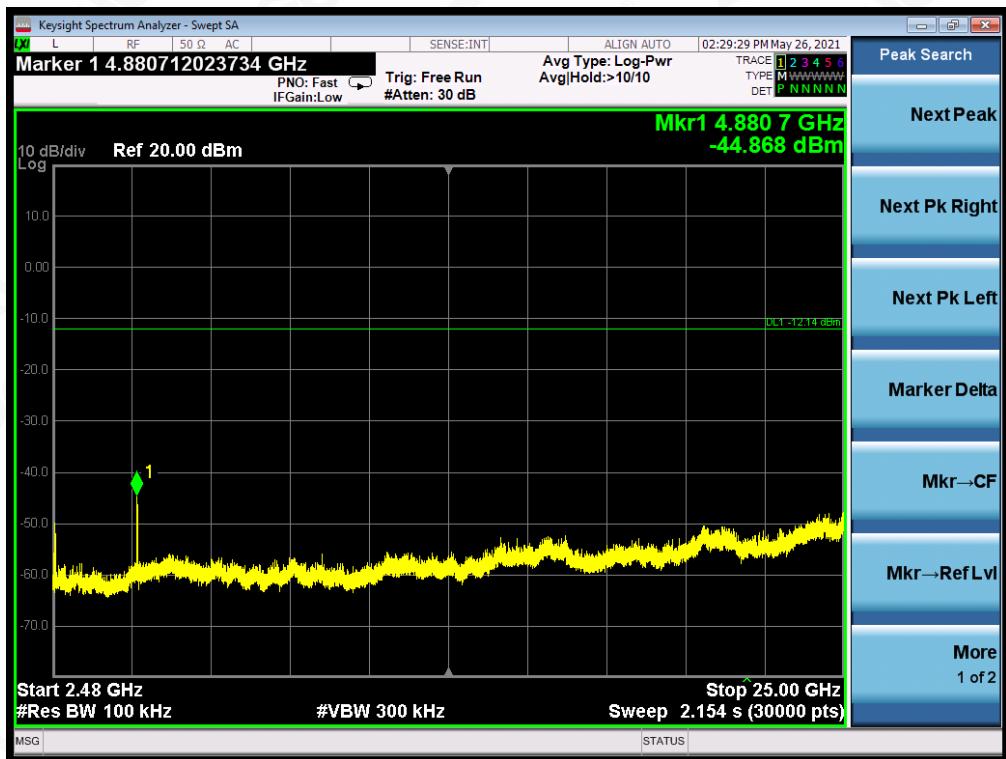

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TEST PLOT OF OUT OF BAND EMISSIONS
 OF GFSK MODULATION IN HIGH CHANNEL


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TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL

Hopping off



Hopping on



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GFSK MODULATION IN HIGH CHANNEL

Hopping off



Hopping on



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10. RADIATED EMISSION

10.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

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The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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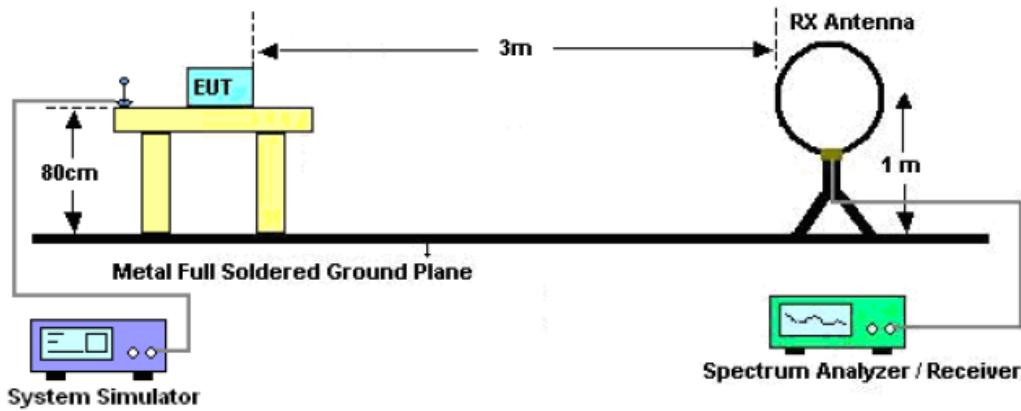
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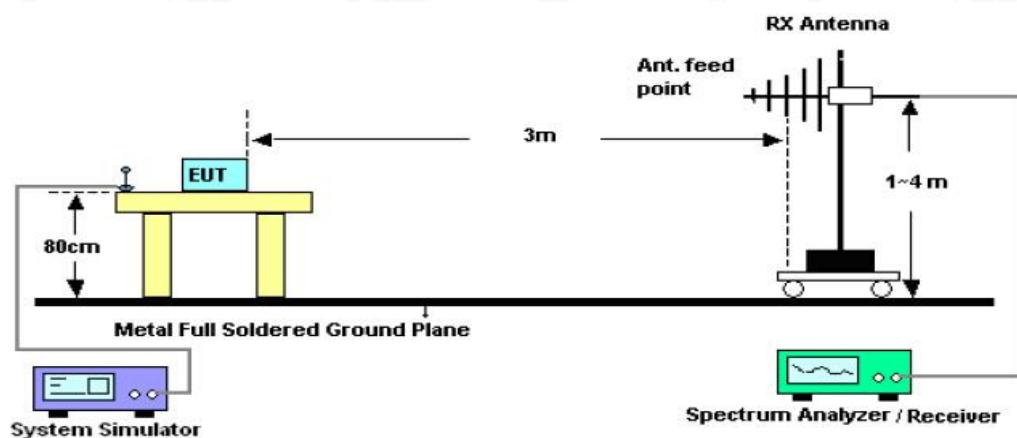


10.2. TEST SETUP

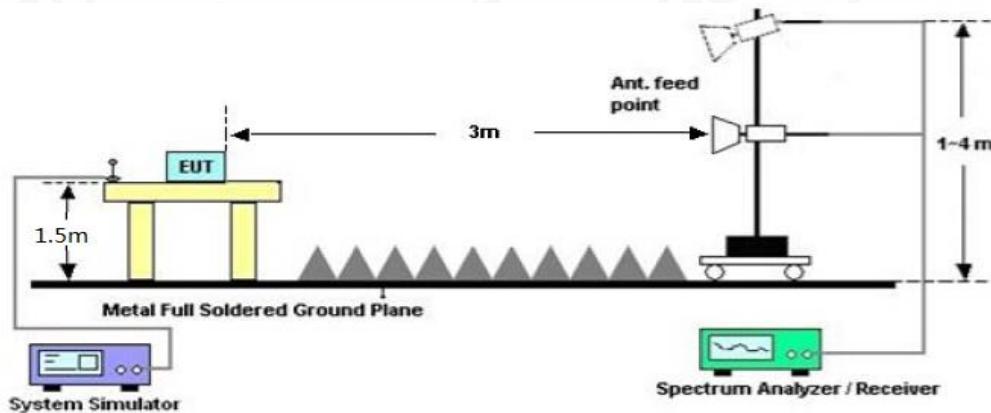
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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10.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

10.4. TEST RESULT

RADIATED EMISSION BELOW 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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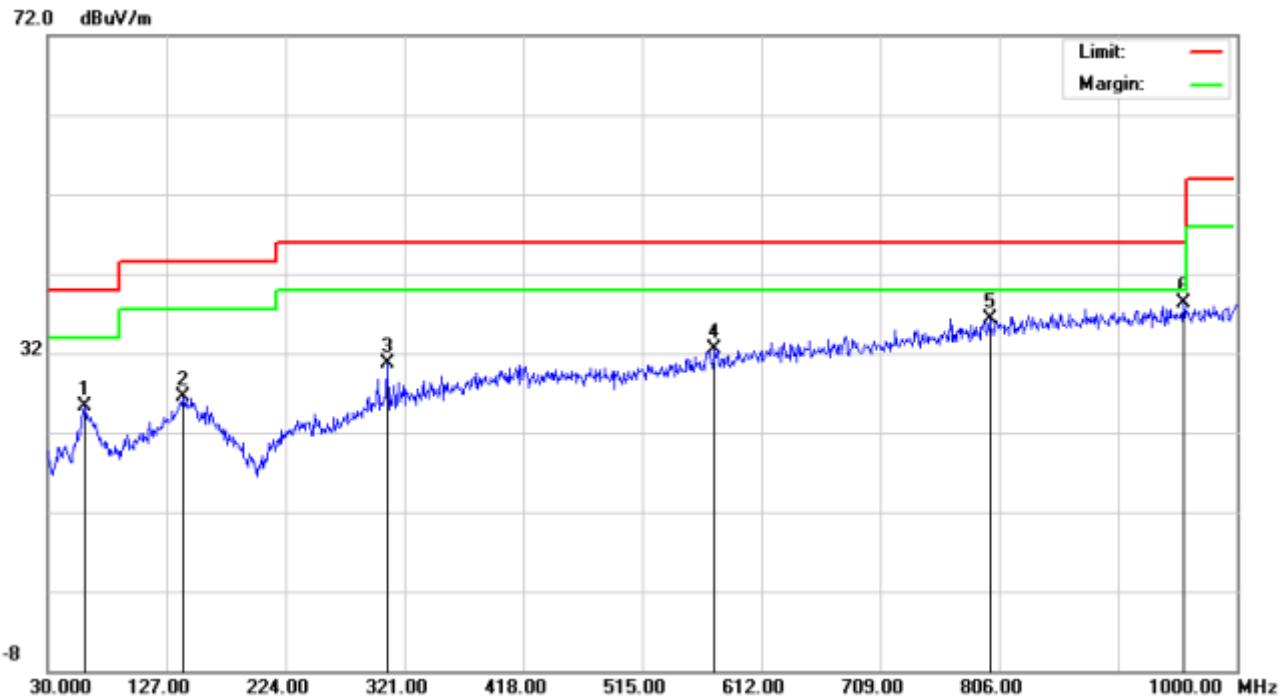
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RADIATED EMISSION BELOW 1GHz

EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	60.0700	5.43	19.85	25.28	40.00	-14.72	peak	
2	140.5800	5.25	21.17	26.42	43.50	-17.08	peak	
3	307.4200	8.98	21.73	30.71	46.00	-15.29	peak	
4	574.1700	6.13	26.44	32.57	46.00	-13.43	peak	
5	798.2400	5.98	30.37	36.35	46.00	-9.65	peak	
6 *	956.3500	6.16	32.18	38.34	46.00	-7.66	peak	

RESULT: PASS

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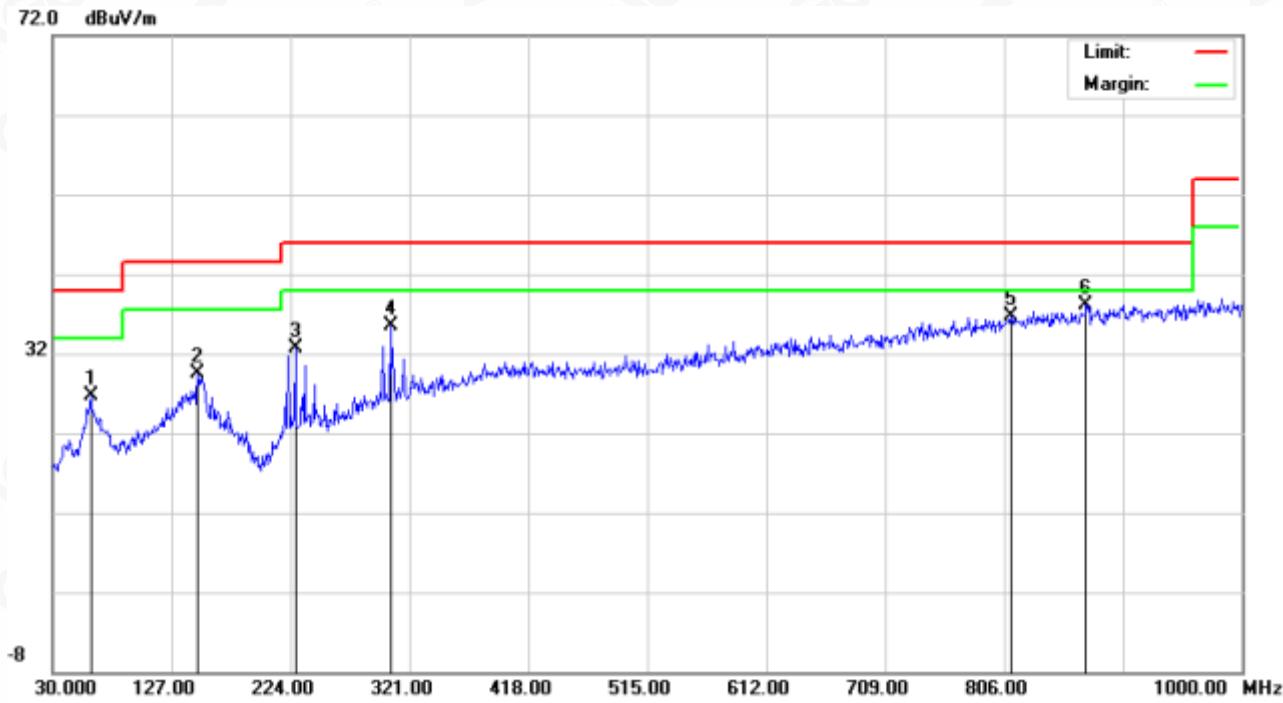
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EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	61.0400	7.20	19.58	26.78	40.00	-13.22	peak
2	148.3400	9.04	20.38	29.42	43.50	-14.08	peak
3	227.8800	14.90	17.80	32.70	46.00	-13.30	peak
4	305.4800	13.77	21.66	35.43	46.00	-10.57	peak
5	811.8200	6.21	30.56	36.77	46.00	-9.23	peak
6 *	872.9300	6.76	31.35	38.11	46.00	-7.89	peak

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Over=Measurement-Limit.

2. All test modes had been pre-tested. The mode 2 is the worst case and recorded in the report.

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RADIATED EMISSION ABOVE 1GHz

EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
4820.000	44.62	0.08	44.7	74	-29.3	peak
4820.000	36.91	0.08	36.99	54	-17.01	AVG
7230.000	41.07	2.21	43.28	74	-30.72	peak
7230.000	31.55	2.21	33.76	54	-20.24	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
4820.000	46.27	0.08	46.35	74	-27.65	peak
4820.000	37.19	0.08	37.27	54	-16.73	AVG
7230.000	41.43	2.21	43.64	74	-30.36	peak
7230.000	32.77	2.21	34.98	54	-19.02	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Value Type
4883.000	45.53	0.14	45.67	74	-28.33	peak
4883.000	36.71	0.14	36.85	54	-17.15	AVG
7324.500	41.91	2.36	44.27	74	-29.73	peak
7324.500	30.47	2.36	32.83	54	-21.17	AVG

Remark:
 Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Value Type
4883.000	47.67	0.14	47.81	74	-26.19	peak
4883.000	38.16	0.14	38.3	54	-15.7	AVG
7324.500	43.84	2.36	46.2	74	-27.8	peak
7324.500	33.01	2.36	35.37	54	-18.63	AVG

Remark:
 Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Value Type
4954.000	46.37	0.22	46.59	74	-27.41	peak
4954.000	38.34	0.22	38.56	54	-15.44	AVG
7431.000	42.67	2.64	45.31	74	-28.69	peak
7431.000	33.44	2.64	36.08	54	-17.92	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Value Type
4954.000	48.1	0.22	48.32	74	-25.68	peak
4954.000	37.57	0.22	37.79	54	-16.21	AVG
7431.000	43.27	2.64	45.91	74	-28.09	peak
7431.000	32.09	2.64	34.73	54	-19.27	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RESULT: PASS

Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin=Emission Level -Limit.

The "Factor" value can be calculated automatically by software of measurement system.

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TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

PK

AV

RESULT: PASS

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EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

PK



AV



RESULT: PASS

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EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

PK



AV


RESULT: PASS

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EUT	Camera	Model Name	S6-C
Temperature	21.8°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

PK

AV


RESULT: PASS

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

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11. NUMBER OF HOPPING FREQUENCY

11.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW \geq RBW. Sweep: Auto. Detector function: Peak. Trace: Max hold.
4. Allow the trace to stabilize.

11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

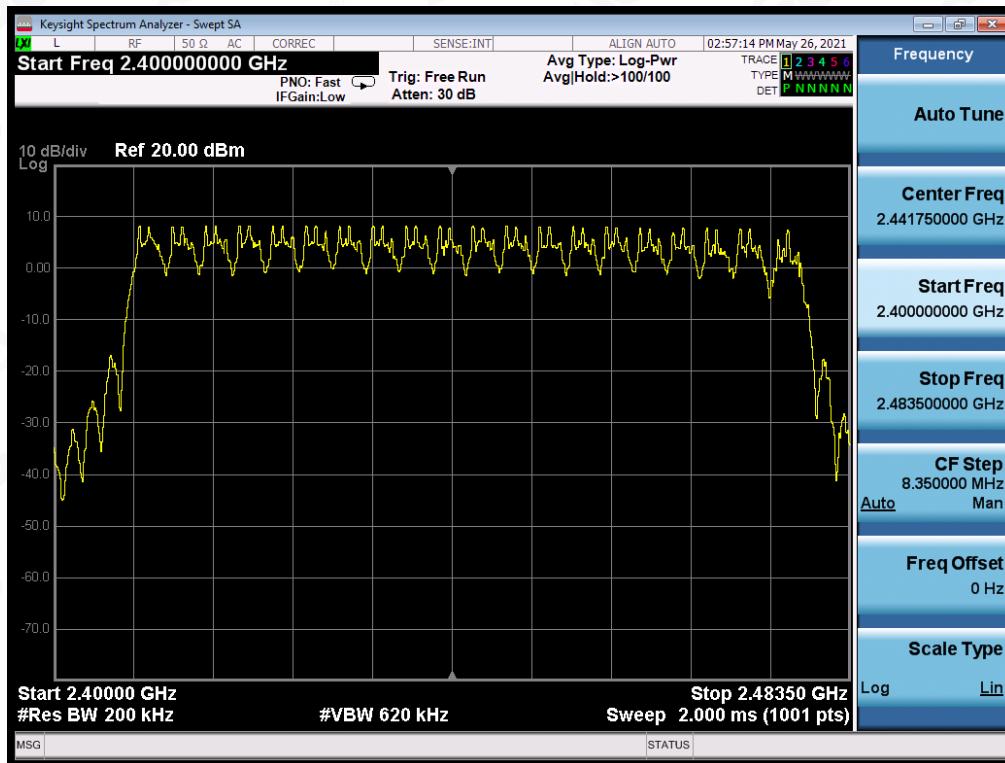
11.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

11.4. LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	≥ 15	20	PASS

TEST PLOT FOR NO. OF TOTAL CHANNELS



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12. TIME OF OCCUPANCY (DWELL TIME)

12.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.
2. RBW shall be \leq channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel.
3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
4. Detector function: Peak. Trace: Max hold.
5. Use the marker-delta function to determine the transmit time per hop.
6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:
(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) \times (period specified in the requirements / analyzer sweep time)
7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

12.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

12.4. LIMITS AND MEASUREMENT RESULT

Channel	Time of Pulse for GFSK (ms)	Number of hops in the period specified in the requirements	Dwell Time (ms)	Limit (ms)
Low	0.217	110*4	95.48	400
Middle	0.220	114*4	100.32	400
High	0.221	107*4	94.588	400

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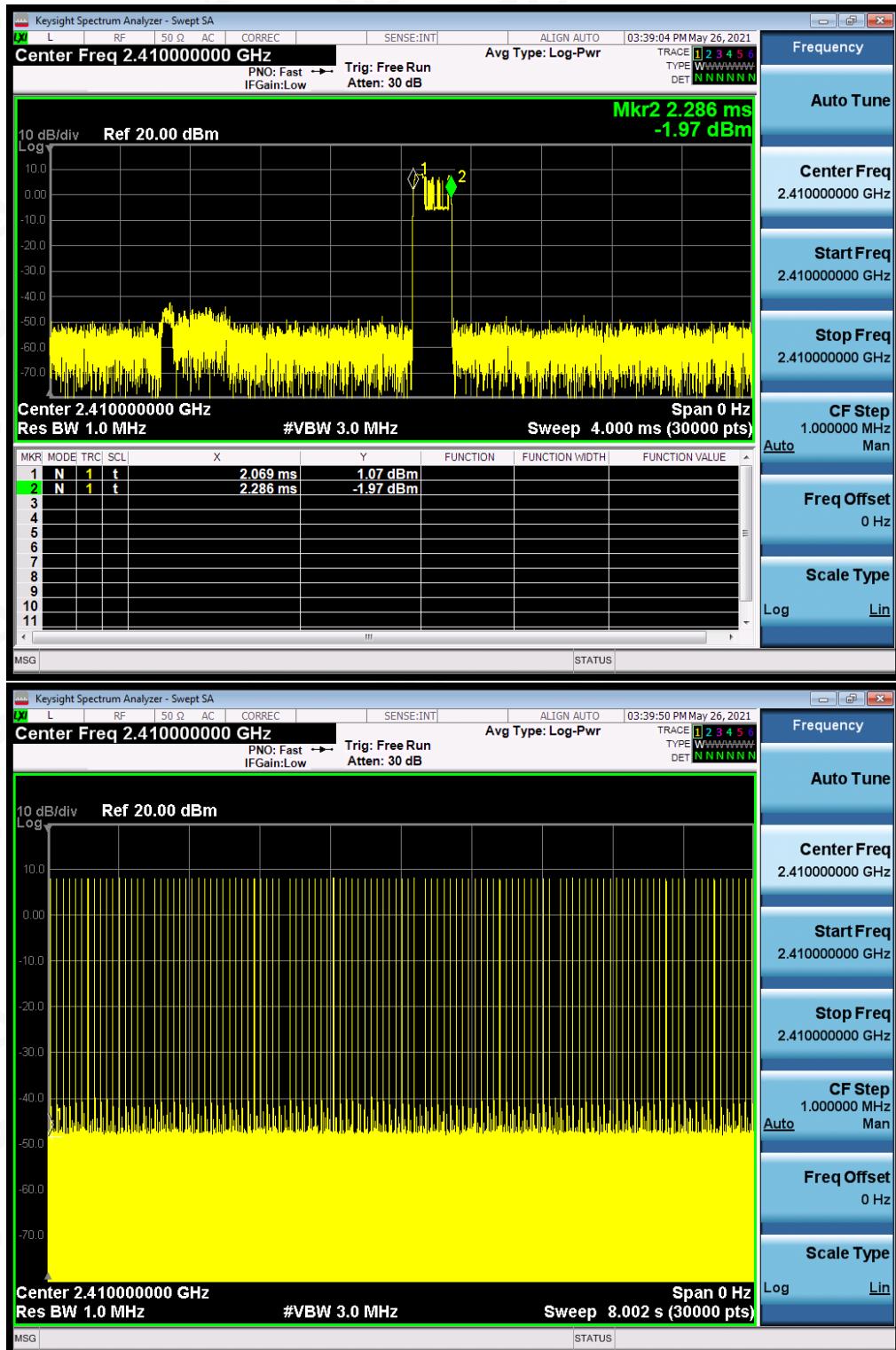
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TEST PLOT OF LOW CHANNEL



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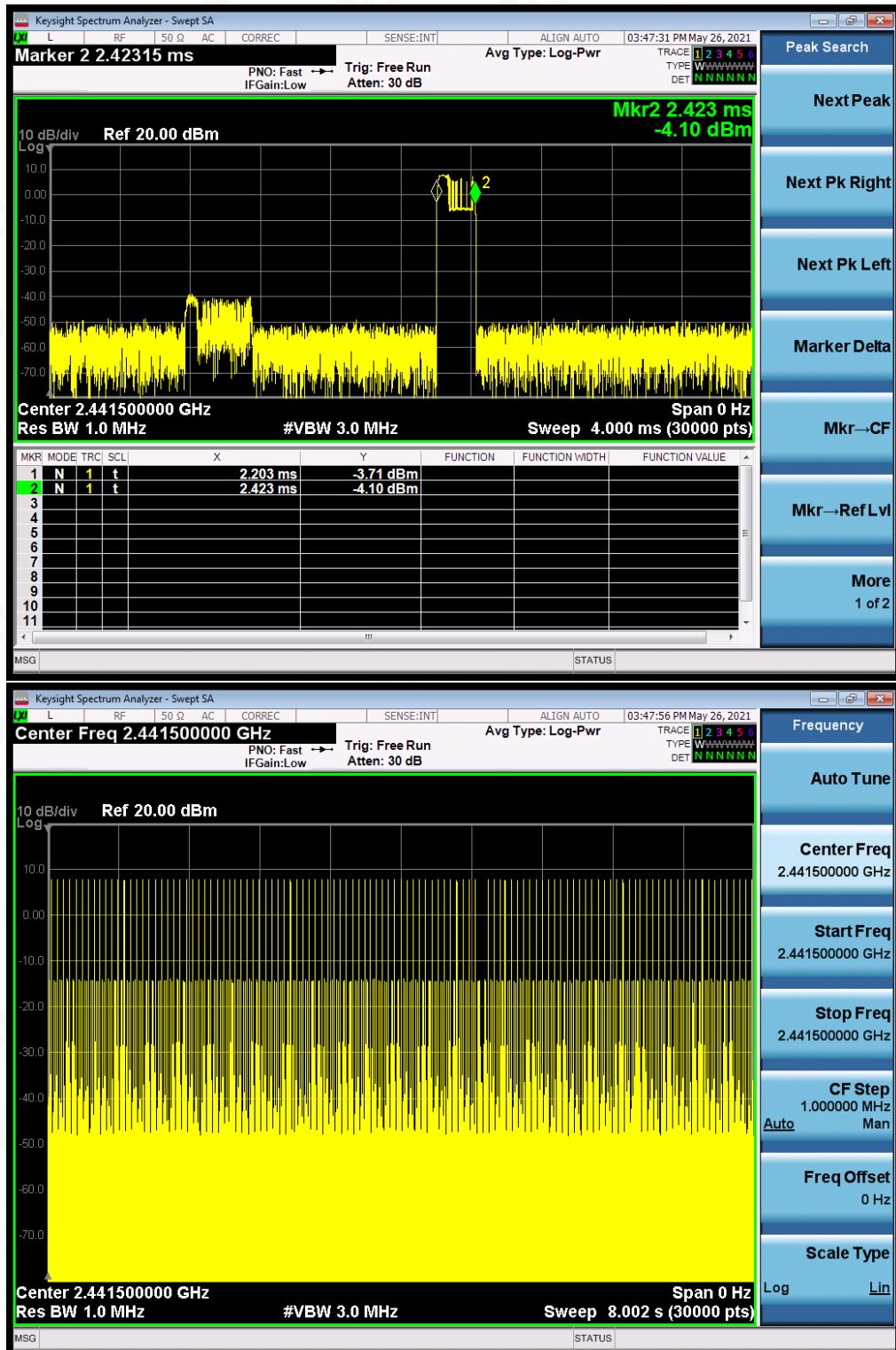
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TEST PLOT OF MIDDLE CHANNEL



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