

## FCC - TEST REPORT

Report Number : **68.950.19.0032.01** Date of Issue: March 20, 2019Model : **CS-MRD-03A, CS-MRD-03B**

Product Type : Microwave motion sensor

Applicant : ZHEJIANG COLASMART TECHNOLOGY., LTD

Address : Room 205-206,12<sup>th</sup> Building, Zhong haixin science and tech park,  
Bulan road, Shenzhen 518112, China

Manufacture : ZHEJIANG COLASMART TECHNOLOGY., LTD

Address : Room 205-206,12<sup>th</sup> Building, Zhong haixin science and tech park,  
Bulan road, Shenzhen 518112, ChinaTest Result :  Positive  NegativeTotal pages including  
Appendices : 32

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval



## 1 Table of Contents

1 Table of Contents .....	2
2 Details about the Test Laboratory .....	3
3 Description of the Equipment Under Test .....	4
4 Summary of Test Standards .....	5
5 Summary of Test Results .....	6
6 General Remarks .....	7
7 Test setups .....	8
8 Technical Requirement .....	9
8.1 Conducted Emission .....	9
8.2 Field strength of emissions and Restricted bands .....	12
Field strength of emissions and Restricted bands .....	13
8.3 Out of Band Emissions .....	18
8.4 20dB Bandwidth .....	27
9 Test equipment list .....	31
10 System Measurement Uncertainty .....	32

## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12&13, Zhiheng Wisdomland Business Park,  
Nantou Checkpoint Road 2, Nanshan District,  
Shenzhen City, 518052,  
P. R. China

FCC Registration Number: 514049

Telephone: 86 755 8828 6998  
Fax: 86 755 8828 5299

### 3 Description of the Equipment Under Test

#### Description of the Equipment Under Test

Product:	Microwave motion sensor
Model no.:	CS-MRD-03A, CS-MRD-03B The difference of two models only lies in the antenna type.
FCC ID:	2ASH6-CSMRD03
Options and accessories:	NIL
Ratings:	8-12VDC
RF Transmission Frequency:	5753MHz - 5842MHz
Modulation:	Unmodulated
Antenna Type:	CS-MRD-03A: S58A 5.8G planar antenna CS-MRD-03B: D5801L-NM antenna
Antenna Gain:	1.62dBi
Description of the EUT:	The product is a Microwave induction module that operated at 5.8GHz, The TX and RX range is 5753MHz-5842MHz.

#### Auxiliary Equipment Used during Test:

Because the module do not have shielding, so it was tested with a host for this limited modular approve application, the host information was used of the modular as below:

Manufacture: Hangzhou days lighting electric appliance Co.,ltd

Product name: Light

model name: A60-PA-C 6W



## 4 Summary of Test Standards

<b>Test Standards</b>	
FCC Part 15 Subpart C 10-1-2018 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators



## 5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C 15.249					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
15.207 Conducted emission AC power port	09	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.205(a), §15.209(a), §15.249(a), §15.249(c) Field strength of emissions and Restricted bands	12	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.249(d) Out of band emissions	18	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCC §15.215(c) 20dB bandwidth	27	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203 Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark 1: N/A- Not Applicable;

Note 1: The EUT used an integral PCB antenna, which gain is 1.62 dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.



## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2ASH6-CSMRD03 complies with Section 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

### SUMMARY:

All tests according to the regulations cited on page 5 were

- Performed

- **Not** Performed

The Equipment Under Test

- **Fulfills** the general approval requirements.

- **Does not** fulfill the general approval requirements.

Sample Received Date: February 16, 2019

Testing Start Date: February 16, 2019

Testing End Date: March 19, 2019

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

Prepared by:

Tested by:

John Zhi

Section Manager

Moon Xiong

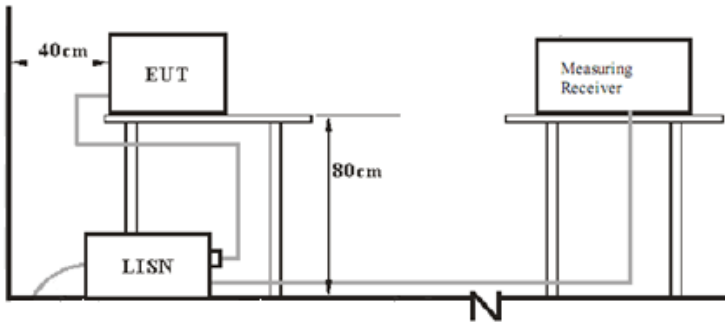
Project Engineer

Louise Liu

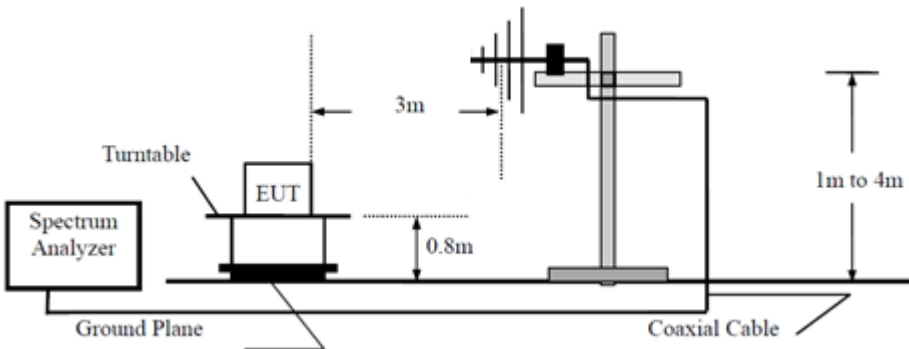
Test Engineer

## 7 Test setups

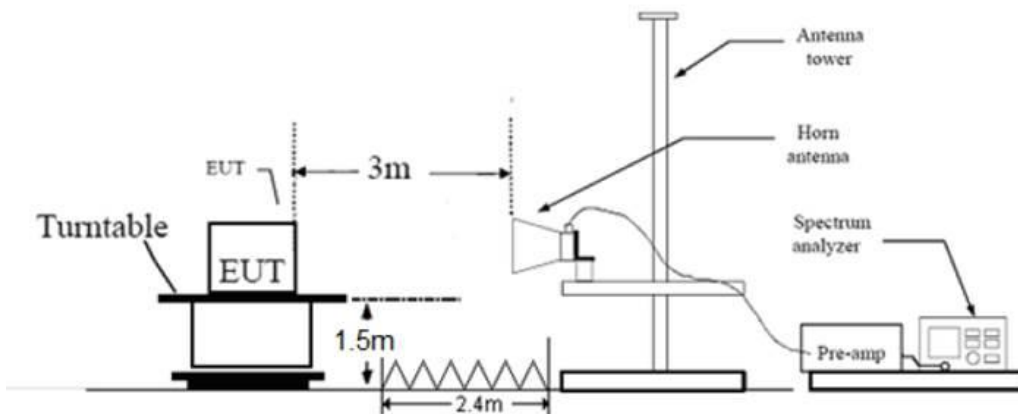
### 7.1 AC Power Line Conducted Emission test setups



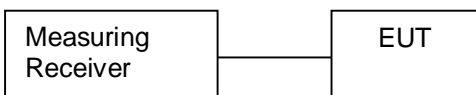
### 7.2 Radiated test setups Below 1GHz



### Above 1GHz



### 7.3 Conducted RF test setups





## 8 Technical Requirement

### 8.1 Conducted Emission

#### Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

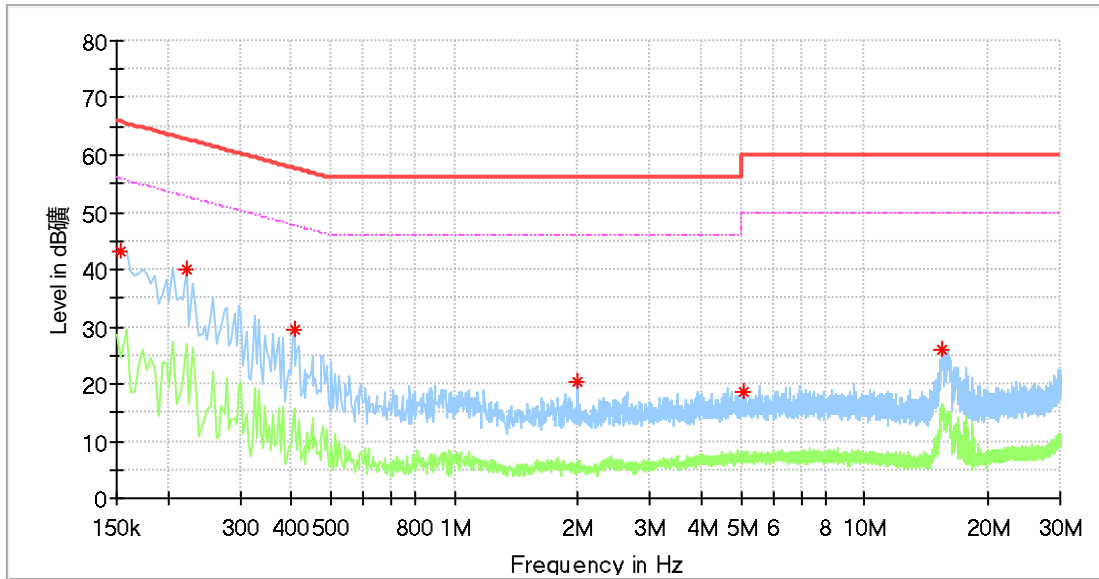
#### Limit

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

\*Decreasing linearly with logarithm of the frequency.

### Test result

Model: CS-MRD-03A, CS-MRD-03B  
 Test mode: ON  
 Test Voltage: AC 120V/60Hz  
 Project No/Sample ID: 68.950.19.0032.01  
 Test By: Leo  
 Remark:



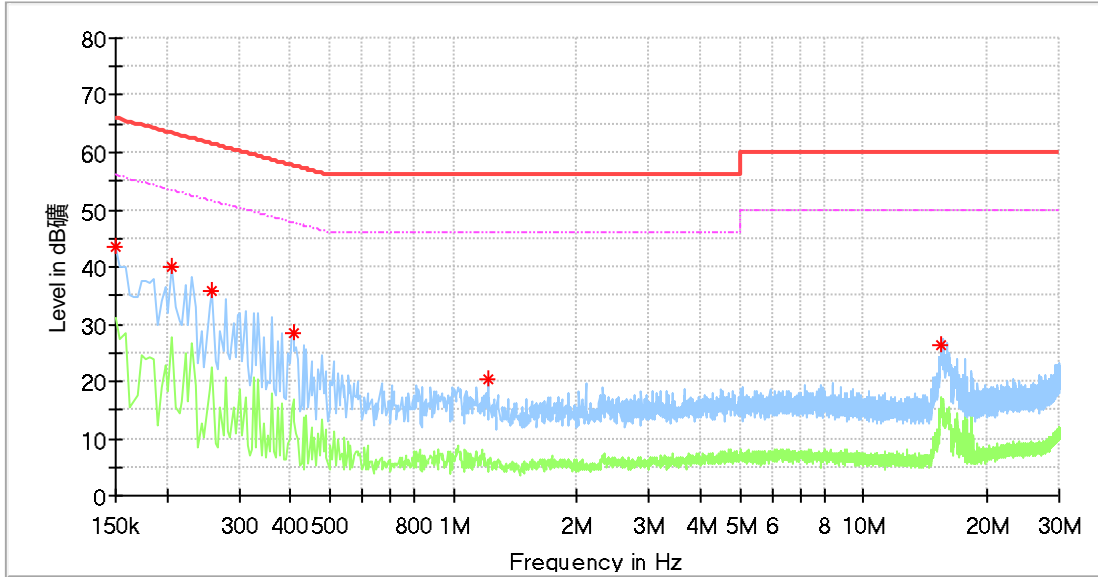
### Critical\_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	43.33	---	65.78	22.45	L1	10.2
0.222000	40.08	---	62.74	22.66	L1	10.2
0.406000	29.43	---	57.73	28.30	L1	10.3
1.990000	20.34	---	56.00	35.66	L1	10.3
5.046000	18.66	---	60.00	41.34	L1	10.4
15.474000	26.13	---	60.00	33.87	L1	10.8

### Final\_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
---	---	---	---	---	---	---

Model: CS-MRD-03A, CS-MRD-03B  
 Test mode: ON  
 Test Voltage: AC 120V/60Hz  
 Project No/Sample ID: 68.950.19.0032.01  
 Test By: Leo  
 Remark:



### Critical\_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.150000	43.66	---	66.00	22.34	N	10.5
0.206000	40.02	---	63.37	23.35	N	10.2
0.258000	35.92	---	61.50	25.57	N	10.2
0.406000	28.34	---	57.73	29.39	N	10.3
1.214000	20.47	---	56.00	35.53	N	10.3
15.470000	26.40	---	60.00	33.60	N	10.9

### Final\_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
---	---	---	---	---	---	---

## 8.2 Field strength of emissions and Restricted bands

### Test Method

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3-meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna 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.
- 4: 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:

#### For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 1MHz, VBW $\geq$ RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

#### For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 KHz, VBW $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

### Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log (1/duty cycle)).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

## Field strength of emissions and Restricted bands

### Limits

According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

According to §15.249 (c), Field strength limits are specified at a distance of 3 meters.  
 According to §15.249 (d), Emissions 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 §15.209, whichever is the lesser attenuation.  
 According to §15.205 Unwanted emissions falling into restricted bands in §15.205 (a) shall comply with the limits specified in §15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

**Field strength of emissions and Restricted bands**

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A, CS-MRD-03B  
 Operating Condition: Tx; 5753MHz

**Below 1GHz**

Frequency (MHz)	Emission Level (dBµV/m)	Read level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Value Type	Corr. (dB)	Emission Type
164.284375*	23.31	10.11	H	43.5	20.19	QP	13.2	Spurious
30.242500	33.80	18.7	V	40.0	6.20	QP	15.1	Spurious

**Above 1GHz  
 CS-MRD-03A**

Frequency (MHz)	Maximum Emission (dBµV/m)	Read level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Corr. (dB)	Value Type	Emission Type
5753.187500	73.15	69.45	H	114.00	40.85	3.7	Peak	Fundamental
5753.187500	72.79	69.09	H	94.00	21.21	3.7	AV	Fundamental
5752.812500	65.91	62.21	V	114.00	48.09	3.7	Peak	Fundamental
5752.812500	65.10	61.4	V	94.00	28.9	3.7	AV	Fundamental
/	/	/	H	74.00	/	/	Peak	Spurious
/	/	/	V	74.00	/	/	Peak	Spurious
Remark:								
Factor=20log(dutycycle), dutycycle=100%								



Above 1GHz  
CS-MRD-03B

Frequency (MHz)	Maximum Emission (dBµV/m)	Read level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Corr. (dB)	Value Type	Emission Type
5753.112800	75.17	71.47	H	114.00	38.83	3.7	Peak	Fundamental
5753.112800	74.81	71.11	H	94.00	19.19	3.7	AV	Fundamental
5752.934200	67.93	64.23	V	114.00	46.07	3.7	Peak	Fundamental
5752.934200	67.12	63.42	V	94.00	26.88	3.7	AV	Fundamental
/	/	/	H	74.00	/	/	Peak	Spurious
/	/	/	V	74.00	/	/	Peak	Spurious
Remark:								
Factor=20log(dutycycle), dutycycle=100%								

Remark

- 1: AV Emission Level= PK Emission Level+20log(dutycycle)
- 2: Data of measurement within this frequency range shown “/” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 3: “\*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 4: Below 1GHz: Corrector factor=Antenna Factor + Cable loss
- 5: Above 1GHz: Corrector factor=Antenna Factor + Cable loss-Amplifier Gain
- 6: Corrected Amplitude= Read level + Corrector factor

**Field strength of emissions and Restricted bands**

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A, CS-MRD-03B  
 Operating Condition: Tx; 5798MHz

Above 1GHz  
 CS-MRD-03A

Frequency (MHz)	Maximum Emission (dBµV/m)	Read level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Corr. (dB)	Value Type	Emission Type
5797.625000	84.13	80.53	H	114.00	29.87	3.6	Peak	Fundamental
5797.625000	83.45	79.85	H	94.00	14.15	3.6	AV	Fundamental
5797.625000	77.14	73.54	V	114.00	36.86	3.6	Peak	Fundamental
5797.625000	76.48	72.88	V	94.00	17.52	3.6	AV	Fundamental
11593.531250	52.38	43.68	H	54.00	21.62	8.7	Peak	Spurious
11593.531250	51.88	43.18	H	54.00	2.12	8.7	AV	Spurious
23224.312500	52.26	52.26	H	54.00	21.74	0.0	Peak	Spurious
23224.312500	51.76	51.76	H	54.00	2.24	0.0	AV	Spurious
Remark:								
Factor=20log(dutycycle), dutycycle=100%								

Above 1GHz  
 CS-MRD-03B

Frequency (MHz)	Maximum Emission (dBµV/m)	Read level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Corr. (dB)	Value Type	Emission Type
5797.716000	85.17	81.57	H	114.00	28.83	3.6	Peak	Fundamental
5797.716000	84.49	80.89	H	94.00	13.11	3.6	AV	Fundamental
5797.716000	78.18	74.58	V	114.00	35.82	3.6	Peak	Fundamental
5797.716000	77.52	73.92	V	94.00	16.48	3.6	AV	Fundamental
11593.651240	53.32	44.62	H	74.00	20.68	8.7	Peak	Spurious
11593.651240	52.92	44.22	H	54.00	1.08	8.7	AV	Spurious
23224.422600	53.20	53.20	H	74.00	20.80	0.0	Peak	Spurious
23224.422600	52.80	52.80	H	54.00	1.20	0.0	AV	Spurious
Remark:								
Factor=20log(dutycycle), dutycycle=100%								

Remark

- 1: AV Emission Level= PK Emission Level+20log(dutycycle)
- 2: Data of measurement within this frequency range shown “/” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 3: “\*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 4: Below 1GHz: Corrector factor=Antenna Factor + Cable loss
- 5: Above 1GHz: Corrector factor=Antenna Factor + Cable loss-Amplifier Gain
- 6: Corrected Amplitude= Read level + Corrector factor



**Field strength of emissions and Restricted bands**

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A, CS-MRD-03B  
 Operating Condition: Tx; 5842MHz

Above 1GHz  
 CS-MRD-03A

Frequency (MHz)	Maximum Emission (dBµV)	Read level (dB)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Corr. (dB)	Value Type	Emission Type
5841.500000	74.11	70.71	H	114.00	39.89	3.4	Peak	Fundamental
5841.500000	73.50	70.1	H	94.00	20.5	3.4	AV	Fundamental
5841.437500	83.53	80.13	V	114.00	30.47	3.4	Peak	Fundamental
5841.437500	82.71	79.31	V	94.00	11.29	3.4	AV	Fundamental
/	/	/	H	74.00	/	/	Peak	Spurious
/	/	/	V	74.00	/	/	Peak	Spurious
Remark:								
Factor=20log(dutycycle), dutycycle=100%								

Above 1GHz  
 CS-MRD-03B

Frequency (MHz)	Maximum Emission (dBµV)	Read level (dB)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Corr. (dB)	Value Type	Emission Type
5841.720000	75.31	71.91	H	114.00	38.79	3.4	Peak	Fundamental
5841.720000	74.70	71.30	H	94.00	19.30	3.4	AV	Fundamental
5841.381000	84.73	81.33	V	114.00	29.27	3.4	Peak	Fundamental
5841.381000	83.91	80.51	V	94.00	10.09	3.4	AV	Fundamental
/	/	/	H	74.00	/	/	Peak	Spurious
/	/	/	V	74.00	/	/	Peak	Spurious
Remark:								
Factor=20log(dutycycle), dutycycle=100%								

Remark

- 1: AV Emission Level= PK Emission Level+20log(dutycycle)
- 2: Data of measurement within this frequency range shown “/” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 3: “\*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 4: Below 1GHz: Corrector factor=Antenna Factor + Cable loss
- 5: Above 1GHz: Corrector factor=Antenna Factor + Cable loss-Amplifier Gain
- 6: Corrected Amplitude= Read level + Corrector factor

## 8.3 Out of Band Emissions

### Test Method

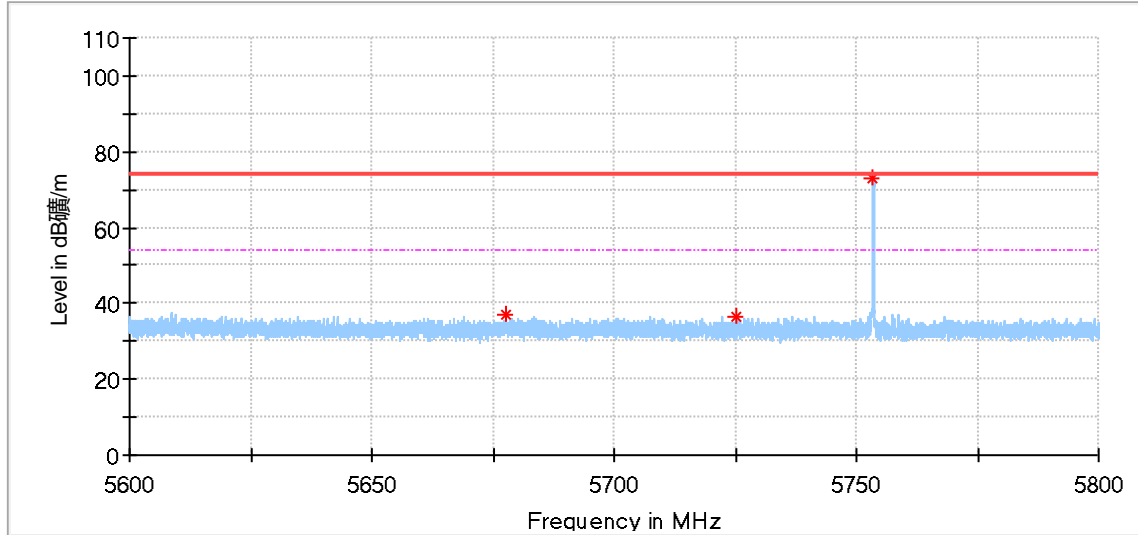
- 1 Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz, VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

### Limits

According to §15.249(d) Emissions 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 §15.209, whichever is the lesser attenuation.

## Out of Band Emissions

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A  
 Operating Condition: Tx; 5753MHz  
 Polarization: Horizontal



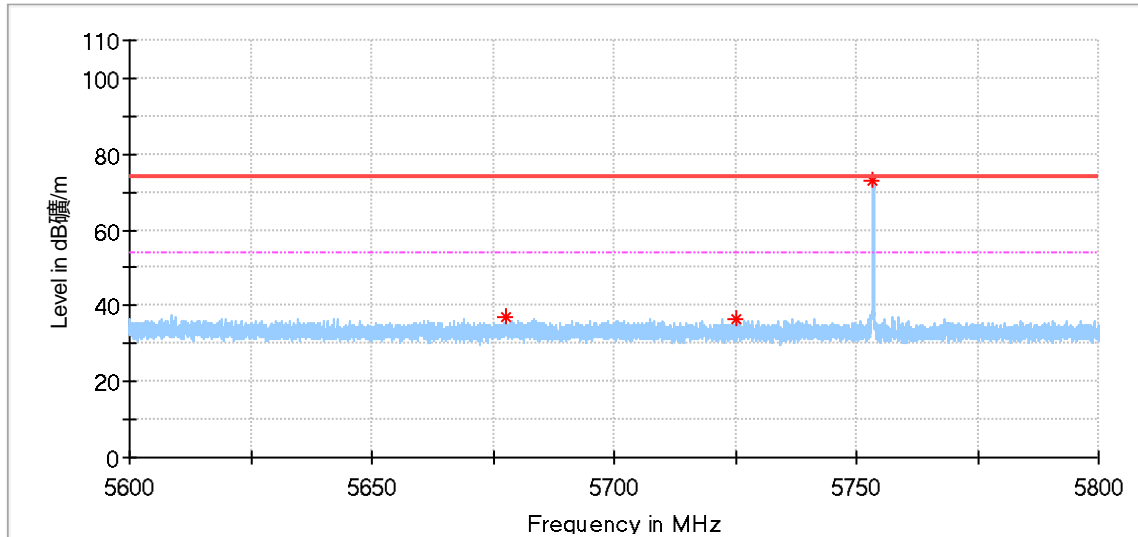
### Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5677.600000	37.19	74.00	36.81	---	---	154.0	H	116.0	3.9
5725.300000	36.46	74.00	37.54	---	---	154.0	H	27.0	3.8
5753.506250	72.87	74.00	1.13	---	---	154.0	H	107.0	3.7

### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---	---	---	---

EUT: Microwave motion sensor  
 M/N: CS-MRD-03B  
 Operating Condition: Tx; 5753MHz  
 Polarization: Horizontal



### Critical\_Freqs

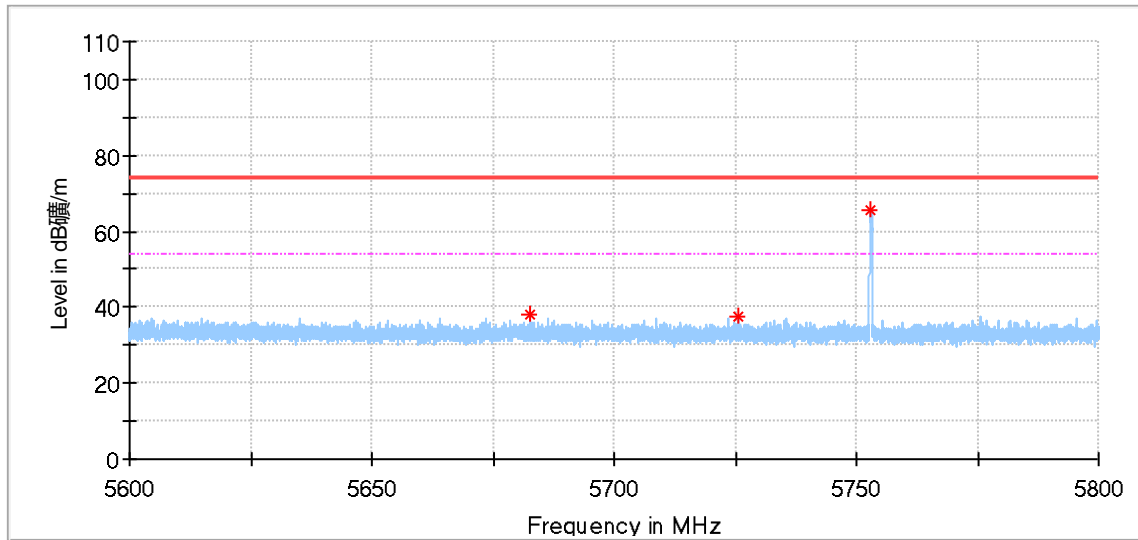
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5671.350000	35.39	74.00	38.61	---	---	154.0	H	116.0	3.9
5725.800000	34.66	74.00	39.34	---	---	154.0	H	27.0	3.8
5753.406490	72.07	74.00	1.93	---	---	154.0	H	107.0	3.7

### Final\_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

## Out of Band Emissions

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A  
 Operating Condition: Tx; 5753MHz  
 Polarization: Vertical



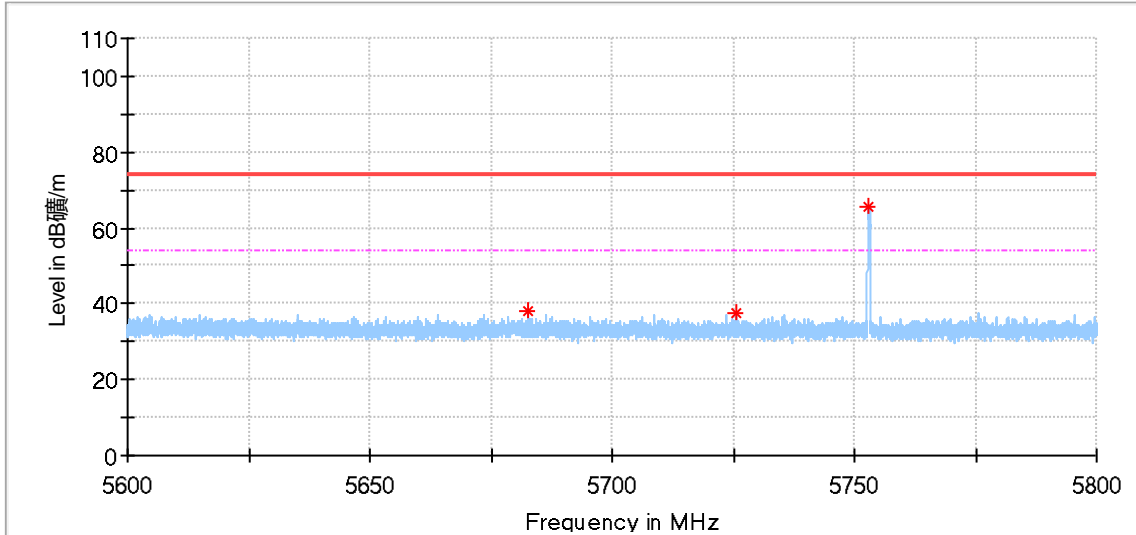
### Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5682.787500	37.87	74.00	36.13	---	---	154.0	V	351.0	3.9
5725.731250	37.47	74.00	36.53	---	---	154.0	V	10.0	3.8
5752.950000	65.34	74.00	8.66	---	---	154.0	V	250.0	3.7

### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

EUT: Microwave motion sensor  
 M/N: CS-MRD-03B  
 Operating Condition: Tx; 5753MHz  
 Polarization: Vertical



### Critical\_Freqs

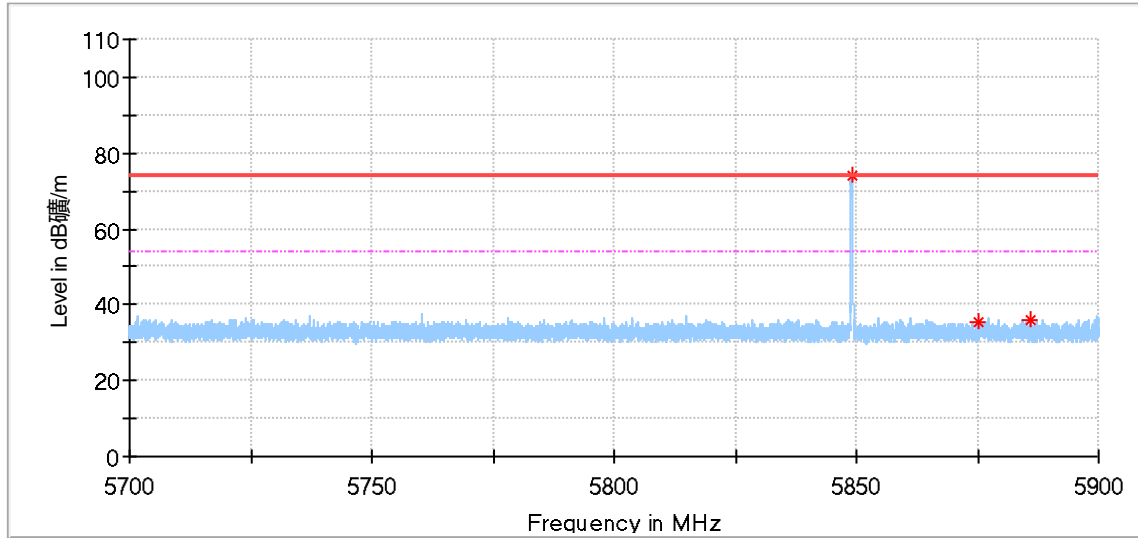
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5679.692560	38.92	74.00	35.08	---	---	154.0	V	351.0	3.9
5725.465320	38.52	74.00	35.48	---	---	154.0	V	10.0	3.8
5752.640300	66.39	74.00	7.61	---	---	154.0	V	250.0	3.7

### Final\_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

## Out of Band Emissions

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A  
 Operating Condition: Tx; 5842MHz  
 Polarization: Horizontal



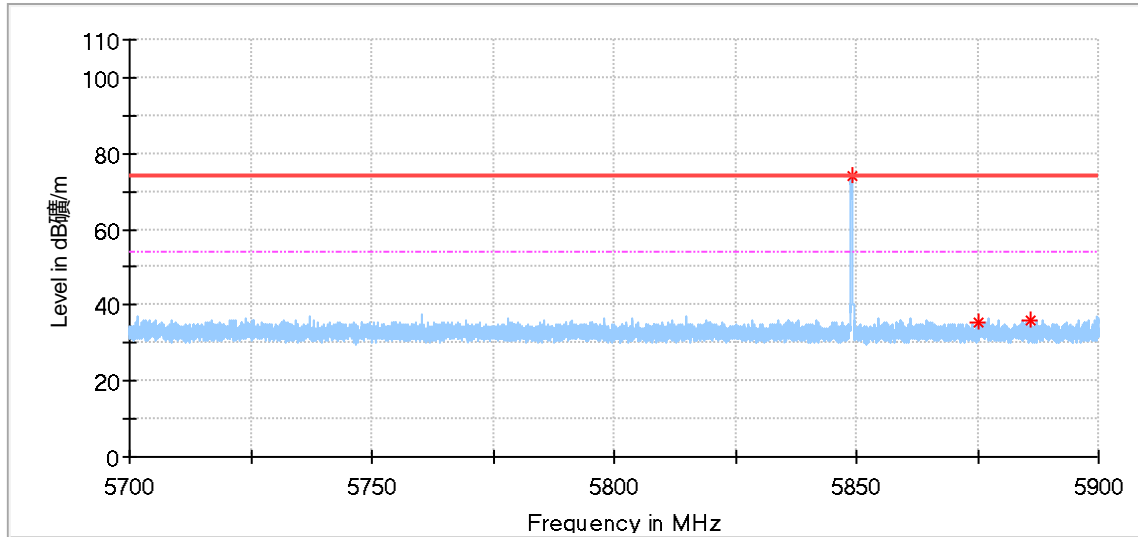
### Critical\_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5842.056250	74.02	74.00	-0.02	---	---	154.0	H	102.0	3.4
5875.125000	35.48	74.00	38.52	---	---	154.0	H	56.0	3.3
5885.875000	36.16	74.00	37.84	---	---	154.0	H	5.0	3.3

### Final\_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

EUT: Microwave motion sensor  
 M/N: CS-MRD-03B  
 Operating Condition: Tx; 5842MHz  
 Polarization: Horizontal



### Critical\_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5842.186430	73.11	74.00	0.88	---	---	154.0	H	102.0	3.4
5875.217000	34.57	74.00	37.43	---	---	154.0	H	56.0	3.3
5882.572000	35.25	74.00	36.75	---	---	154.0	H	5.0	3.3

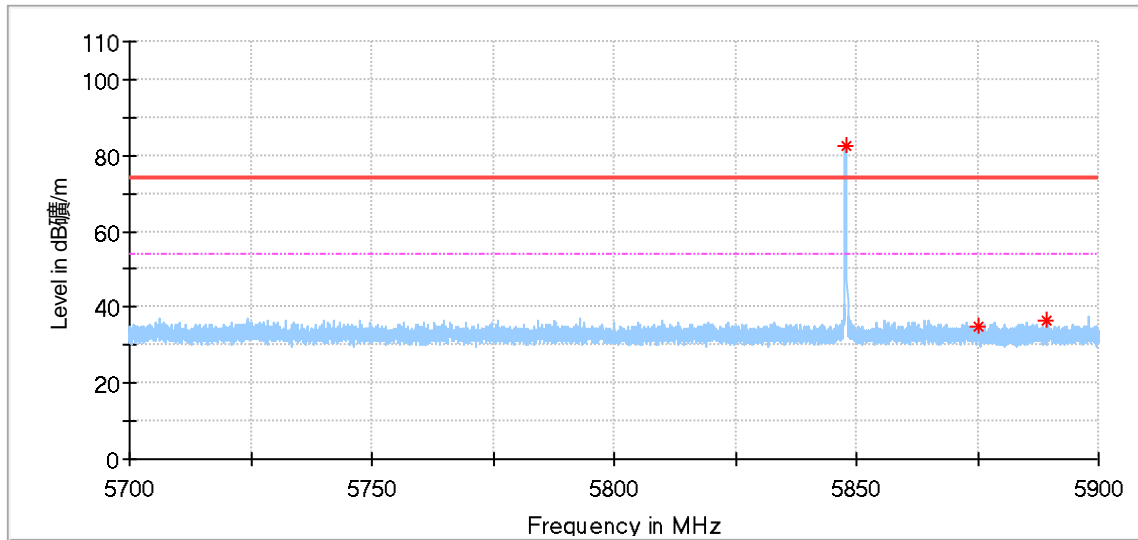
### Final\_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---	---	---	---



## Out of Band Emissions

EUT: Microwave motion sensor  
 M/N: CS-MRD-03A  
 Operating Condition: Tx; 5842MHz  
 Polarization: Vertical



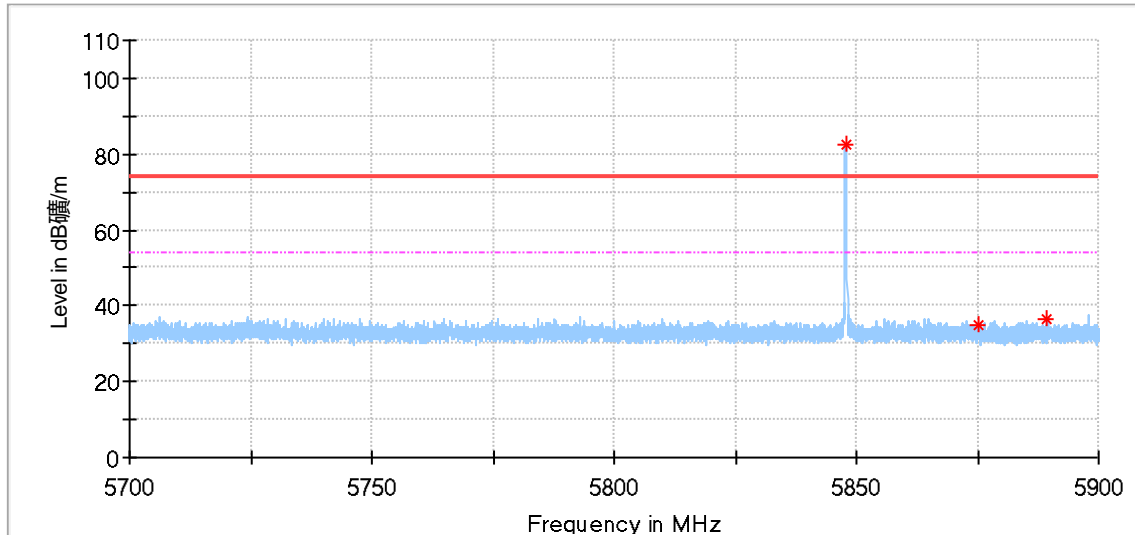
### Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5841.787500	82.38	74.00	-8.38	---	---	154.0	V	82.0	3.4
5875.368750	35.16	74.00	38.84	---	---	154.0	V	210.0	3.3
5889.462500	36.72	74.00	37.28	---	---	154.0	V	292.0	3.3

### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

EUT: Microwave motion sensor  
 M/N: CS-MRD-03B  
 Operating Condition: Tx; 5842MHz  
 Polarization: Vertical



### Critical\_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5841.926300	81.43	74.00	-7.33	---	---	154.0	V	82.0	3.4
5874.635430	34.21	74.00	38.79	---	---	154.0	V	210.0	3.3
5885.237500	35.77	74.00	37.23	---	---	154.0	V	292.0	3.3

### Final\_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

## 8.4 20dB Bandwidth

### Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

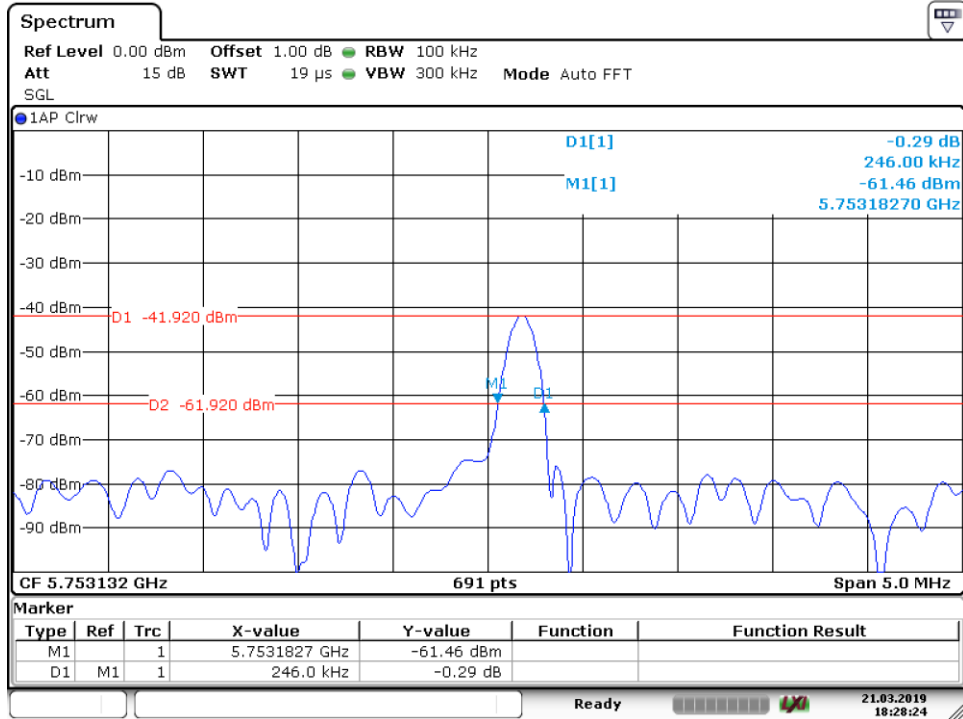
### Limits:

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## 20dB Bandwidth

The difference of two models only lies in the antenna type, so 20dB bandwidth test was only applied on CS-MRD-03A.

Frequency	20dB Bandwidth	Limit
MHz	KHz	kHz
5753	246.0	--

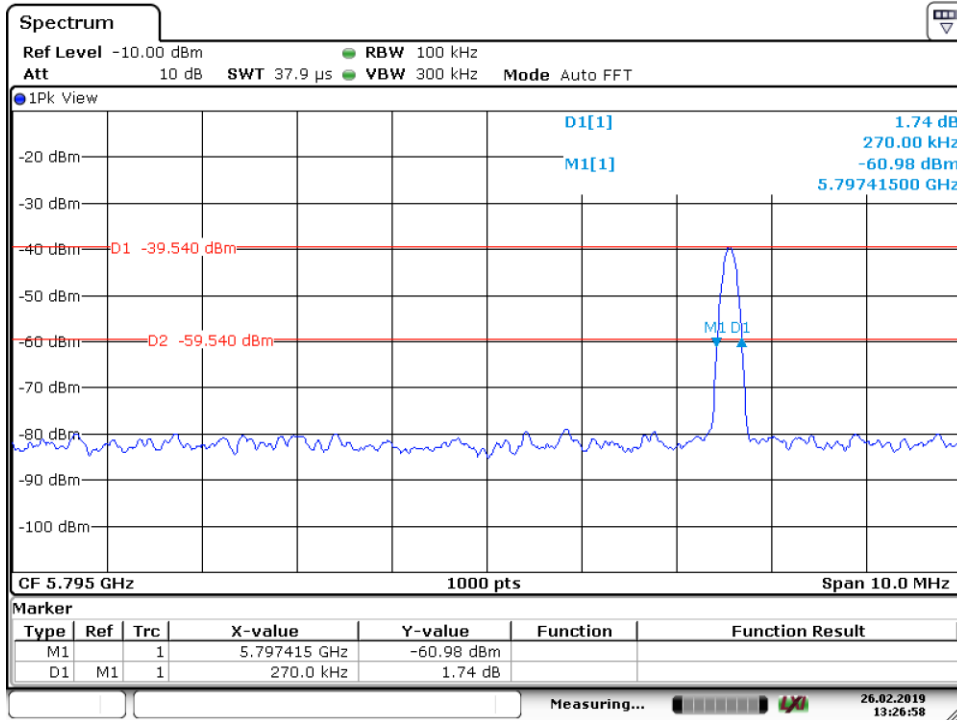


Date: 21.MAR.2019 18:28:25

5753MHz

**20dB Bandwidth**

Frequency MHz	20dB Bandwidth KHz	Limit kHz
5798	270.0	--



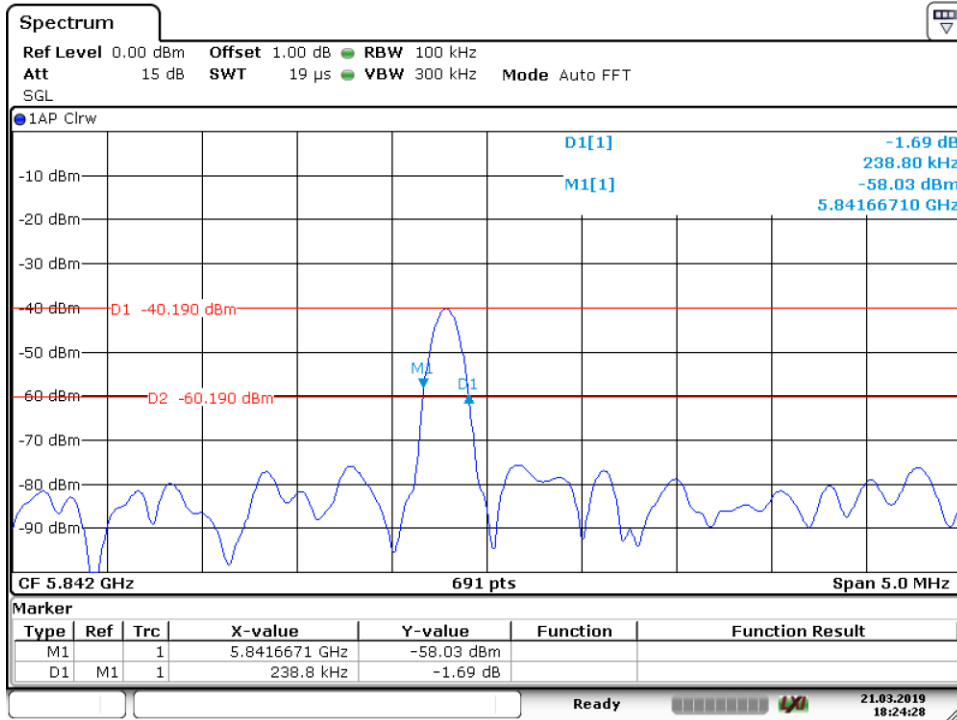
Date: 26.FEB.2019 13:26:58

5798MHz



### 20dB Bandwidth

Frequency MHz	20dB Bandwidth KHz	Limit kHz
5842	238.8	--



Date: 21.MAR.2019 18:24:28

5842MHz

## 9 Test equipment list

### List of Test Instruments

#### Radiated Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102294	2019-6-28
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2019-7-6
Attenuator	Agilent	8491A	MY39264334	2019-7-6
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

#### RF Conducted Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6

## 10 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Spurious Emission 1000MHz-18000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10 <sup>-7</sup> or 1%