

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test Report No. : OT-200-RWD-006
Reception No. : 2009003838
Applicant : Samsung Electronics Co Ltd
Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States
Manufacturer : Samsung Electronics Co Ltd
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677, Korea
Type of Equipment : Motion Detection Sensor Module
FCC ID. : A3LMDRTI301
Model Name : MDRTI301
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : September 18, 2020
Date of issue : October 12, 2020

SUMMARY

The equipment complies with the regulation; *FCC CFR 47 PART 15 SUBPART C Section 15.255*

This test report only contains the result of a single test of the sample supplied for the examination.

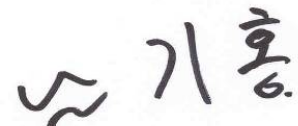
It is not a generally valid assessment of the features of the respective products of the mass-production.



Tested by
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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-200-RWD-006	October 12, 2020	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : Samsung Electronics Co Ltd
 Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States
 Contact Person : Youngjoong Noh / Principal Engineer
 Telephone No. : +82-31-277-0598
 FCC ID : A3LMDRTI301
 Model Name : MDRTI301
 Brand Name : 
 Serial Number : N/A
 Date : October 12, 2020

DEVICE TYPE	DXT – Part 15 Low Power Transceiver, Rx Verified
E.U.T. DESCRIPTION	Motion Detection Sensor Module
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC CFR47 Part 15 Subpart C Section 15.255
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The Samsung Electronics Co Ltd, Model MDRTI301 (referred to as the EUT in this report) is an Motion Detection Sensor Module, Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Motion Detection Sensor Module
TRANSMITTING FREQUENCY	61.251 GHz
MODULATION	FMCW
ANTENNA TYPE	Chip Antenna
LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz)	38.4 MHz

2.2 Model Differences:

-. None

2.3 Related Submittal(s) / Grant(s)

Original submittal only

3. EUT MODIFICATIONS

-. None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500$ mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm, using $P \text{ (mW)} = P \text{ (W)} / 1 000$, $d \text{ (cm)} = 0.01 * d \text{ (m)}$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

4.2 EUT Description

Kind of EUT	Motion Detection Sensor Module
Device Category	<input type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input checked="" type="checkbox"/> Others
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A

4.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Freq. Band (GHz)	Average Power (dBm)	Average Power (mW)	Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			Log	Linear			
61.251	-5.176	0.304	7.626	5.789	0.37	0.000 3	1.0

According to above table, for safe distance,

$$D = 0.282 * \sqrt{(0.304 * 5.789)/1.00} = 0.37 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 0.304 * 5.789 / (4 * \pi * 20^2) = 0.000 3$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna