ELECTROMAGNETIC EMISSIONS COMPLIANCE TEST REPORT

FCC Applicant:	Murata Electronics North America 2200 Lake Park Dr #7604, Smyrna,GA 30080 USA
FCC Manufacturer:	Murata Electronics North America 2200 Lake Park Dr #7604, Smyrna,GA 30080 USA
Product Name:	Type 1SC
Brand Name:	Murata
Model No.:	LBAD0XX1SC-DM
Report Number:	TERF2406001814E2
FCC ID	HSW-TY1SCDM
Date of EUT Received:	June 25, 2024
Date of Test:	August 28, 2024
Issue Date:	September 13, 2024

Approved By Arno Hsieh

Arno Hsieh

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI ANSI C63.26-2015 and the energy emitted by the sample EUT comply with FCC rule part 2 , 22H & 24E & 27 C & 90S.

The results of this report relate only to the sample identified in this report.

Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2406001814E2	00	C2PC for adding Satellite Band 23, NTN Band 255, Band 256	September 13, 2024	Yuri Tsai	

Note:

1、 The remark "*" indicates modification of the report upon requests from certification body.

2、 This is an addendum test report reference to the test report E2/2019/B0010.

Contents

1 GENERAL PRODUCT INFORMATION

1.1 Product Description

Product Name:	Type 1SC
Brand Name:	Murata
Model No.:	LBAD0XX1SC-DM
Hardware Version:	ES2
Firmware Version:	RK_03_02_00_00_41841_001
EUT Series No.:	N/A
Power Supply:	3.6Vdc
Test Software (Name/Version)	default(Link Call Box)

1.2 Frequency Range

M1 Band	BW (MHz)	Operation Frequency (MHz)
2	1.4	1850.7 - 1909.3
	3	1851.5 - 1908.5
	5	1852.5 - 1907.5
	10	1855 - 1905
	15	1857.5 - 1902.5
	20	1860 - 1900
4	1.4	1710.7 - 1754.3
	3	1711.5 - 1753.5
	5	1712.5 - 1752.5
	10	1715 - 1750
	15	1717.5 - 1747.5
	20	1720 - 1745
5	1.4	824.7 - 848.3
	3	825.5 - 847.5
	5	826.5 - 846.5
	10	829 - 844
12	1.4	699.7 - 715.3
	3	700.5 - 714.5
	5	701.5 - 713.5
	10	704 - 711
13	5	779.5 - 784.5
	10	782
17	5	706.5 - 713.5
	10	709.0 - 711.0

M1 Band	BW (MHz)	Operation Frequency (MHz)
25	1.4	1850.7 - 1914.3
	3	1851.5 - 1913.5
	5	1852.5 - 1912.5
	10	1855 - 1910
	15	1857.5 - 1907.5
	20	1860 - 1905
26	1.4	824.7 - 848.3
	3	825.5 - 847.5
	5	826.5 - 846.5
	10	829 - 844
	15	831.5 - 841.5
26 Part90	1.4	814.7 - 823.3
	3	815.5 - 822.5
	5	816.5 - 821.5
	10	819
66	1.4	1710.7 - 1779.3
	3	1711.5 - 1778.5
	5	1712.5 - 1777.5
	10	1715.0 - 1775.0
	15	1717.5 - 1772.5
	20	1720.0 - 1770.0
71	5	665.5 - 695.5
	10	688.0 - 693.0
	15	670.5 - 690.5
	20	673.0 - 688.0

1.3 Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22H, 24E, 27C, Part 90.
ANSI C63.26-2015
KDB971168 D01 Power Meas license Digital System v03r01
TS 151 010-1 is used to set, and measure the output power.

1.4 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 2		
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

1.5 Special Accessories

No special accessories were used during testing.

1.6 Equipment Modifications

There was no modifications incorporated into the EUT.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Measurement at Antenna Port

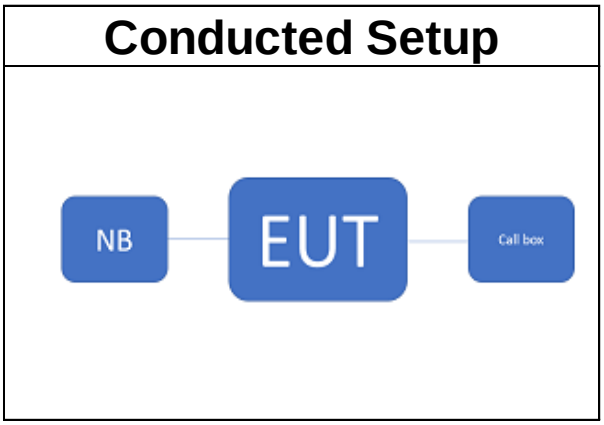
The EUT is placed on a table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.4 Measurement Results Explanation Example

For all conducted test items:
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.
Note:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

2.5 Test Configuration

2.5.1 Conducted Emission at the Antenna Port



2.5.2 Equipment used for test

Conducted Emission Test Site: Conducted E					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Notebook	HP	HSN-Q35C-4	P0003858	N/A	N/A

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a)	RF Power Output	Compliant
§22.913(a)(5) §24.232(c) §27.50(b)(c)(10) §27.50(d)(4) §90.542(a)(7) §90.635	ERP/ EIRP measurement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 The Worst Test Modes and Configuration

1. The EUT has been tested under operating condition.

Test Items				Max. Output Power										
Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
	L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
2	v			v						v	v			v
4	v			v						v	v			v
5	v			v				-	-	v	v			v
12/17	v			v				-	-	v	v			v
13	v			-	-			-	-	v	v			v
25	v			v						v	v			v
26	v			v					-	v	v			v
26 P90	v			v				-	-	v	v			v
66	v			v						v	v			v
71	v			-	-	v				v	v			v

5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
RF Power Output	+/-	0.97	dB
ERP/ EIRP measurement	+/-	2.15	dB
	+/-	2.15	dB
Emission Bandwidth	+/-	1.38	Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/-	0.77	dB
Peak to Average Ratio	+/-	0.97	dB
Frequency Stability vs. Temperature	+/-	1.48	Hz
Frequency Stability vs. Voltage	+/-	1.48	Hz
Temperature	+/-	0.6	°C
Humidity	+/-	3	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.15**	**dB**	30MHz - 1000MHz
	+/-	**3.43**	**dB**	1GHz - 18GHz
	+/-	**3.86**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.02**	**dB**	30MHz - 1000MHz
	+/-	**3.43**	**dB**	1GHz - 18GHz
	+/-	**3.86**	**dB**	18GHz - 40GHz
Radiated Spurious Emission	**+/-**	**2**	**dB**	33GHz-50GHz
	+/-	**1.59**	**dB**	50GHz-60GHz
	+/-	**1.7**	**dB**	60GHz-90GHz
	+/-	**1.64**	**dB**	90GHz-140GHz
	+/-	**3.83**	**dB**	140GHz-220GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6 MEASUREMENT EQUIPMENT USED

6.1 Conducted Measurement

Conducted Emission Test Site: Conducted E					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Radio Communication Analyzer	R&S	CMW500	7723	04/01/2024	03/31/2025
Coaxial Cables	Woken	00100A1F1A185C	RF54	11/15/2023	11/14/2024

7 MAXIMUM OUTPUT POWER

7.1 Standard Applicable

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

7.2 FCC ERP/EIRP LIMIT

According to FCC §2.1046

FCC 22.913(a)

(5) mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

FCC 24.232(c)

Mobile and portable stations are limited to 2 W EIRP.

FCC 27.50 (b)

(9) Control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 30 watts ERP.
(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

FCC 27.50(c)

(9) Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.
(10) Portable stations (hand-held devices) are limited to 3 watts ERP.

FCC 27.50(d)

(4) Mobile, and portable (hand-held) stations operating in the 1710-1755 MHz, 1695-1710 MHz and 1755-1780 MHz bands are limited to 1W EIRP.
(7) Mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 2 watts EIRP.

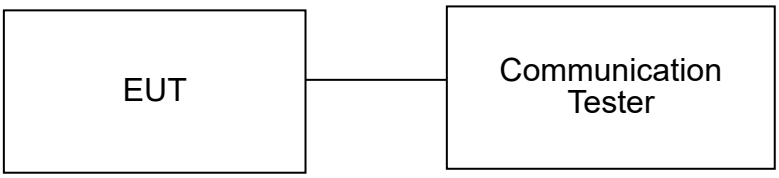
FCC 90.542(a)

(6) Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP.
(7) Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

FCC 90.635(b)

Mobile station is limited to 100W ERP

7.3 Test Set-up



Note: *Measurement setup for testing on Antenna connector*

7.4 Output Power Measurement Applicable Guideance

The transmitter output was connected to a communication tester. Transmitter output was read off the communication tester in dBm. The power output at the transmitter antenna port was determined by the communication tester reading.

The Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, (WCDMA/HSPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing, and KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results.WAll bands conducted average power is obtained from the simulator telecommunication test set.

7.5 Determining ERP and/or EIRP from conducted RF output power measurements

ERP/EIRP = PMeas + GT-LC

Where:

ERP/EIRP	= effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas	= measured transmitter output power or PSD, in dBm or dBW;
GT	= gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)
LC	= signal attenuation in the connecting cable between the transmitter and antenna, in dB.2

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

7.6 Measurement Result

Antenna gain (dBi) 10

CAT-M1 Band 2_Uplink frequency band : 1850 to 1910 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB allocation	RB Start	Index	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	18607	1850.7	QPSK	6	0	0	22.21	**32.21**	33	-0.79
	18607	1850.7	16QAM	5	0	0	22.09	**32.09**	33	-0.91

Antenna gain (dBi) 7

CAT-M1 Band 4_Uplink frequency band : 1710 to 1755 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB allocation	RB Start	Index	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	19957	1710.7	QPSK	6	0	0	22.34	**29.34**	30	-0.66
	19957	1710.7	16QAM	5	0	0	22.12	**29.12**	30	-0.88

Antenna gain (dBi) 11.41

M1 Band 5_Uplink frequency band : 824 to 849 MHz											
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB allocation	RB Start	Index	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
1.4	20407	824.7	QPSK	6	0	0	21.98	31.24	**33.39**	38.45	-7.21
	20407	824.7	16QAM	5	0	0	21.85	31.11	**33.26**	38.45	-7.34

Antenna gain (dBi) 10.7

CAT-M1 Band 12/17_Uplink frequency band : 699 to 716 MHz											
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB allocation	RB Start	Index	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
1.4	23017	699.7	QPSK	6	0	0	20.06	28.61	**30.76**	34.77	-6.16
	23017	699.7	16QAM	5	0	0	19.61	28.16	30.31	34.77	-6.61

Antenna gain (dBi) 11.16

CAT-M1 Band 13_Uplink frequency band : 777 to 787 MHz											
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB allocation	RB Start	Index	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
5	23205	779.5	QPSK	6	0	0	20.27	29.28	**31.43**	34.77	-5.49
	23205	779.5	16QAM	5	0	0	20.16	29.17	31.32	34.77	-5.60

Antenna gain (dBi) 10

M1 Band 25_Uplink frequency band : 1850 to 1915 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Index	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	26047	1850.7	QPSK	6	0	0	20.79	**30.79**	33	-2.21
	26047	1850.7	16QAM	5	0	0	20.56	30.56	33	-2.44

Antenna gain (dBi) 11.36

M1 Band 26_Uplink frequency band : 824 to 849 MHz											
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Index	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
1.4	26797	824.7	QPSK	6	0	0	20.09	29.30	**31.45**	38.45	-9.15
	26797	824.7	16QAM	5	0	0	19.07	28.28	**30.43**	38.45	-10.17

Antenna gain (dBi) 11.36

Part 90S_Band 26_Uplink frequency band : 814 to 824 MHz											
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Index	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
1.4	26697	814.7	QPSK	6	0	0	19.99	29.20	**31.35**	50	-20.80
	26697	814.7	16QAM	5	0	0	18.99	28.20	**30.35**	50	-21.80

Antenna gain (dBi) 4

M1 Band 66_Uplink frequency band : 1710 to 1780 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Index	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	131979	1710.7	QPSK	6	0	0	23.33	**27.33**	30	-2.67
	131979	1710.7	16QAM	5	0	0	22.95	**26.95**	30	-3.05

Antenna gain (dBi) 0.4

M1 Band 71_Uplink frequency band : 663 to 698 MHz											
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Index	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
5	133147	665.5	QPSK	6	0	0	23.86	**22.11**	24.26	34.77	-12.66
	133147	665.5	16QAM	5	0	0	23.68	**21.93**	24.08	34.77	-12.84

~ End of Report ~