FCC IC RF EXPOSURE REPORT

For

Communication Module

MODEL NUMBER: 1CQ

FCC ID: VPYLB1CQ

IC : 772C-LB1CQ

REPORT NUMBER: 4788296310-10

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Prepared for

Murata Manufacturing Co.,Ltd.

Prepared by

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Murata Manufacturing Co.,Ltd.
Address:	10-1,Higashikotari 1-chome,Nagaokakyo-shi,Kyoto 617-8555,Japan

Manufacturer Information

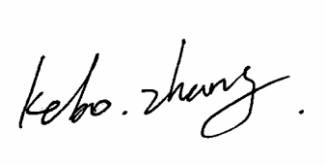
Company Name:	Murata Manufacturing Co.,Ltd.
Address:	10-1,Higashikotari 1-chome,Nagaokakyo-shi,Kyoto 617-8555,Japan

EUT Description

Product Name	Communication Module
Model Name	1CQ
Sample ID	1468264
Sample Status	Good
Sample Received date	March 8, 2018
Date Tested	March 8~November 4, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC 47CFR§2.1091	Complies
KDB-447498 D01 V06	

Tested By:



Kebo Zhang
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Laboratory Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 447498 D01 General RF Exposure Guidance v06.

3. FACILITIES AND ACCREDITATION

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules **IC(Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011

Note:

1. All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
2. The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.
3. For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OATS.

4. REQUIREMENT

LIMIT

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f2)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/150	30
1500-100,000	--	--	1.0	30
Note 1: f = frequency in MHz, * means Plane-wave equivalent power density				
Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.				
Note 3: The limit value 1.0mW/cm^2 is available for this EUT.				

MPE CALCULATION METHOD

$S = PG/(4\pi R^2)$

where: S = power density (in appropriate units, e.g. mW/ cm2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

CALCULATED RESULTS

Radio Frequency Radiation Exposure Evaluation

Bluetooth (Worst case)							
Operating Mode	Output Power	Tune up tolerance	Max. Tune up Power	Antenna Gain		Power density	Limit
	(dBm)	(dBm)	(dBm)	(dBi)	(num)	(mW/ cm^2)	
BT4.1+EDR	8.72	9±1	10	0	1	0.0020	1
BT4.2 LE	0.67	0.5±1	1.5	0	1	0.0003	1

WIFI2.4G (Worst case)							
Operating Mode	Output Power	Tune up tolerance	Max. Tune up Power	Antenna Gain		Power density	Limit
	(dBm)	(dBm)	(dBm)	(dBi)	(num)	(mW/ cm^2)	
802.11b - ANT 1	17.08	17±1	18	0	1	0.0126	1
802.11b - ANT 2	17.03	17±1	18	0	1	0.0126	1
802.11b - ANT 1+2	20.01	20±1	21	3.01	2	0.0501	1
802.11g - ANT 1	14.17	14.0±1	15	0	1	0.0063	1
802.11g - ANT 2	14.42	14.5±1	15.5	0	1	0.0071	1
802.11g - ANT 1+2	17.01	17.0±1	18	3.01	2	0.0251	1
802.11n20 - ANT 1	13.03	13.0±1	14.0	0	1	0.0050	1
802.11n20 – ANT 2	13.53	13.5±1	14.5	0	1	0.0056	1
802.11n20 – ANT1+2 (MIMO)	16.30	16.5±1	17.5	3.01	2	0.0224	1
802.11n40 - ANT 1	12.86	13.0±1	14	0	1	0.0050	1
802.11n40 – ANT 2	13.07	13.0±1	14	0	1	0.0050	1
802.11n40 – ANT1+2 (MIMO)	15.84	16±1	17	3.01	2	0.0199	1

WIFI5G (Worst case)							
Operating Mode	Output Power	Tune up tolerance	Max. Tune up Power	Antenna Gain		Power density	Limit
	(dBm)	(dBm)	(dBm)	(dBi)	(num)	(mW/ cm^2)	
802.11a-ANT 1	14.60	14.5±1	15.5	0	1	0.0071	1
802.11a-ANT 2	14.42	14.5±1	15.5	0	1	0.0071	1
802.11a-ANT 1+2	17.52	17.5±1	18.5	3.01	2	0.0282	1
802.11ac20 - ANT 1	13.55	13.5±1	14.5	0	1	0.0056	1
802.11ac20 - ANT 2	13.10	13.0±1	14.0	0	1	0.0050	1
802.11ac20 (ANT 1+2) MIMO	16.34	16.5±1	17.5	3.01	2	0.0224	1
802.11ac40 - ANT 1	13.48	13.5±1	14.5	0	1	0.0056	1
802.11ac40 - ANT 2	13.33	13.5±1	14.5	0	1	0.0056	1
802.11ac40 (ANT1+2) MIMO	16.35	16.5±1	17.5	3.01	2	0.0224	1
802.11ac80 - ANT 1	11.46	11.5±1	12.5	0	1	0.0035	1
802.11ac80 - ANT 2	11.08	11.0±1	12.0	0	1	0.0032	1
802.11ac80 (ANT 1+2) MIMO	14.15	14.0±1	15.0	3.01	2	0.0126	1

Note:

1. the calculated distance is 20cm.

2. For this product, it has two antennas, antenna1 and antenna2, it can transmit at the same time during work at 802.11b & 802.11g & 802.11n20 & 802.11n40 & 802.11a & 802.11ac20 & 802.11ac40 & 802.11ac80 modes, but only the 802.11n20 & 802.11n40 & 802.11ac20 & 802.11ac40 & 802.11ac80 modes support the MIMO technical.

END OF REPORT