



RF EXPOSURE EVALUATION REPORT

FCC ID : J9C-M2X35
Equipment : Module
Brand Name : Qualcomm
Model Name : M2X35
Applicant : Qualcomm Technologies, Inc.
5775 Morehouse Drive, San Diego, California 92121, United States
Manufacturer : Qualcomm Technologies, Inc.
5775 Morehouse Drive, San Diego, California 92121, United States
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager



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1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Module
Brand Name	Qualcomm
Model Name	M2X35
FCC ID	J9C-M2X35
Wireless Technology and Frequency Range	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz LTE Band 43: 3700 MHz ~ 3800 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 70: 1695 MHz ~ 1710 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n13: 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n70 : 1695 MHz ~ 1710 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz RedCap NR n2: 1850 MHz ~ 1910 MHz RedCap NR n5: 824 MHz ~ 849 MHz RedCap NR n7: 2500 MHz ~ 2570 MHz RedCap NR n12: 699 MHz ~ 716 MHz RedCap NR n25: 1850 MHz ~ 1915 MHz RedCap NR n41: 2496 MHz ~ 2690 MHz RedCap NR n66: 1710 MHz ~ 1780 MHz RedCap NR n71: 663 MHz ~ 698 MHz RedCap NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz
Mode	LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM

Reviewed by: Jason Wang

Report Producer: Daisy Peng



2. Maximum RF average output power among production units

Mode	Band Number	Maximum Average Power (dBm)
LTE	B2	24.50
LTE	B4	24.50
LTE	B5	24.50
LTE	B7	24.00
LTE	B12	24.50
LTE	B13	24.50
LTE	B14	24.50
LTE	B17	24.50
LTE	B25	24.50
LTE	B26	24.50
LTE	B30	23.00
LTE	B38	24.50
LTE	B41_PC3	25.00
LTE	B41_PC2	27.00
LTE	B42_PC3	24.50
LTE	B42_PC2	26.50
LTE	B43	24.50
LTE	B48	22.50
LTE	B66	24.50
LTE	B70	24.50
LTE	B71	24.50
FR1	n2	25.00
FR1	n5	24.60
FR1	n7	24.00
FR1	n12	24.50
FR1	n13	24.50
FR1	n14	24.50
FR1	n25	25.00
FR1	n26	24.60
FR1	n30	23.00
FR1	n38	25.00
FR1	n41_PC3	25.20
FR1	n41_PC2	27.20
FR1	n48	23.00
FR1	n66	24.80
FR1	n70	24.80
FR1	n71	24.50
FR1	n77_PC3_27O	24.50
FR1	n77_PC3_27Q	25.50
FR1	n77_PC2_27O	26.50
FR1	n77_PC2_27Q	27.50
FR1	n78_PC3_27O	24.50
FR1	n78_PC3_27Q	25.50
FR1	n78_PC2_27O	26.50
FR1	n78_PC2_27Q	27.50



Mode	Band Number	Maximum Average Power (dBm)
RedCap FR1	n2	25.00
RedCap FR1	n5	24.60
RedCap FR1	n7	24.00
RedCap FR1	n12	24.50
RedCap FR1	n25	25.00
RedCap FR1	n41_PC3	25.20
RedCap FR1	n66	24.80
RedCap FR1	n71	24.50
RedCap FR1	n78_PC3_27O	24.50
RedCap FR1	n78_PC3_27Q	25.50



3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Table with 5 columns: Frequency range (MHz), Electric field strength (V/m), Magnetic field strength (A/m), Power density (mW/cm²), Averaging time (minutes). It is divided into two sections: (A) Limits for Occupational/Controlled Exposures and (B) Limits for General Population/Uncontrolled Exposure.

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

S = PG / (4πR²)

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum ERP (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum ERP Limit (W)	Maximum EIRP Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
LTE Band 2	8.00	24.50	30.350	1.084	32.500	1.778		2.000	1778.279	0.354	1.000
LTE Band 4	5.00	24.50	27.350	0.543	29.500	0.891		1.000	891.251	0.177	1.000
LTE Band 5	6.00	24.50	28.350	0.684	30.500	1.122	7.000		1122.018	0.223	0.549
LTE Band 7	7.80	24.00	29.650	0.923	31.800	1.514		2.000	1513.561	0.301	1.000
LTE Band 12	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.466
LTE Band 13	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.518
LTE Band 14	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.525
LTE Band 17	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.469
LTE Band 25	8.00	24.50	30.350	1.084	32.500	1.778		2.000	1778.279	0.354	1.000
LTE Band 26	6.00	24.50	28.350	0.684	30.500	1.122	7.000		1122.018	0.223	0.543
LTE Band 30	0.98	23.00	21.830	0.152	23.980	0.250		0.250	250.035	0.050	1.000
LTE Band 38	7.80	24.50	30.150	1.035	32.300	1.698		2.000	1698.244	0.338	1.000
LTE Band 41_PC3	7.80	25.00	30.650	1.161	32.800	1.905		2.000	1905.461	0.379	1.000
LTE Band 41_PC2	5.80	27.00	30.650	1.161	32.800	1.905		2.000	1905.461	0.379	1.000
LTE Band 42_PC3	5.50	24.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
LTE Band 42_PC2	3.50	26.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
LTE Band 43	5.50	24.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
LTE Band 48	0.00	22.50	20.350	0.108	22.500	0.178		0.200	177.828	0.035	1.000
LTE Band 66	5.00	24.50	27.350	0.543	29.500	0.891		1.000	891.251	0.177	1.000
LTE Band 70	5.20	24.50	27.550	0.569	29.700	0.933		1.000	933.254	0.186	1.000
LTE Band 71	5.50	24.50	27.850	0.610	30.000	1.000	3.000		1000.000	0.199	0.442
5G NR n2	8.00	25.00	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
5G NR n5	6.00	24.60	28.450	0.700	30.600	1.148	7.000		1148.154	0.229	0.549
5G NR n7	7.80	24.00	29.650	0.923	31.800	1.514		2.000	1513.561	0.301	1.000
5G NR n12	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.466
5G NR n13	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.518
5G NR n14	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.525
5G NR n25	8.00	25.00	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
5G NR n26	6.00	24.60	28.450	0.700	30.600	1.148	7.000		1148.154	0.229	0.543
5G NR n30	0.98	23.00	21.830	0.152	23.980	0.250		0.250	250.035	0.050	1.000
5G NR n38	7.80	25.00	30.650	1.161	32.800	1.905		2.000	1905.461	0.379	1.000
5G NR n41_PC3	7.80	25.20	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
5G NR n41_PC2	5.80	27.20	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
5G NR n48	0.00	23.00	20.850	0.122	23.000	0.200		0.200	199.526	0.040	1.000
5G NR n66	5.00	24.80	27.650	0.582	29.800	0.955		1.000	954.993	0.190	1.000
5G NR n70	5.20	24.80	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n71	5.50	24.50	27.850	0.610	30.000	1.000	3.000		1000.000	0.199	0.442
5G NR n77_PC3_27O	5.50	24.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n77_PC3_27Q	4.50	25.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n77_PC2_27O	3.50	26.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n77_PC2_27Q	2.50	27.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n78_PC3_27O	5.50	24.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n78_PC3_27Q	4.50	25.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n78_PC2_27O	3.50	26.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n78_PC2_27Q	2.50	27.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000



RF EXPOSURE EVALUATION REPORT

Report No. : FA422321-02

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum ERP (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum ERP Limit (W)	Maximum EIRP Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
RedCap NR n2	8.00	25.00	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
RedCap NR n5	6.00	24.60	28.450	0.700	30.600	1.148	7.000	7.000	1148.154	0.229	0.549
RedCap NR n7	7.80	24.00	29.650	0.923	31.800	1.514		2.000	1513.561	0.301	1.000
RedCap NR n12	6.00	24.50	28.350	0.684	30.500	1.122	3.000		1122.018	0.223	0.466
RedCap NR n25	8.00	25.00	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
RedCap NR n41_PC3	7.80	25.20	30.850	1.216	33.000	1.995		2.000	1995.262	0.397	1.000
RedCap NR n66	5.00	24.80	27.650	0.582	29.800	0.955		1.000	954.993	0.190	1.000
RedCap NR n71	5.50	24.50	27.850	0.610	30.000	1.000	3.000		1000.000	0.199	0.442
5G NR n78_PC3_27O	5.50	24.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000
5G NR n78_PC3_27Q	4.50	25.50	27.850	0.610	30.000	1.000		1.000	1000.000	0.199	1.000



4.2. Collocated Power Density Calculation

Note:

- 1. This MPE analysis is applicable to any collocated transmitters, with the maximum EIRP for WLAN assumed to be 30 dBm and the maximum EIRP for BT assumed to be 20 dBm.

Table with 9 columns: Band, Antenna Gain (dBi), Maximum Power (dBm), Maximum EIRP (dBm), Maximum EIRP (W), Average EIRP (mW), Power Density at 20cm (mW/cm^2), Limit (mW/cm^2), Power Density / Limit. Rows include LTE Bands 2-71 and 5G NR bands n2-n71 and PC3/PC2 variants.

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
RedCap NR n2	6.00	25.00	31.0	1.26	1258.93	0.251	1.000	0.251
RedCap NR n5	4.00	24.60	28.6	0.72	724.44	0.144	0.549	0.262
RedCap NR n7	6.90	24.00	30.9	1.23	1230.27	0.245	1.000	0.245
RedCap NR n12	3.50	24.50	28.0	0.63	630.96	0.126	0.466	0.270
RedCap NR n25	6.00	25.00	31.0	1.26	1258.93	0.251	1.000	0.251
RedCap NR n41_PC3	6.90	25.20	32.1	1.62	1621.81	0.323	1.000	0.323
RedCap NR n66	5.00	24.80	29.8	0.95	954.99	0.190	1.000	0.190
RedCap NR n71	3.50	24.50	28.0	0.63	630.96	0.126	0.442	0.284
5G NR n78_PC3_270	5.50	24.50	30.0	1.00	1000.00	0.199	1.000	0.199
5G NR n78_PC3_27Q	4.50	25.50	30.0	1.00	1000.00	0.199	1.000	0.199
WLAN2.4GHz Band			30.0	1.00	1000.00	0.199	1.000	0.199
WLAN5GHz Band			30.0	1.00	1000.00	0.199	1.000	0.199
Bluetooth			20.0	0.10	100.00	0.020	1.000	0.020

Maximum WWAN Power Density / Limit	Maximum WLAN Power Density / Limit	Maximum Bluetooth Power Density / Limit	Σ(Power Density / Limit) of WWAN + WLAN + Bluetooth
0.323	0.199	0.020	0.542

Note:

- The device implanted DPS (Dynamic Power Share) function to achieve higher uplink data rate keeping the total power unchanged in 5G NR NSA EN-DC mode according to 3GPP 38.213, when the equipment has a dynamic power sharing capability, it adjusts the LTE or NR transmission power so that the instantaneous total power does not exceed the specified value, when the maximum transmission power of NR (P_{LTE}, P_{NR}) and the specified total power (P_{total}) have been set and the instantaneous calculated total transmission power exceeds P_{total}, the NR transmission power is reduced so that the actual transmission power of the user equipment will not exceed P_{total} power.
- Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)], for WWAN + WLAN + Bluetooth.
- Considering the WWAN module collocation with the WLAN and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of all collocated transmitters is compliant.



Conclusion:

Based on FCC 47 CFR §2.1901, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Band	Maximum Conducted Power (dBm)	Stanalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
M2X35	LTE	LTE Band 2	24.50	8.00	6.00
		LTE Band 4	24.50	5.00	5.00
		LTE Band 5	24.50	6.00	4.00
		LTE Band 7	24.00	7.80	6.90
		LTE Band 12	24.50	6.00	3.50
		LTE Band 13	24.50	6.00	4.00
		LTE Band 14	24.50	6.00	4.00
		LTE Band 17	24.50	6.00	3.50
		LTE Band 25	24.50	8.00	6.00
		LTE Band 26	24.50	6.00	4.00
		LTE Band 30	23.00	0.98	0.98
		LTE Band 38	24.50	7.80	6.90
		LTE Band 41_PC3	25.00	7.80	6.90
		LTE Band 41_PC2	27.00	5.80	4.90
		LTE Band 42_PC3	24.50	5.50	5.50
		LTE Band 42_PC2	26.50	3.50	3.50
		LTE Band 43	24.50	5.50	5.50
	LTE Band 48	22.50	0.00	0.00	
	LTE Band 66	24.50	5.00	5.00	
	LTE Band 70	24.50	5.20	5.20	
	LTE Band 71	24.50	5.50	3.50	
	FR1	5G NR n2	25.00	8.00	6.00
		5G NR n5	24.60	6.00	4.00
		5G NR n7	24.00	7.80	6.90
		5G NR n12	24.50	6.00	3.50
		5G NR n13	24.50	6.00	4.00
		5G NR n14	24.50	6.00	4.00
		5G NR n25	25.00	8.00	6.00
		5G NR n26	24.60	6.00	4.00
		5G NR n30	23.00	0.98	0.98
		5G NR n38	25.00	7.80	6.90
		5G NR n41_PC3	25.20	7.80	6.90
		5G NR n41_PC2	27.20	5.80	4.90
		5G NR n48	23.00	0.00	0.00
		5G NR n66	24.80	5.00	5.00
		5G NR n70	24.80	5.20	5.20
		5G NR n71	24.50	5.50	3.50
		5G NR n77_PC3_27O	24.50	5.50	5.50
	5G NR n77_PC3_27Q	25.50	4.50	4.50	
	5G NR n77_PC2_27O	26.50	3.50	3.50	
	5G NR n77_PC2_27Q	27.50	2.50	2.50	
	5G NR n78_PC3_27O	24.50	5.50	5.50	
	5G NR n78_PC3_27Q	25.50	4.50	4.50	
	5G NR n78_PC2_27O	26.50	3.50	3.50	
	5G NR n78_PC2_27Q	27.50	2.50	2.50	
	RedCap NR	RedCap NR n2	25.00	8.00	6.00
		RedCap NR n5	24.60	6.00	4.00
RedCap NR n7		24.00	7.80	6.90	
RedCap NR n12		24.50	6.00	3.50	
RedCap NR n25		25.00	8.00	6.00	
RedCap NR n41_PC3		25.20	7.80	6.90	
RedCap NR n66		24.80	5.00	5.00	
RedCap NR n71		24.50	5.50	3.50	
5G NR n78_PC3_27O		24.50	5.50	5.50	
5G NR n78_PC3_27Q	25.50	4.50	4.50		