



TESTING LABORATORY  
CERTIFICATE#4323.01



## FCC PART 15B

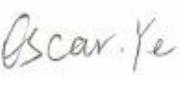
### TEST REPORT

For

**CMC Group, Inc.**

12836 S Dixie Hwy, Bowling Green, Ohio, 43402 United States

**FCC ID: 2AOCU-MATT77**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Label Printer
<b>Test Engineer:</b> <u>Jett Zhao</u> 	
<b>Report Number:</b> <u>RXM191029050-00C</u>	
<b>Report Date:</b> <u>2019-11-26</u>	
<b>Reviewed By:</b> <u>Oscar Ye</u> <u>EMC Manager</u>	
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant	CMC Group, Inc.
Test Model	MATT77
Product	Label Printer
Rate Voltage	DC 24V from adapter
Highest Operation Frequency	2480MHz

#### *Adapter Information:*

*Model: DJ-240250-SA*

*Input: AC100-240V 50/60Hz 1.5A*

*Output: 24V, 2.5A*

*\* All measurement and test data in this report was gathered from production sample serial number: 20191029050. (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2019-10-29.*

### Objective

This report is prepared on behalf of *CMC Group, Inc.* in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15, Class B devices.

### Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS&FCC Part 15.247 DSS submissions with FCC ID: 2AOCU-MATT77

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

*Test Mode1: USB print*

*Test Mode2: Bluetooth print*

### EUT Exercise Software

"Label printer Tool"

### Special Accessories

No special accessory was used.

### Equipment Modifications

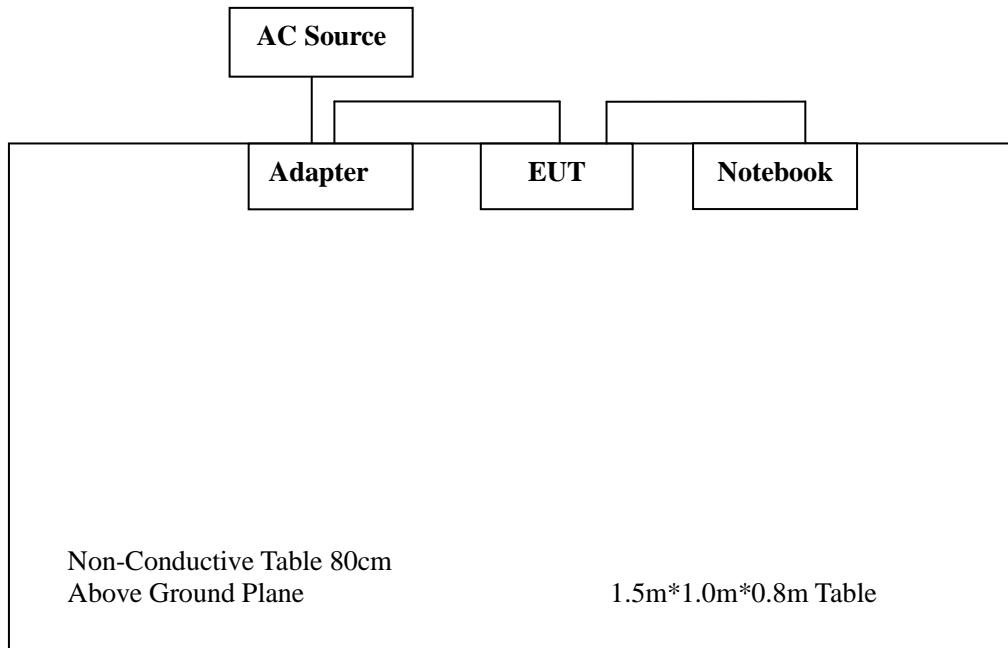
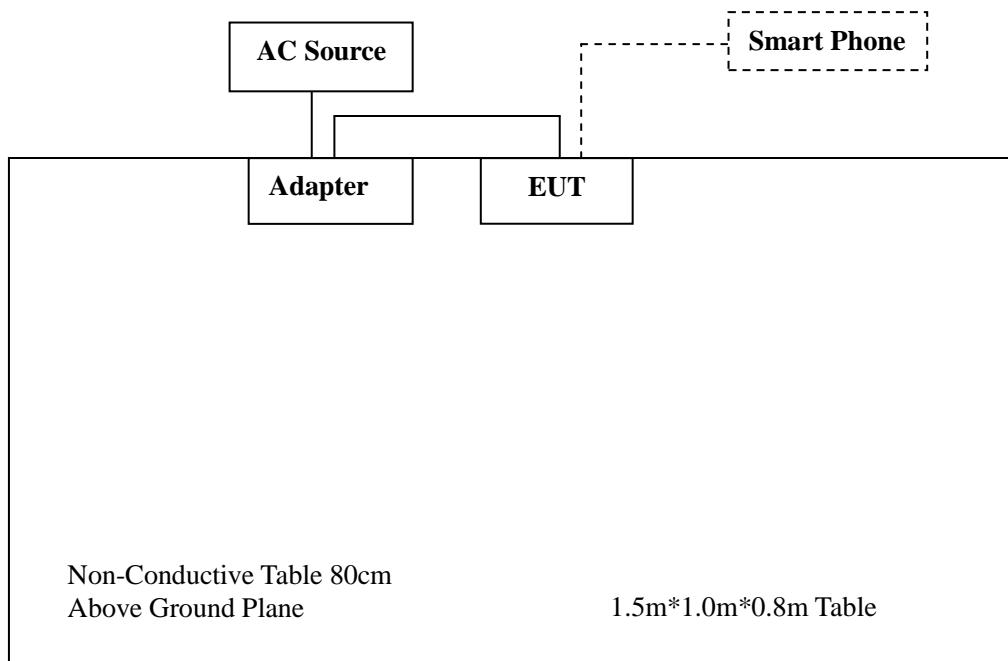
No modification was made to the EUT tested.

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Apple	Smart Phone	5S	/
HP	Notebook	4441s	2CE3130VWY

### External I/O Cable

Cable Description	Length (m)	From/Port	To
USB Cable	1.5	EUT	Computer
Power Cable1	1.0	Adapter	AC Source
Power Cable2	1.0	EUT	Adapter

**Block Diagram of Radiated Test Setup***Test Mode 1**Test Mode 2*

**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant

## FCC §15.107 – CONDUCTED EMISSIONS

### Applicable Standard

According to FCC§15.107

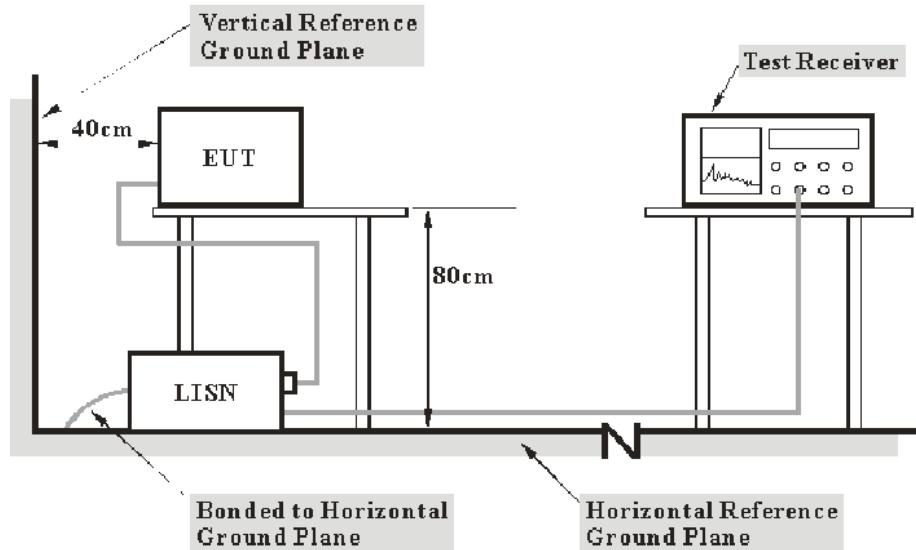
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Item	Measurement Uncertainty	$U_{cispr}$
AMN	150kHz~30MHz	3.19 dB

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### EUT Setup



**Note:**

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

## EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

## Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-08-05	2020-08-04
Rohde & Schwarz	LISN	ENV216	3560655016	2019-08-05	2020-08-04
Audix	Test Software	e3	V9	--	--
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-14	2020-08-13

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## Factor & Over Limit Calculation

The Factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of 7 dB means the emission is 7 dB above the limit. The equation for margin calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

## Test Data

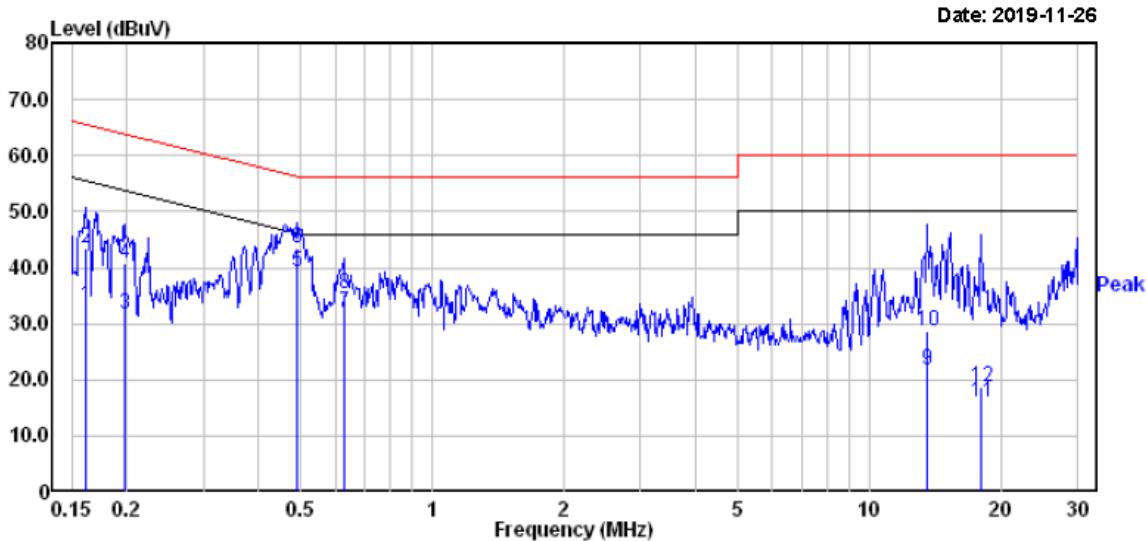
### Environmental Conditions

Temperature:	12°C
Relative Humidity:	52 %
ATM Pressure:	102.0 kPa

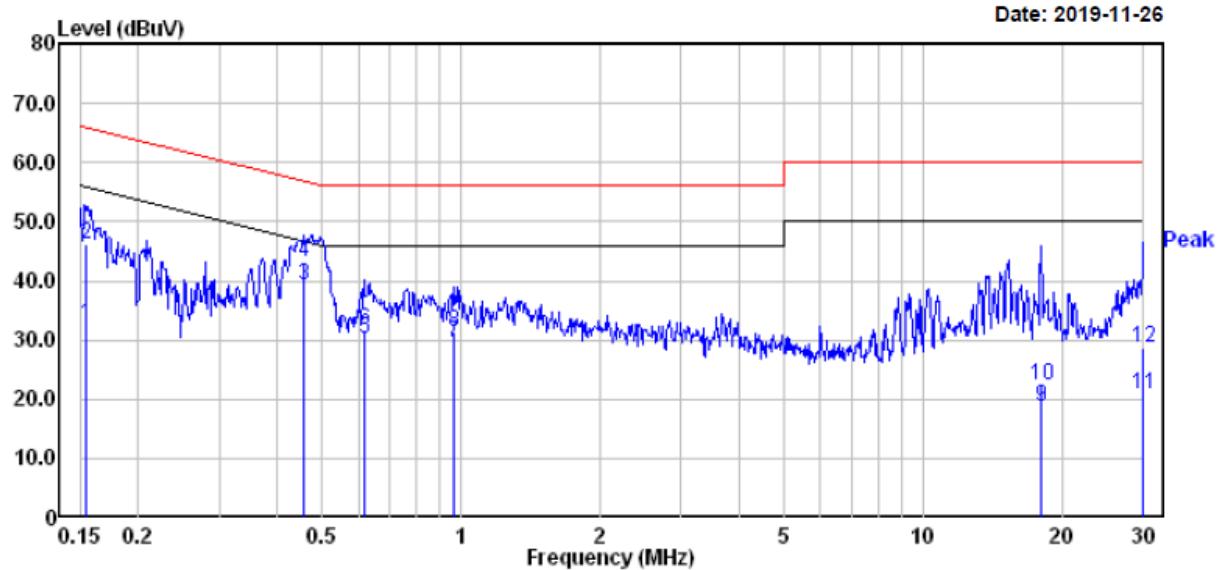
The testing was performed by Jett Zhao on 2019-11-26.

### Test Model

#### Line:



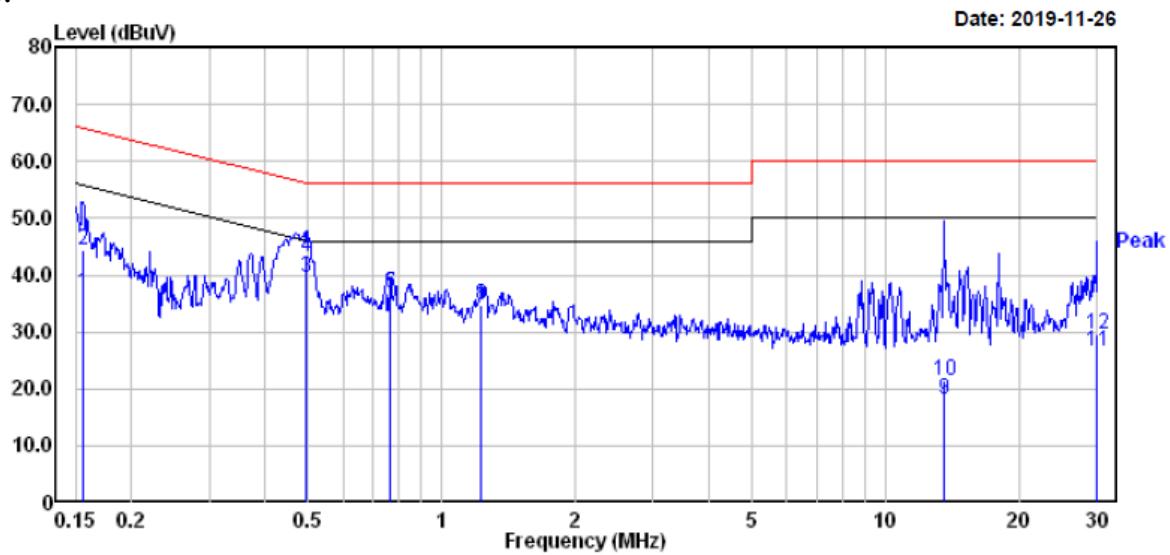
Freq	Read			Limit		Over Limit	Remark
	MHz	Level	Factor	Level	Line		
1	0.161	13.46	19.83	33.29	55.43	-22.14	Average
2	0.161	23.63	19.83	43.46	65.43	-21.97	QP
3	0.198	11.80	19.82	31.62	53.71	-22.09	Average
4	0.198	21.00	19.82	40.82	63.71	-22.89	QP
5	0.492	19.40	19.76	39.16	46.14	-6.98	Average
6	0.492	23.70	19.76	43.46	56.14	-12.68	QP
7	0.627	12.36	19.75	32.11	46.00	-13.89	Average
8	0.627	15.60	19.75	35.35	56.00	-20.65	QP
9	13.551	2.10	19.61	21.71	50.00	-28.29	Average
10	13.551	9.00	19.61	28.61	60.00	-31.39	QP
11	18.039	-3.70	19.84	16.14	50.00	-33.86	Average
12	18.039	-1.20	19.84	18.64	60.00	-41.36	QP

**Neutral:**

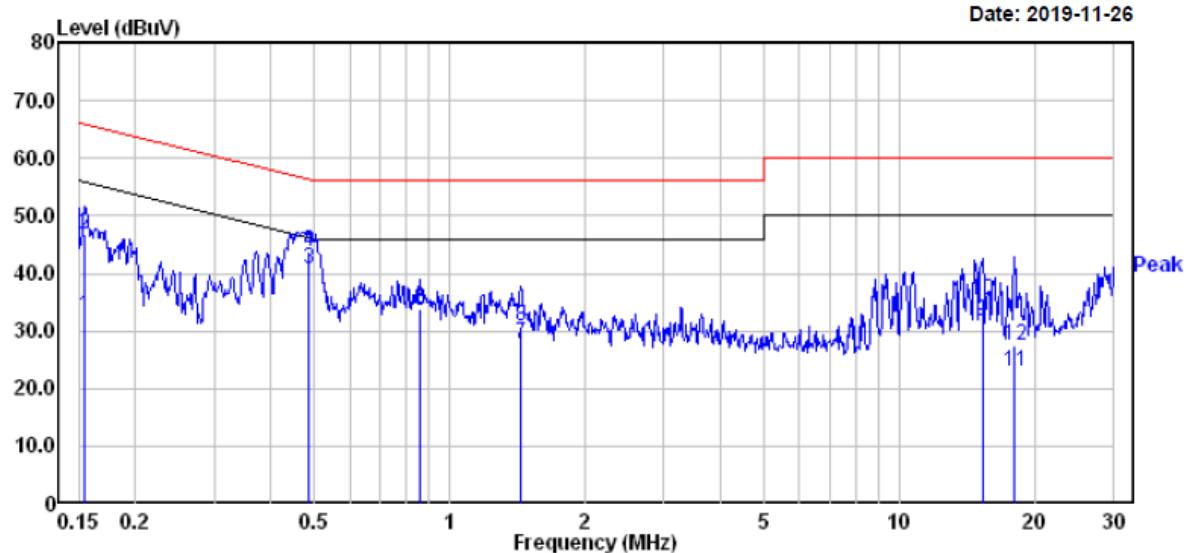
Freq	MHz	Read		Level	Limit	Over	Remark
		Level	Factor				
1	0.154	12.80	19.82	32.62	55.78	-23.16	Average
2	0.154	26.50	19.82	46.32	65.78	-19.46	QP
3	0.456	19.50	19.75	39.25	46.76	-7.51	Average
4	0.456	23.50	19.75	43.25	56.76	-13.51	QP
5	0.617	10.32	19.75	30.07	46.00	-15.93	Average
6	0.617	11.90	19.75	31.65	56.00	-24.35	QP
7	0.968	9.80	19.79	29.59	46.00	-16.41	Average
8	0.968	11.52	19.79	31.31	56.00	-24.69	QP
9	18.039	-1.00	19.84	18.84	50.00	-31.16	Average
10	18.039	2.40	19.84	22.24	60.00	-37.76	QP
11	30.000	1.00	19.78	20.78	50.00	-29.22	Average
12	30.000	9.00	19.78	28.78	60.00	-31.22	QP

Test Mode2

Line:



Freq	Read			Limit		Over	
	MHz	dBuV	Factor	Level	Line	Limit	Remark
1	0.156	16.90	19.82	36.72	55.69	-18.97	Average
2	0.156	24.60	19.82	44.42	65.69	-21.27	QP
3	0.497	19.80	19.76	39.56	46.05	-6.49	Average
4	0.497	23.50	19.76	43.26	56.05	-12.79	QP
5	0.767	17.00	19.72	36.72	46.00	-9.28	Average
6	0.767	17.20	19.72	36.92	56.00	-19.08	QP
7	1.229	14.31	19.81	34.12	46.00	-11.88	Average
8	1.229	14.91	19.81	34.72	56.00	-21.28	QP
9	13.551	-1.40	19.61	18.21	50.00	-31.79	Average
10	13.551	1.70	19.61	21.31	60.00	-38.69	QP
11	30.000	6.90	19.78	26.68	50.00	-23.32	Average
12	30.000	9.70	19.78	29.48	60.00	-30.52	QP

**Neutral:**

Freq	Read			Limit		Over	
	MHz	Level	Factor	Level	Line	Limit	Remark
1	0.155	12.90	19.82	32.72	55.74	-23.02	Average
2	0.155	27.00	19.82	46.82	65.74	-18.92	QP
3	0.486	21.00	19.76	40.76	46.23	-5.47	Average
4	0.486	23.90	19.76	43.66	56.23	-12.57	QP
5	0.857	13.91	19.71	33.62	46.00	-12.38	Average
6	0.857	14.21	19.71	33.92	56.00	-22.08	QP
7	1.441	7.91	19.83	27.74	46.00	-18.26	Average
8	1.441	11.11	19.83	30.94	56.00	-25.06	QP
9	15.307	12.10	19.65	31.75	50.00	-18.25	Average
10	15.307	15.80	19.65	35.45	60.00	-24.55	QP
11	18.039	3.20	19.84	23.04	50.00	-26.96	Average
12	18.039	7.50	19.84	27.34	60.00	-32.66	QP

**Note:**

1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)

2) Over Limit (dB) = Read level (dB $\mu$ V) + Factor (dB) - Limit (dB $\mu$ V)

## FCC §15.109 - RADIATED EMISSIONS

### Applicable Standard

FCC §15.109

### Measurement Uncertainty

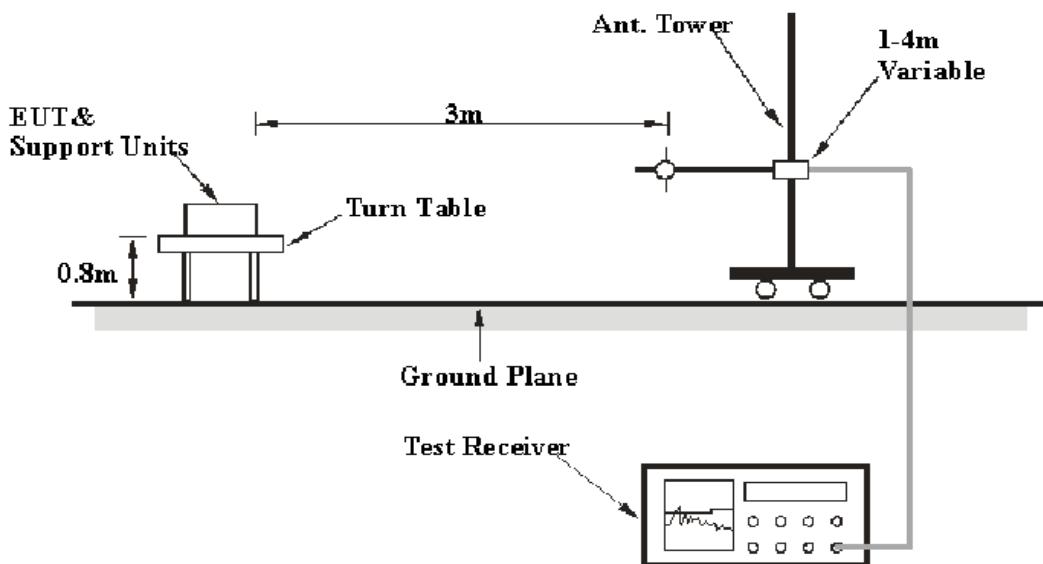
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average) and system repeatability.

Item	Measurement Uncertainty	$U_{cispr}$
Radiated Emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6 GHz ~18 GHz	5.23dB

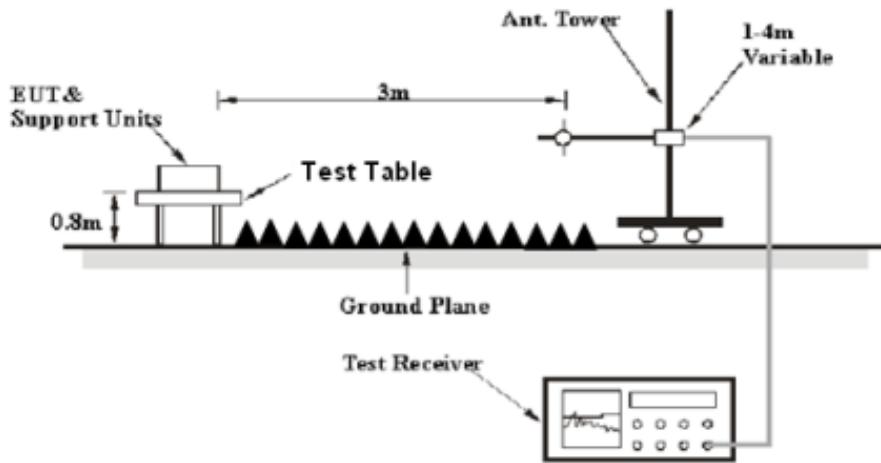
Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

### EMI Test Receiver Setup

The system was investigated from 30 MHz to 18 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	1MHz	AVG

### Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	185700	2019-08-14	2020-08-13
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03 -102454-Qd	2019-08-05	2020-08-04
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2019-01-09	2022-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
Champrotek	Chamber	Chamber B	T-KSEMC080	-	-
Audix	Test Software	e3	V9	--	--
Rohde & Schwarz	Auto test Software	EMC32	100361	-	-
ETS	Horn Antenna	3115	6229	2016-12-12	2019-12-11
Rohde & Schwarz	EMI Receiver	ESU40	100207	2018-05-30	2020-05-29
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
MICRO-COAX	Coaxial Cable	Cable-4	004	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-5	005	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## Factor & Over Limit Calculation(For Below 1 GHz)

The Factor is calculated by adding Antenna Factor, Cable Loss and Amplifier Gain. The basic equation is as follows:

$$\text{Factor (dB)} = \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + \text{Amplifier Gain (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of 7 dB means the emission is 7 dB above the limit. The equation for margin calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

## Corrected Amplitude & Margin Calculation(For Above 1 GHz)

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Data

### Environmental Conditions

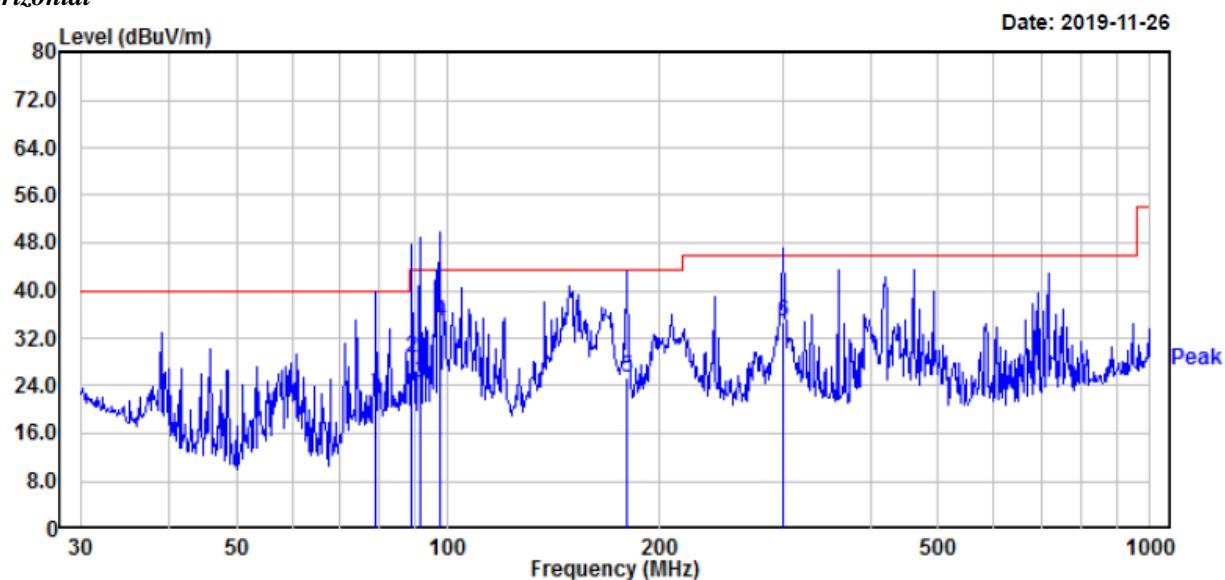
Temperature:	12.0~12.5°C
Relative Humidity:	51~52 %
ATM Pressure:	101.2~102.0kPa

The testing was performed by Jett Zhao from 2019-11-24 to 2019-11-26.

### Test Mode1

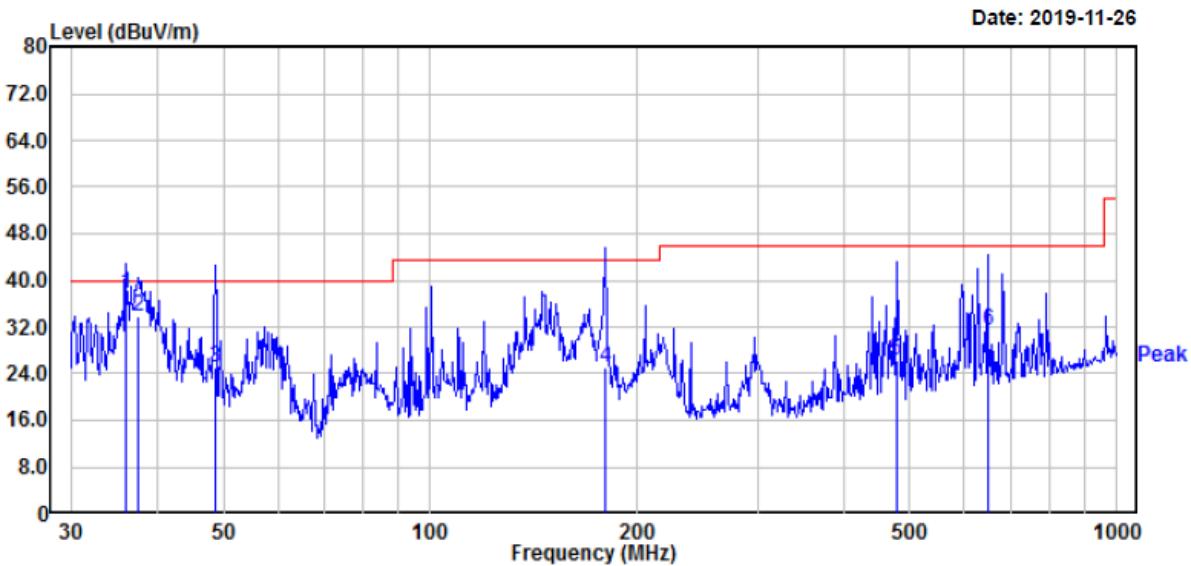
#### Below 1GHz:

##### Horizontal



Freq	Read			Limit Line	Over Limit	APos	TPos	Remark
	Level	Factor	Level					
1	78.97	40.20	-17.14	23.06	40.00	-16.94	200	78 QP
2	88.96	46.00	-17.24	28.76	43.50	-14.74	200	78 QP
3	91.18	41.30	-16.94	24.36	43.50	-19.14	100	266 QP
4	97.46	50.00	-15.29	34.71	43.50	-8.79	200	236 QP
5	180.02	38.30	-13.01	25.29	43.50	-18.21	200	4 QP
6	300.37	45.10	-10.28	34.82	46.00	-11.18	200	4 QP

Note: The peak value higher than the limit in the data is generated by the motor. After multiple tests and verification, the results are consistent.

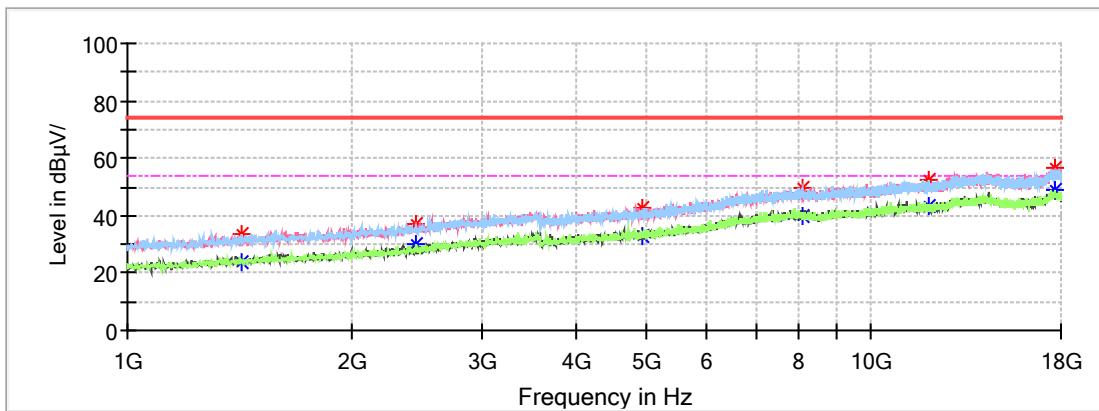
*Vertical*

Freq	Read			Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m				
1	36.00	45.80	-8.12	37.68	40.00	-2.32	100	184 QP
2	37.55	43.29	-9.40	33.89	40.00	-6.11	100	184 QP
3	48.67	41.41	-16.22	25.19	40.00	-14.81	100	85 QP
4	180.02	38.10	-13.01	25.09	43.50	-18.41	100	210 QP
5	477.17	32.29	-6.00	26.29	46.00	-19.71	100	241 QP
6	649.66	34.60	-3.08	31.52	46.00	-14.48	100	241 QP

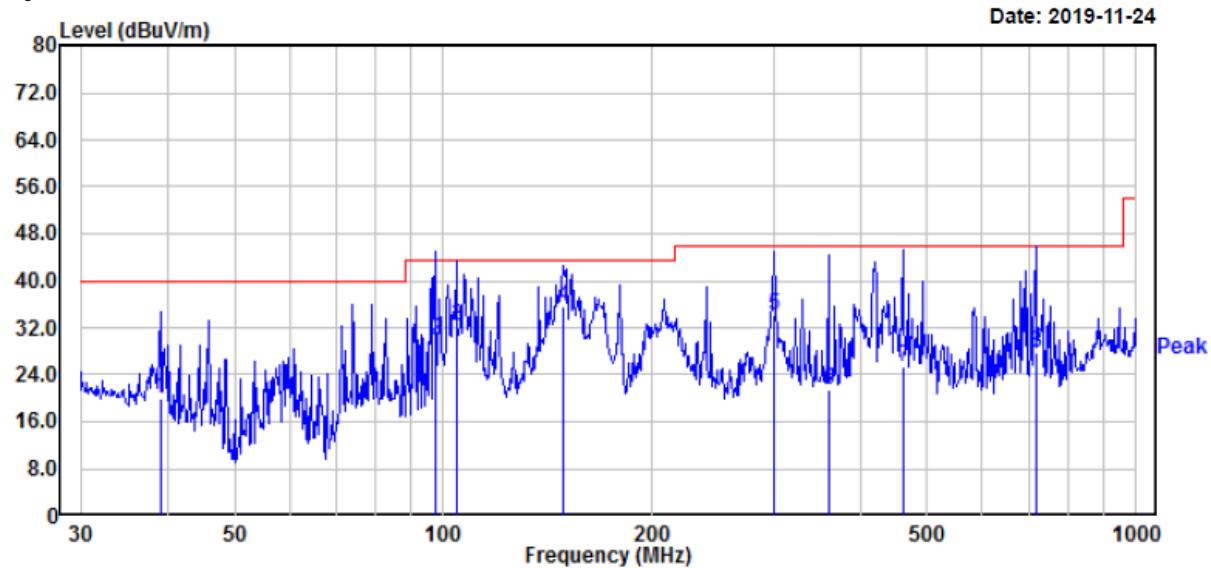
*Note: The peak value higher than the limit in the data is generated by the motor. After multiple tests and verification, the results are consistent.*

**Above 1GHz:**

Full Spectrum

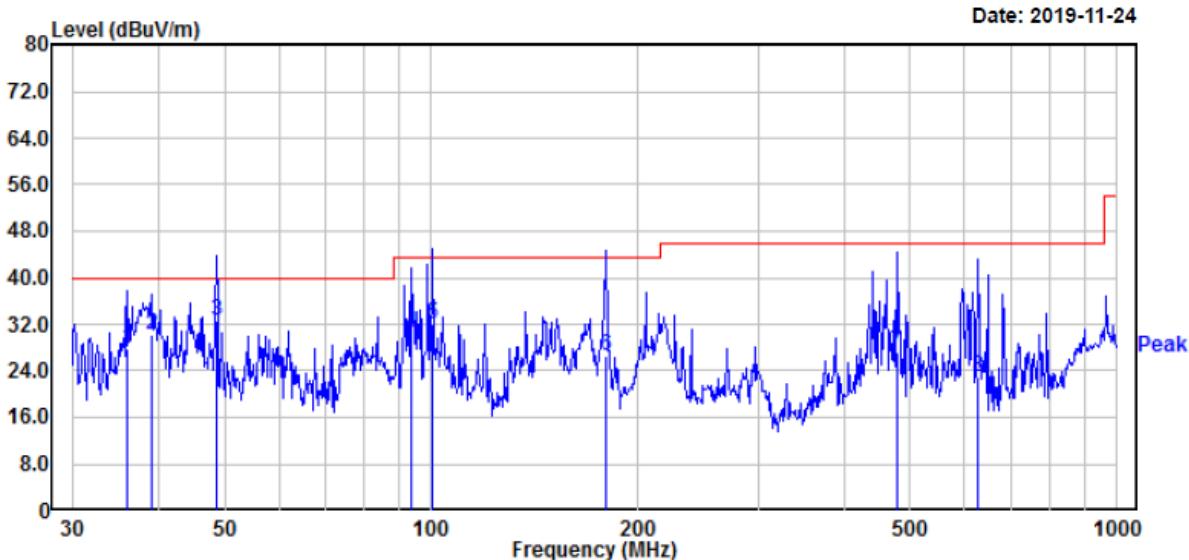


Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1421.600000	---	23.65	54.00	30.35	200.0	H	348.0	-10.4
1421.600000	33.54	---	74.00	40.46	200.0	H	348.0	-10.4
2446.700000	37.03	---	74.00	36.97	100.0	H	328.0	-7.1
2446.700000	---	29.79	54.00	24.21	100.0	H	328.0	-7.1
4932.100000	---	33.21	54.00	20.79	100.0	V	99.0	-0.4
4932.100000	42.82	---	74.00	31.18	100.0	V	99.0	-0.4
8063.500000	---	40.11	54.00	13.89	100.0	H	146.0	7.0
8063.500000	49.80	---	74.00	24.20	100.0	H	146.0	7.0
11976.900000	---	43.40	54.00	10.60	200.0	H	249.0	10.1
11976.900000	52.39	---	74.00	21.61	200.0	H	249.0	10.1
17649.800000	---	49.13	54.00	4.87	100.0	V	75.0	14.0
17649.800000	56.47	---	74.00	17.53	100.0	V	75.0	14.0

*Test Mode 2***Below 1GHz:***Horizontal*

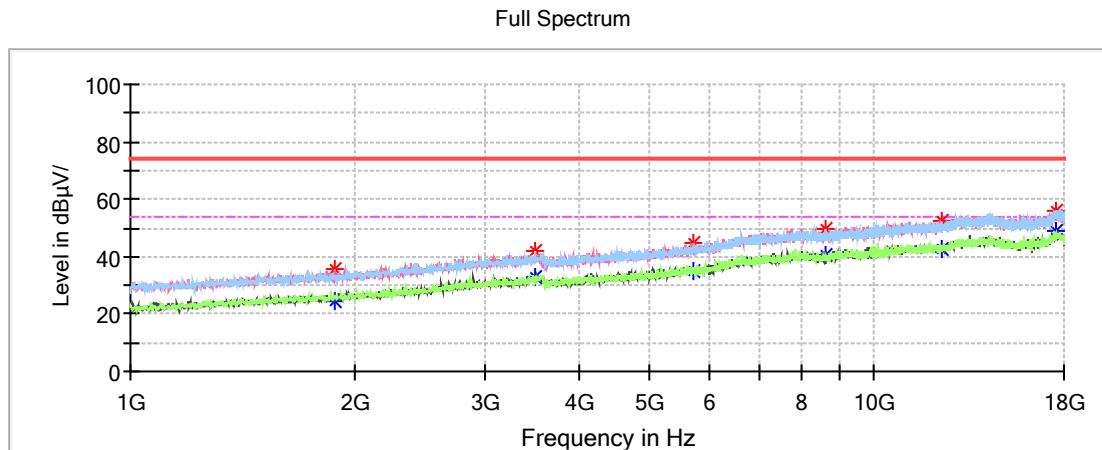
Freq	Read			Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m				
1	39.02	30.45	-10.63	19.82	40.00	-20.18	200	78 QP
2	97.46	45.22	-15.29	29.93	43.50	-13.57	200	236 QP
3	104.54	46.09	-13.71	32.38	43.50	-11.12	100	14 QP
4	148.96	47.56	-11.88	35.68	43.50	-7.82	100	47 QP
5	300.37	44.45	-10.28	34.17	46.00	-11.83	150	7 QP
6	360.45	30.14	-8.81	21.33	46.00	-24.67	100	53 QP
7	460.73	31.72	-6.38	25.34	46.00	-20.66	100	170 QP
8	716.68	29.67	-1.84	27.83	46.00	-18.17	100	220 QP

*Note: The peak value higher than the limit in the data is generated by the motor. After multiple tests and verification, the results are consistent.*

**Vertical**

Freq	Read			Limit	Over	APos	TPos	Remark
	MHz	dBuV	dB/m	Level				
1	36.00	35.85	-8.12	27.73	40.00	-12.27	100	184 QP
2	39.16	40.89	-10.74	30.15	40.00	-9.85	100	184 QP
3	48.67	48.87	-16.22	32.65	40.00	-7.35	100	85 QP
4	93.44	46.90	-16.35	30.55	43.50	-12.95	100	85 QP
5	100.58	46.55	-14.51	32.04	43.50	-11.46	100	184 QP
6	180.02	39.54	-13.01	26.53	43.50	-16.97	100	210 QP
7	477.17	33.29	-6.00	27.29	46.00	-18.71	100	241 QP
8	627.27	26.58	-3.49	23.09	46.00	-22.91	100	241 QP

*Note: The peak value higher than the limit in the data is generated by the motor. After multiple tests and verification, the results are consistent.*

**Above 1GHz:**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1885.700000	---	24.81	54.00	29.19	200.0	V	356.0	-8.6
1885.700000	35.38	---	74.00	38.62	200.0	V	356.0	-8.6
3499.000000	---	32.76	54.00	21.24	100.0	H	39.0	-3.5
3499.000000	41.84	---	74.00	32.16	100.0	H	39.0	-3.5
5702.200000	---	34.71	54.00	19.29	100.0	V	4.0	1.8
5702.200000	44.99	---	74.00	29.01	100.0	V	4.0	1.8
8621.100000	---	40.78	54.00	13.22	100.0	H	140.0	6.6
8621.100000	49.34	---	74.00	24.66	100.0	H	140.0	6.6
12296.500000	---	42.40	54.00	11.60	200.0	V	98.0	10.2
12296.500000	52.44	---	74.00	21.56	200.0	V	98.0	10.2
17588.600000	---	48.67	54.00	5.33	200.0	V	208.0	14.1
17588.600000	56.15	---	74.00	17.85	200.0	V	208.0	14.1

Note:

- 1) Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB) + Amplifier Gain (dB)
- 2) Over Limit (dB) = Read level (dB $\mu$ V) + Factor (dB) - Limit (dB $\mu$ V)

\*\*\*\*\*END OF REPORT\*\*\*\*\*