



# FCC EMI TEST REPORT

Filing Type : Supplier's Declaration Of Conformity  
Equipment : CC2340R5 Launchpad™ Development Kit  
Brand Name : Texas Instruments  
Model Name : LP-EM-CC2340R5  
Marketing Name : LP-EM-CC2340R5  
Applicant : Texas Instruments Incorporated  
12500 TI BLVD., Dallas, Texas, 75243  
Manufacturer : Texas Instruments Incorporated  
12500 TI BLVD., Dallas, Texas, 75243  
Standard : FCC 47 CFR FCC Part 15 Subpart B Class B

The product was received on Mar. 16, 2023 and testing was performed from Mar. 28, 2023 to Mar. 29, 2023. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

*Louis Wu*

Responsible Party (Name) : \_\_\_\_\_

Responsible Party (Title) : \_\_\_\_\_

Approved by: Louis Wu

Responsible Company : \_\_\_\_\_

**Sporton International Inc. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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## History of this test report

Report No.	Version	Description	Issue Date
FD331602	01	Initial issue of report	Apr. 21, 2023

## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	3.12 dB under the limit at 0.175 MHz
3.2	15.109	Radiated Emission	Pass	12.25 dB under the limit at 958.000 MHz

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Uncertainty of Evaluation".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

**Reviewed by: Danny Lee**

**Report Producer: Lea Yu**

# 1. General Description

## 1.1. Product Feature of Equipment Under Test

Product Feature
<b>General Specs</b> Bluetooth LE (125 kbps, 500 kbps, 1 Mbps, 2Mbps)
<b>Antenna Type</b> Bluetooth LE: Inverted F PCB antenna

**Remark:** The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

## 1.2. Modification of EUT

No modifications made to the EUT during the testing.

## 1.3. Test Location

<b>Test Site</b>	Sporton International Inc. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
<b>Test Site No.</b>	<b>Sporton Site No.</b> CO05-HY
<b>Test Site</b>	Sporton International Inc. Wensan Laboratory
<b>Test Site Location</b>	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
<b>Test Site No.</b>	<b>Sporton Site No.</b> 03CH10-HY (TAF Code: 3786)
<b>Remark</b>	The Radiated Emission test item subcontracted to Sporton International Inc. Wensan Laboratory

FCC designation No.: TW1093 and TW1132

## 1.4. Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC 47 CFR FCC Part 15 Subpart B Class B
- ♦ ANSI C63.4-2014

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.

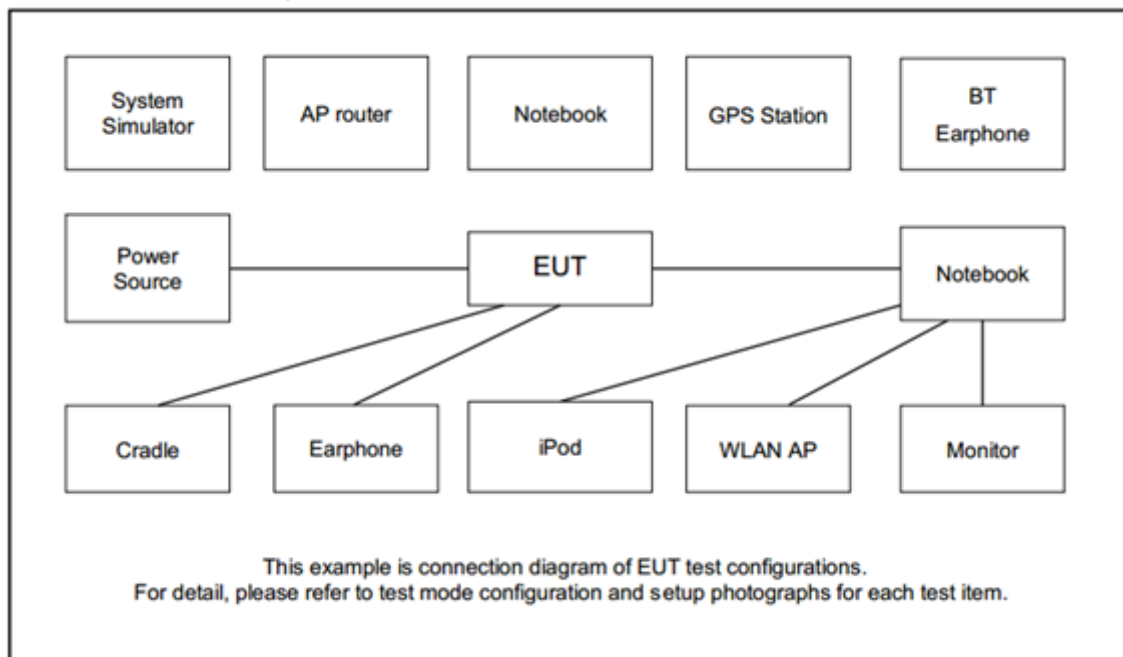
## 2. Test Configuration of Equipment Under Test

### 2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Conduction Emission (150 kHz to 30 MHz), Radiation Emission (30 MHz to the 5<sup>th</sup> harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Functions Enabled
<b>AC Conducted Emission</b>	Mode 1 :Bluetooth - LE RX + USB Cable (Charging from Notebook)
<b>Radiated Emissions</b>	Mode 1 :Bluetooth - LE RX + USB Cable (Charging from Notebook)

### 2.2. Connection Diagram of Test System



## 2.3. Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
2.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
3.	Notebook	Dell	Latitude3400	FCC DoC	Shielded, 0.3 m	AC I/P : Unshielded, 1.2 m DC O/P : Shielded, 1.8 m
4.	Notebook	Dell	Latitude5480	FCC DoC	Shielded, 0.3 m	AC I/P : Unshielded, 1.2 m DC O/P : Shielded, 1.8 m

## 2.4. EUT Operation Test Setup

The RF utility, "SmartRF Studio" was installed in the notebook in order to make the EUT provide functions for continuous receiving signals from Bluetooth - LE.

### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1. Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

<Class B>

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

##### 3.1.2. Measuring Instruments

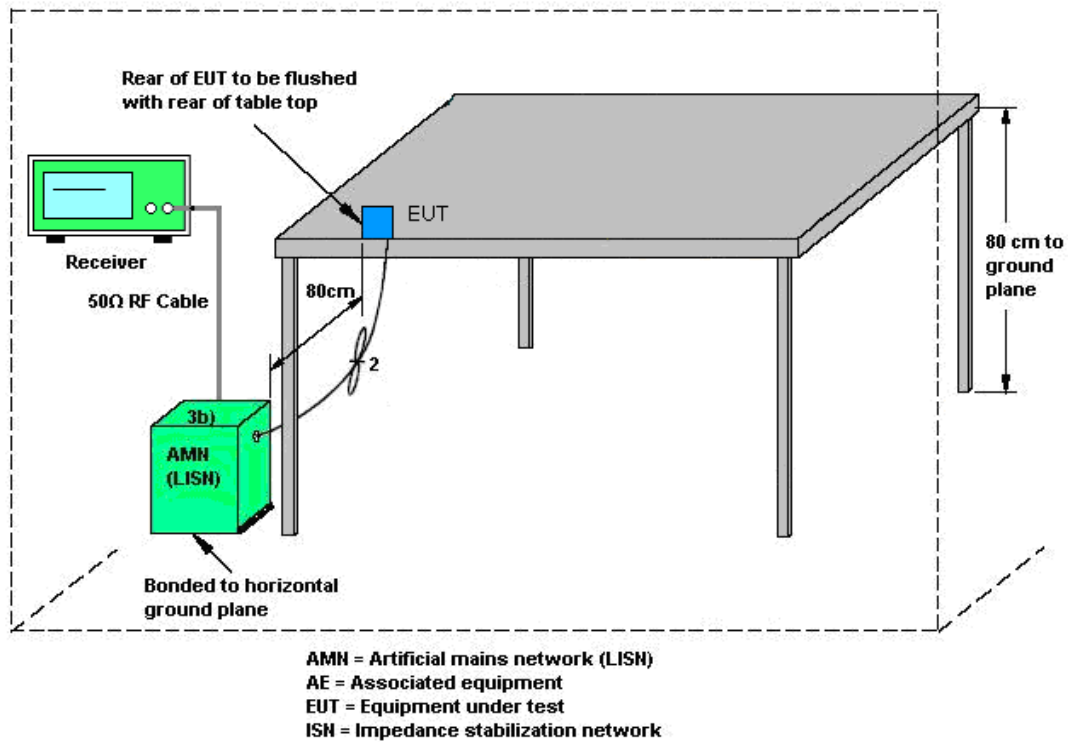
Please refer to the measuring equipment list in this test report.

##### 3.1.3. Test Procedure

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (If Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.



### 3.1.4. Test Setup



### 3.1.5. Test Result of AC Conducted Emission

Please refer to Appendix A.

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.2.2. Measuring Instruments

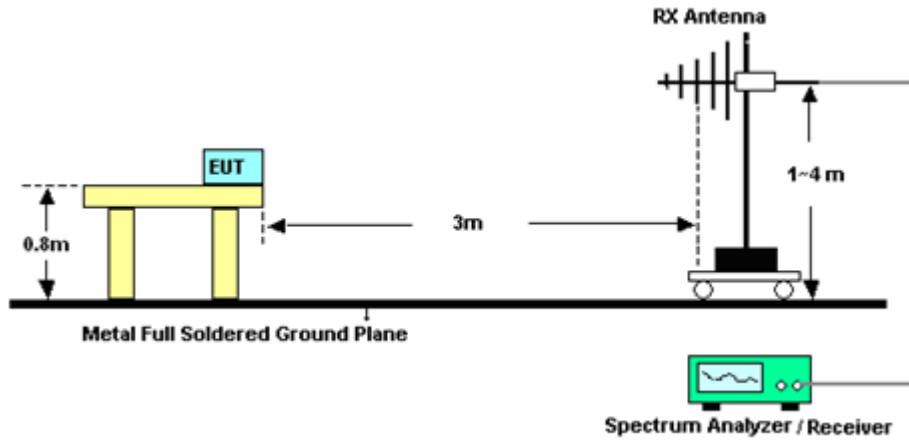
Please refer to the measuring equipment list in this test report.

### 3.2.3. Test Procedures

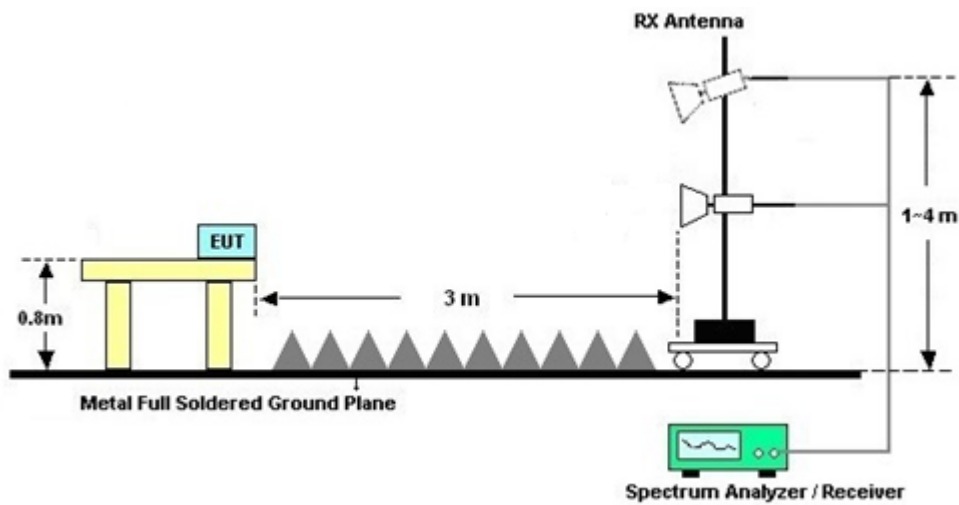
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

### 3.2.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions from 1GHz to 18GHz



### 3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



## 4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Mar. 28, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	Mar. 28, 2023	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2022	Mar. 28, 2023	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 17, 2022	Mar. 28, 2023	Nov. 16, 2023	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Mar. 28, 2023	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Aug. 01, 2022	Mar. 28, 2023	Jul. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	Mar. 28, 2023	Dec. 28, 2023	Conduction (CO05-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 19, 2022	Mar. 29, 2023	Oct. 18, 2023	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	35413 & 02	30MHz~1GHz	Nov. 06, 2022	Mar. 29, 2023	Nov. 05, 2023	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz~18GHz	Oct. 27, 2022	Mar. 29, 2023	Oct. 26, 2023	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800-30-10P	160118550004	1GHz~18GHz	Feb. 27, 2023	Mar. 29, 2023	Feb. 26, 2024	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Mar. 29, 2023	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Mar. 29, 2023	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Mar. 29, 2023	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Keysight	N9038A	MY59053012	3Hz~26.5GHz	Nov. 18, 2022	Mar. 29, 2023	Nov. 17, 2023	Radiation (03CH10-HY)
Signal Analyzer	Keysight	N9010B	MY60241055	10Hz~44GHz	Jul. 22, 2022	Mar. 29, 2023	Jul. 21, 2023	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519226/2, 804014/2, 804026/2	30MHz~40GHz	Nov. 02, 2022	Mar. 29, 2023	Nov. 01, 2023	Radiation (03CH10-HY)

## 5. Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.5 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	6.2 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.6 dB
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### Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.3 dB
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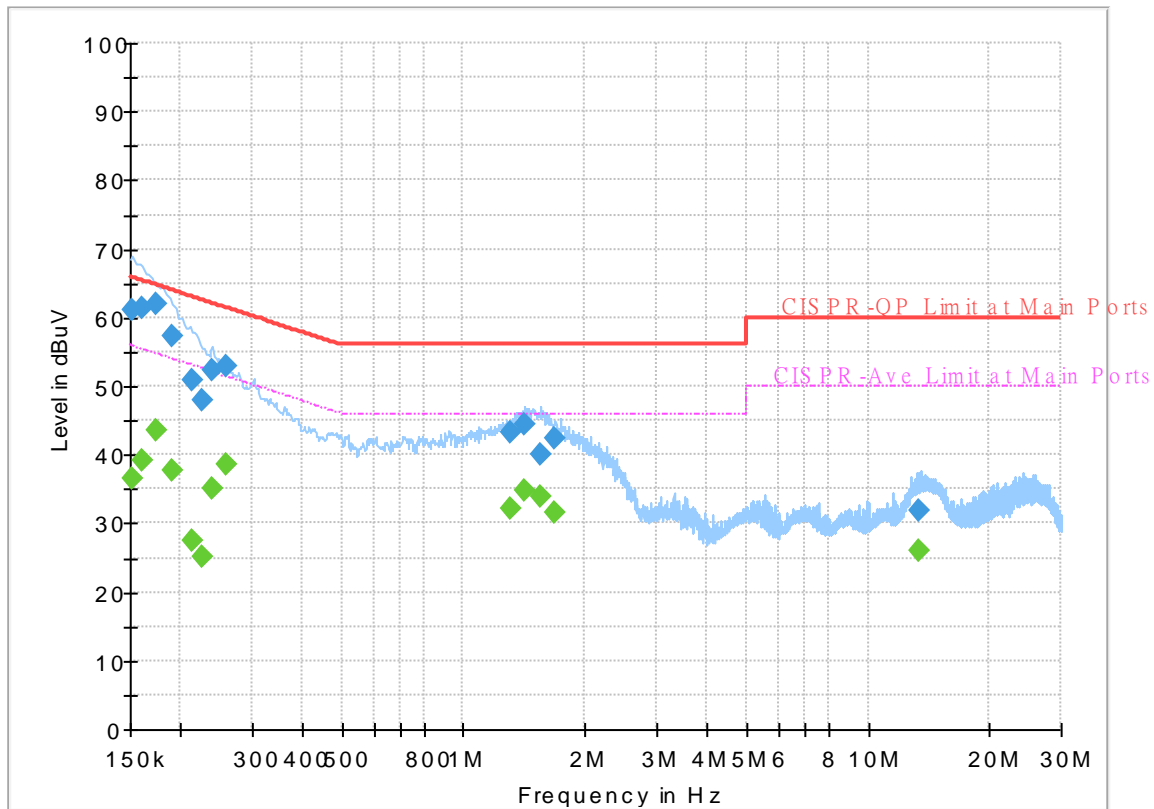
## Appendix A. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	Temperature :	23~26°C
		Relative Humidity :	45~55%

## EUT Information

Report NO : 331602  
Test Mode : Mode 1  
Test Voltage : Power From System  
Phase : Line

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	36.49	55.88	19.39	L1	OFF	19.8
0.152250	61.22	---	65.88	4.66	L1	OFF	19.8
0.161250	---	39.07	55.40	16.33	L1	OFF	19.8
0.161250	61.45	---	65.40	3.95	L1	OFF	19.8
0.174750	---	43.55	54.73	11.18	L1	OFF	19.8
0.174750	61.61	---	64.73	3.12	L1	OFF	19.8
0.190500	---	37.82	54.02	16.20	L1	OFF	19.8
0.190500	57.18	---	64.02	6.84	L1	OFF	19.8
0.213000	---	27.58	53.09	25.51	L1	OFF	19.8
0.213000	50.86	---	63.09	12.23	L1	OFF	19.8
0.226500	---	25.19	52.58	27.39	L1	OFF	19.8
0.226500	47.91	---	62.58	14.67	L1	OFF	19.8
0.240000	---	35.06	52.10	17.04	L1	OFF	19.8
0.240000	52.33	---	62.10	9.77	L1	OFF	19.8
0.258000	---	38.58	51.50	12.92	L1	OFF	19.8
0.258000	52.80	---	61.50	8.70	L1	OFF	19.8
1.306500	---	32.16	46.00	13.84	L1	OFF	19.8
1.306500	43.41	---	56.00	12.59	L1	OFF	19.8
1.416750	---	34.75	46.00	11.25	L1	OFF	19.8
1.416750	44.39	---	56.00	11.61	L1	OFF	19.8
1.545000	---	33.89	46.00	12.11	L1	OFF	19.8

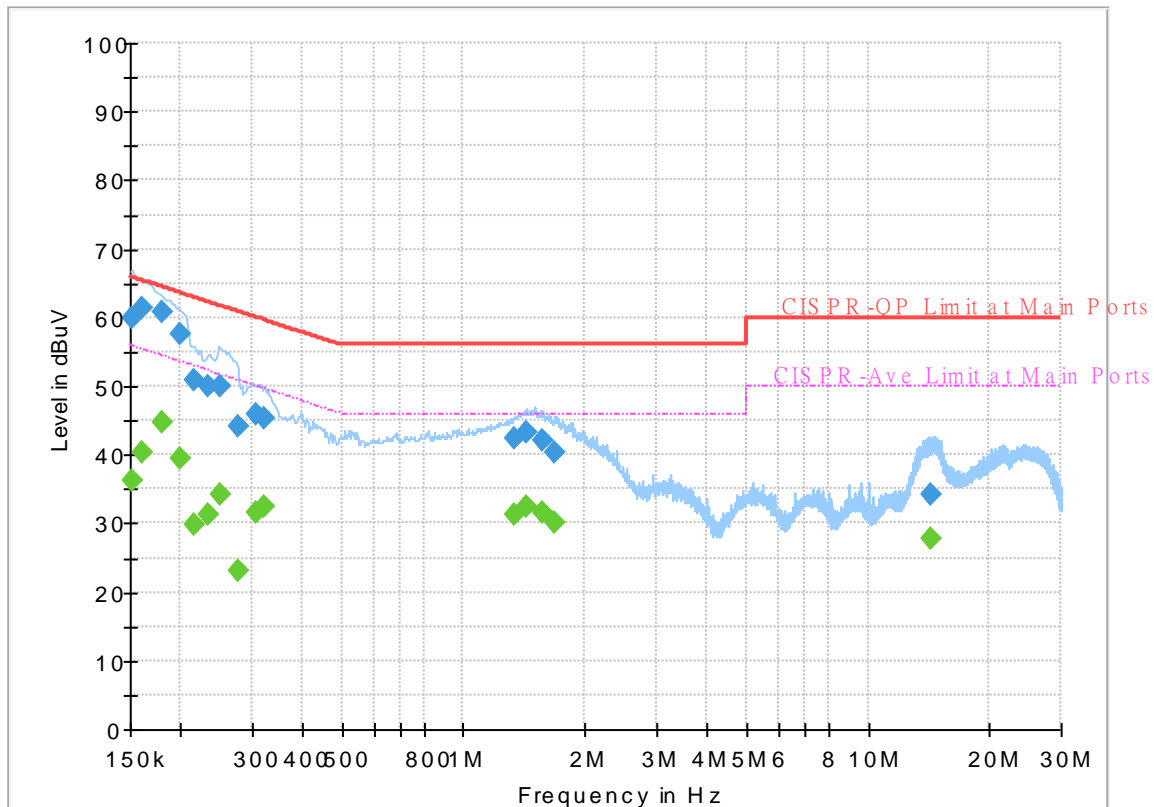
1.545000	40.04	---	56.00	15.96	L1	OFF	19.8
1.673250	---	31.53	46.00	14.47	L1	OFF	19.8
1.673250	42.41	---	56.00	13.59	L1	OFF	19.8
13.373250	---	26.08	50.00	23.92	L1	OFF	20.0
13.373250	31.85	---	60.00	28.15	L1	OFF	20.0



# EUT Information

Report NO : 331602  
 Test Mode : Mode 1  
 Test Voltage : Power From System  
 Phase : Neutral

Full Spectrum

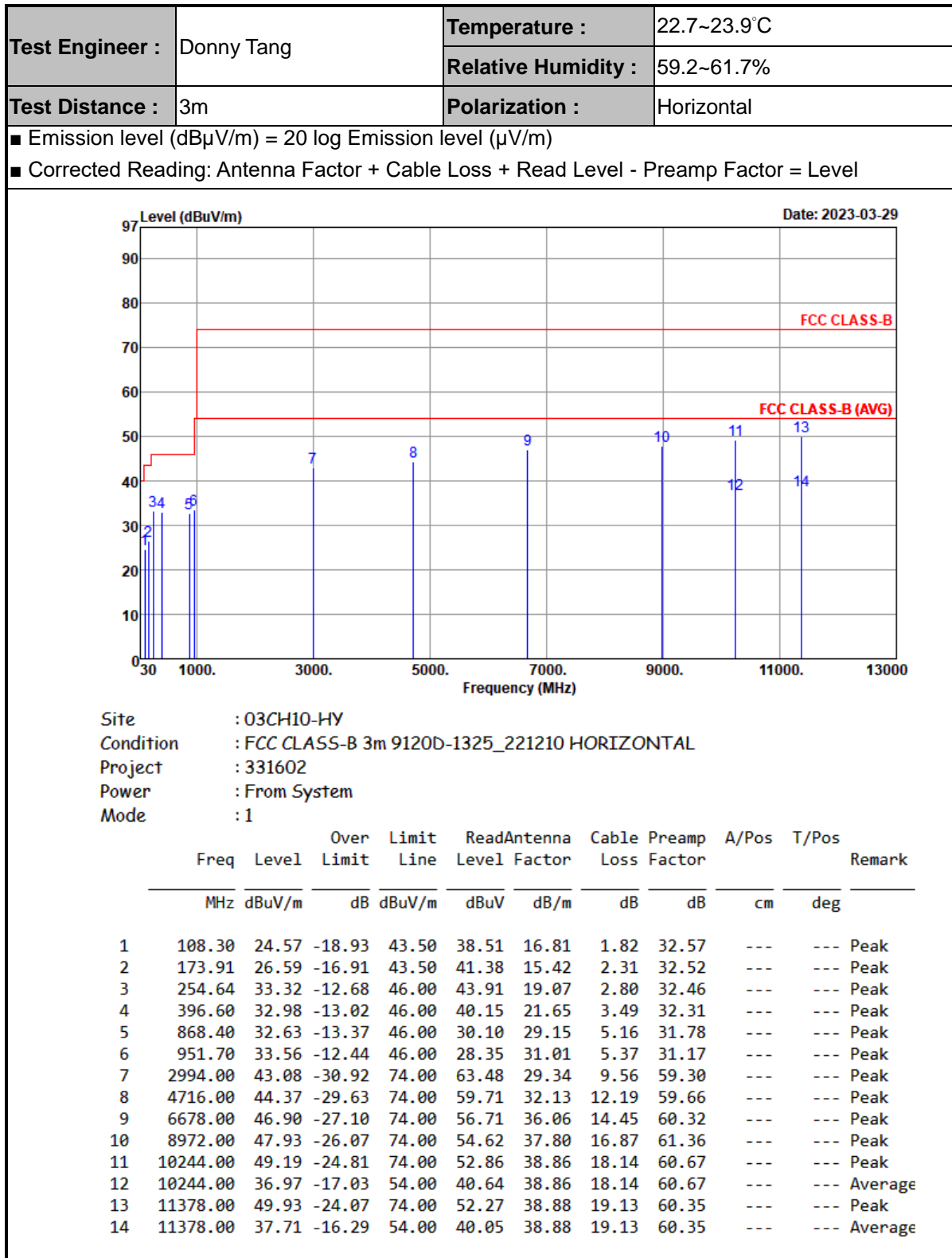


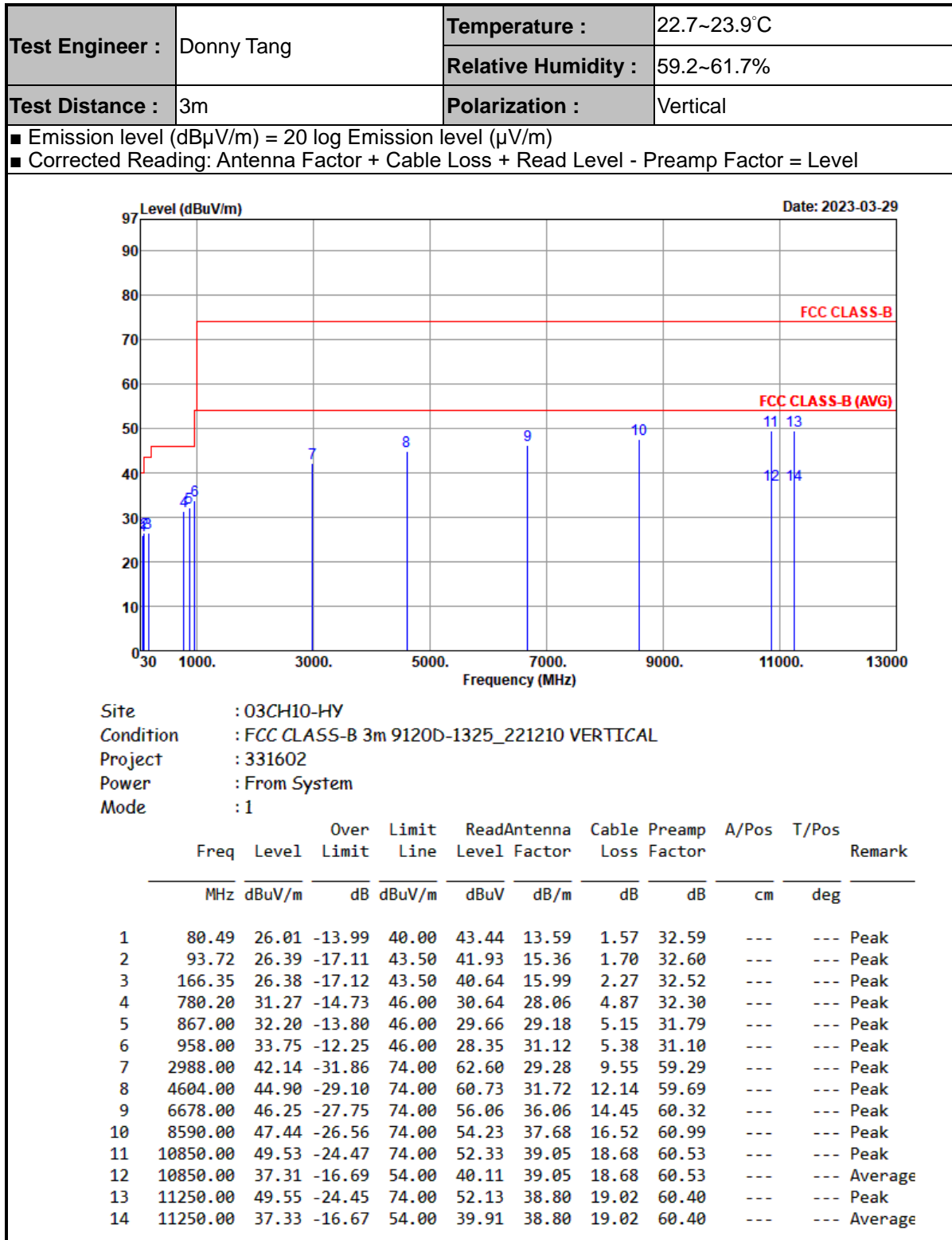
## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	60.01	---	65.88	5.87	N	OFF	19.8
0.152250	---	36.27	55.88	19.61	N	OFF	19.8
0.161250	61.46	---	65.40	3.94	N	OFF	19.8
0.161250	---	40.26	55.40	15.14	N	OFF	19.8
0.179250	60.70	---	64.52	3.82	N	OFF	19.8
0.179250	---	44.69	54.52	9.83	N	OFF	19.8
0.199500	57.48	---	63.63	6.15	N	OFF	19.8
0.199500	---	39.53	53.63	14.10	N	OFF	19.8
0.215250	50.80	---	63.00	12.20	N	OFF	19.8
0.215250	---	29.92	53.00	23.08	N	OFF	19.8
0.233250	49.93	---	62.33	12.40	N	OFF	19.8
0.233250	---	31.21	52.33	21.12	N	OFF	19.8
0.251250	50.13	---	61.72	11.59	N	OFF	19.8
0.251250	---	34.31	51.72	17.41	N	OFF	19.8
0.276000	44.07	---	60.94	16.87	N	OFF	19.8
0.276000	---	23.19	50.94	27.75	N	OFF	19.8
0.307500	45.95	---	60.04	14.09	N	OFF	19.8
0.307500	---	31.51	50.04	18.53	N	OFF	19.8
0.323250	45.18	---	59.62	14.44	N	OFF	19.8
0.323250	---	32.38	49.62	17.24	N	OFF	19.8
1.335750	42.36	---	56.00	13.64	N	OFF	19.8

1.335750	---	31.19	46.00	14.81	N	OFF	19.8
1.437000	43.29	---	56.00	12.71	N	OFF	19.8
1.437000	---	32.47	46.00	13.53	N	OFF	19.8
1.567500	42.10	---	56.00	13.90	N	OFF	19.8
1.567500	---	31.51	46.00	14.49	N	OFF	19.8
1.677750	40.45	---	56.00	15.55	N	OFF	19.8
1.677750	---	30.24	46.00	15.76	N	OFF	19.8
14.277750	34.29	---	60.00	25.71	N	OFF	20.1
14.277750	---	27.83	50.00	22.17	N	OFF	20.1

## Appendix B. Radiated Emission Test Result





## Appendix C. Setup Photographs

### <Conducted Emission>

Remote View





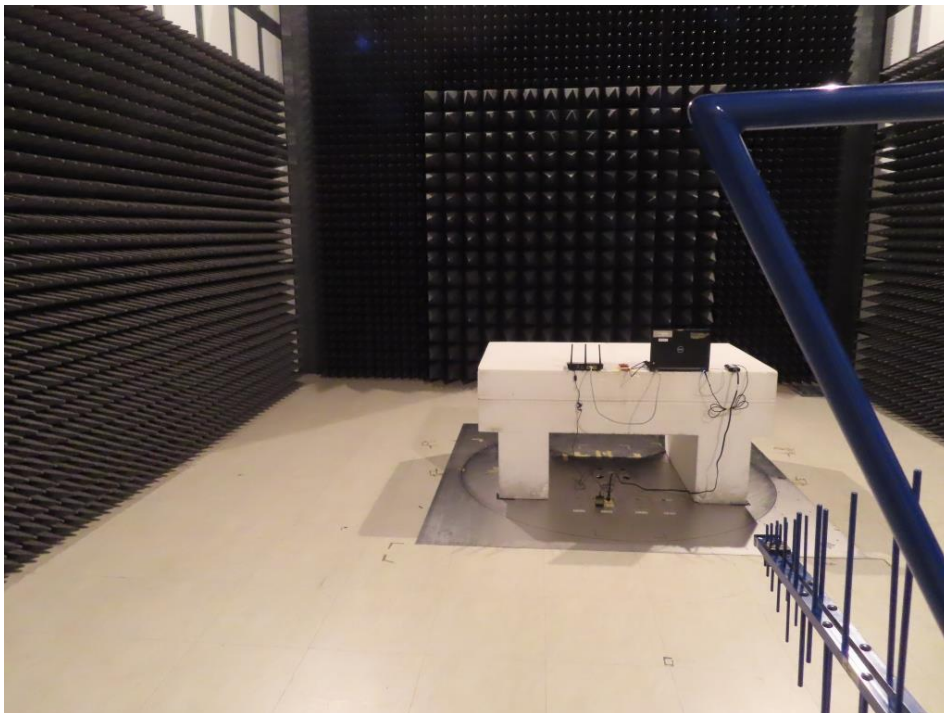
Rear View





## &lt;Radiated Emission&gt;

LF



HF



————THE END————