FCC RADIO TEST REPORT

FCC ID	:	**2AW3A-2NAC24ACUCM**
Equipment	:	**EV Charger**
Brand Name	:	**RIVIAN**
Model Name	:	**2NAC24ACUCM**
Marketing Name	:	**RIVIAN WAYPOINTS CHARGER**
Applicant	:	**Rivian Automotive LLC. 14600 Myford Road, Irvine Irvine CA, 92606**
Manufacturer	:	**Lite-On Technology Corporation 29F , No.555, Siyuan Rd., Xinzhuang Dist., New Taipei City, Taiwan (R.O.C.)**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Mar. 27, 2024 and testing was performed from Jun. 14, 2024 to Jul. 01, 2024. 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 and has been in compliance with the applicable technical standards.

The test results in this partial 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

Approved by: Louis Wu

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
FR432616A	01	Initial issue of report	Jul. 30, 2024
FR432616A	02	Revise Antenna Type This report is an updated version, replacing the report issued on Jul. 30, 2024.	Aug. 21, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.247(a)(2)	6dB Bandwidth	Pass	See Note
-	2.1049	99% Occupied Bandwidth	Reporting only	See Note
3.1	15.247(b)(3) 15.247(b)(4)	Output Power	Pass	-
-	15.247(e)	Power Spectral Density	Pass	See Note
-	15.247(d)	Conducted Band Edges and Spurious Emission	Pass	See Note
3.1	15.247(d)	Radiated Band Edges and Spurious Emission	Pass	4.98 dB under the limit at 790.00 MHz
3.3	15.207	AC Conducted Emission	Pass	1.05 dB under the limit at 17.78 MHz
3.4	15.203	Antenna Requirement	Pass	-

Note: The module (Model: ANNA-B112) makes no difference after verifying output power, this report reuses test data from the module report.

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/manufacturer 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 “Measurement Uncertainty”.
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: Wilda Wei

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs GSM/LTE, Bluetooth - LE, Wi-Fi 2.4GHz 802.11b/g/n, and NFC. **Antenna Type** WWAN: FPC Antenna WLAN: FPC Antenna Bluetooth-LE: Internal Antenna NFC: Loop Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	0.5

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 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	CO05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	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
Test Site No.	**Sporton Site No.**
	03CH11-HY (TAF Code: 3786)
Remark	The Radiation Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-

2.2 Test Mode

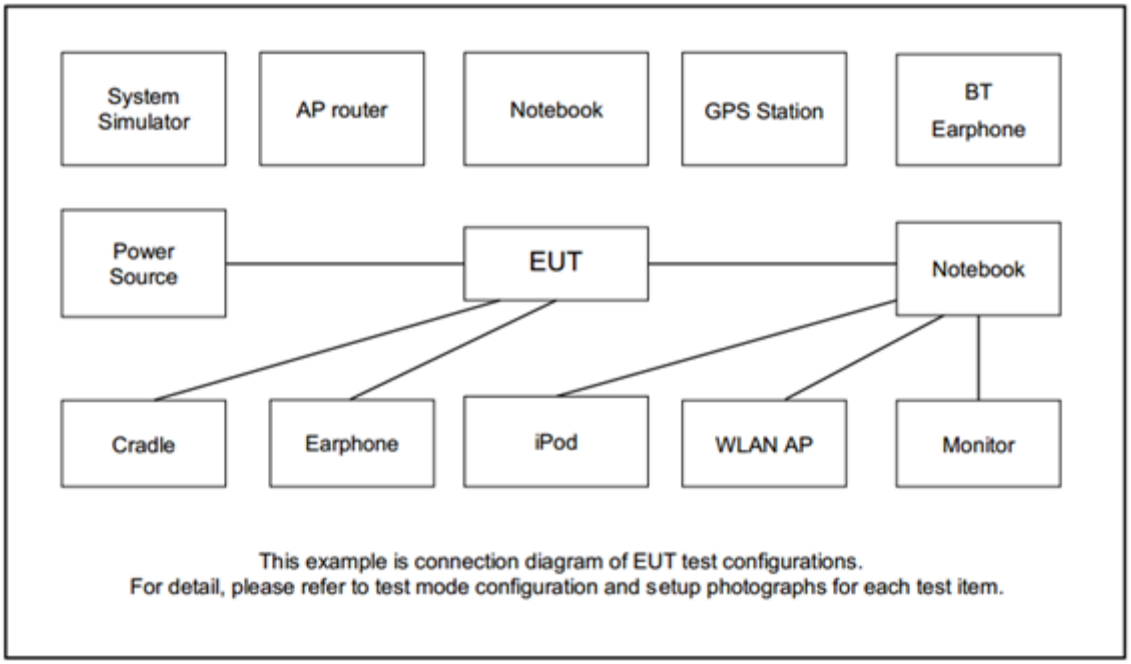
a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
Radiated Test Cases	**Bluetooth – LE / GFSK**
	Mode 1: Bluetooth Tx CH19_2440 MHz_1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_2Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_2Mbps
AC Conducted Emission	Mode 1: WLAN (2.4GHz) Link + Bluetooth Link + Power Cable (240Vac/ 60Hz)

2.3 Connection Diagram of Test System



2.4 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,1.8m
2.	Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
3.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
4.	Mobile Phone	Apple	A1586	BCG-E2816A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “nRF Connect version 4.4.1” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Output Power Measurement

3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna of directional gain greater than 6 dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

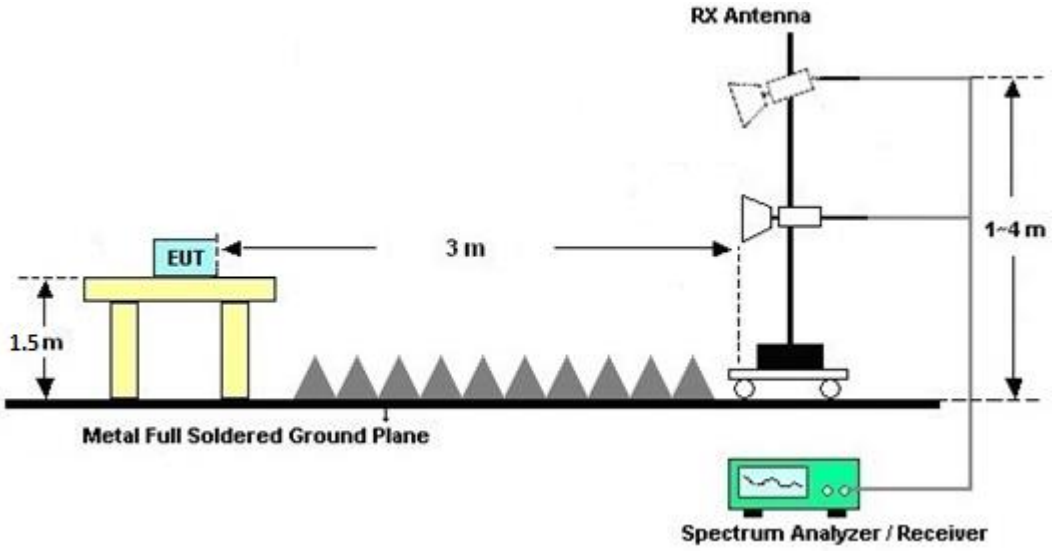
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.2.4 Method AVSGA-2.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
4. Set VBW ≥ [3 × RBW].
5. Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
8. The sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
10. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11. Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is 25%.

3.1.4 Test Setup



3.1.5 Test Result of Average Output Power

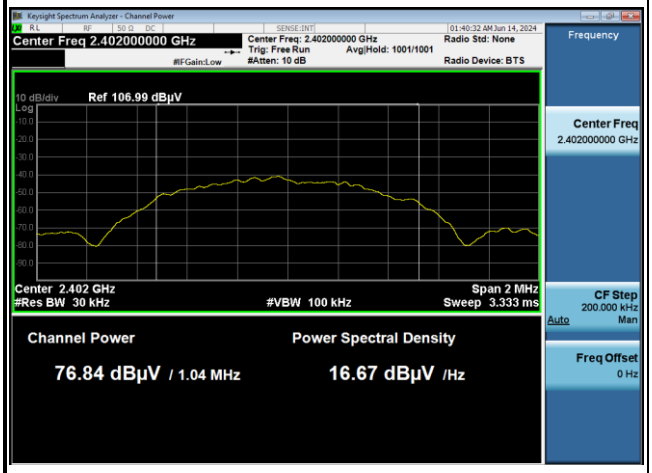
<1Mbps>

Setting	Frequency	Field Strengh@3m						Output Power			
		Level	Read Level	Antenna Factor	Path Loss	Preamp Factor	Duty Factor	EIRP	Gain	Conducted Power	Limit
	(MHz)	(dBuV/m)	(dBuV)	(dB/m)	(dB)	(dB)	(dB)	(dBm)	(dBi)	(dBm)	(dBm)
0	2402	89.75	76.84	27.5	16.72	33.33	2.02	-5.45	0.5	-5.95	30.00
	2440	90.49	77.40	27.6	16.78	33.31	2.02	-4.71	0.5	-5.21	30.00
	2480	89.90	76.62	27.7	16.84	33.28	2.02	-5.30	0.5	-5.80	30.00

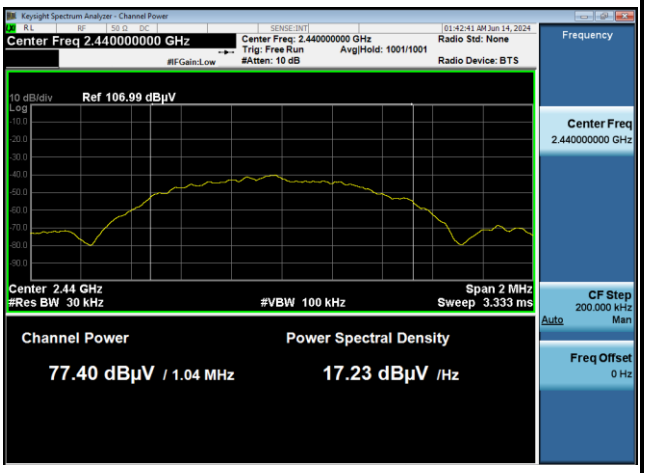
Note:

1. Field Strengh (dBuV/m) = Read Level (dBuV) + Antenna Factor (dB/m) + Path Loss (dB) - Preamp Factor (dB) + Duty Factor (dB)
2. EIRP (dBm) = Field Strengh (dBuV/m)@3m - 95.2
3. Conducted Power (dBm) = EIRP (dBm) - Gain (dBi)

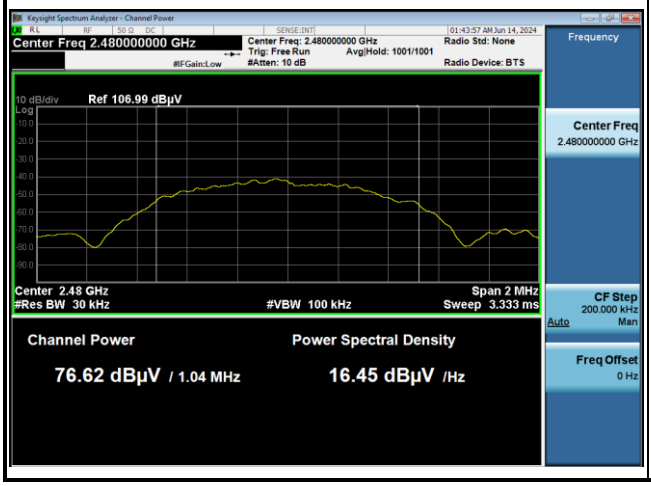
Read Level Channel 00



Read Level Channel 19



Read Level Channel 39



N/A

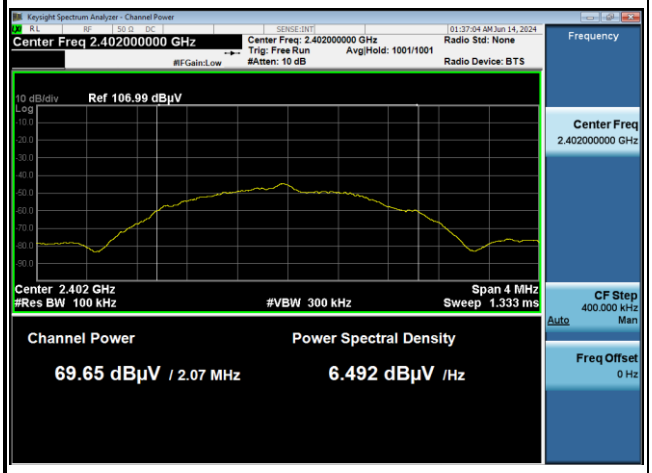
<2Mbps>

Setting	Frequency	Field Strengh@3m						Output Power			
		Level	Read Level	Antenna Factor	Path Loss	Preamp Factor	Duty Factor	EIRP	Gain	Conducted Power	Limit
	(MHz)	(dBuV/m)	(dBuV)	(dB/m)	(dB)	(dB)	(dB)	(dBm)	(dBi)	(dBm)	(dBm)
-4	2402	85.37	69.65	27.5	16.72	33.33	4.83	-9.83	0.5	-10.33	30.00
	2440	85.89	69.99	27.6	16.78	33.31	4.83	-9.31	0.5	-9.81	30.00
	2480	85.91	69.82	27.7	16.84	33.28	4.83	-9.27	0.5	-9.79	30.00

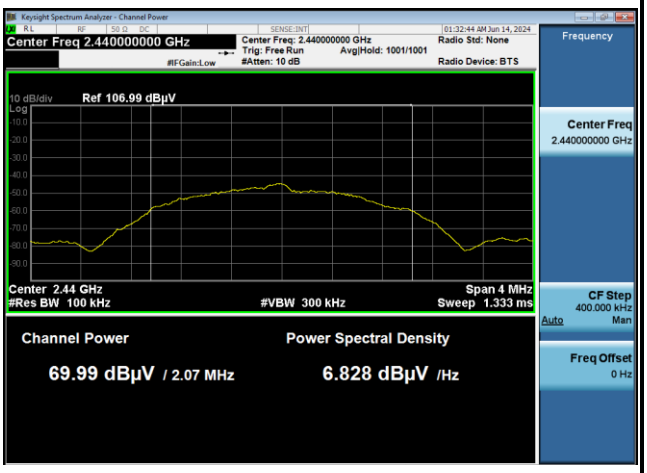
Note:

1. Field Strengh (dBuV/m) = Read Level (dBuV) + Antenna Factor (dB/m) + Path Loss (dB) - Preamp Factor (dB) + Duty Factor (dB)
2. EIRP (dBm) = Field Strengh (dBuV/m)@3m - 95.2
3. Conducted Power (dBm) = EIRP (dBm) - Gain (dBi)

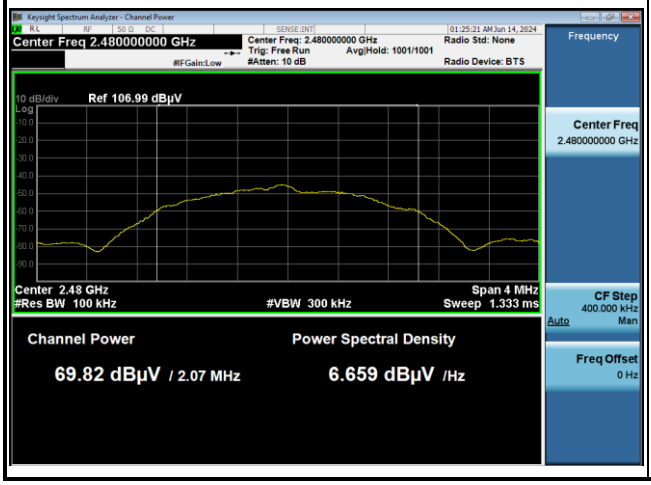
Read Level Channel 00



Read Level Channel 19



Read Level Channel 39



N/A

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2 Measuring Instruments

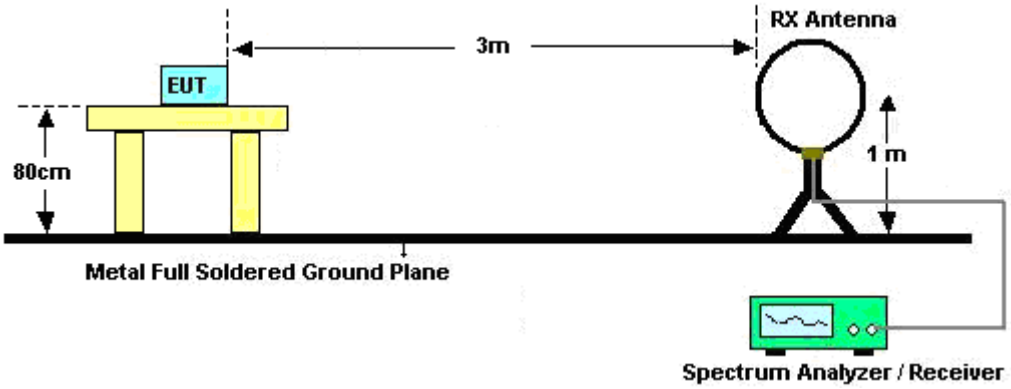
Please refer to the measuring equipment list in this test report.

3.2.3 Test Procedures

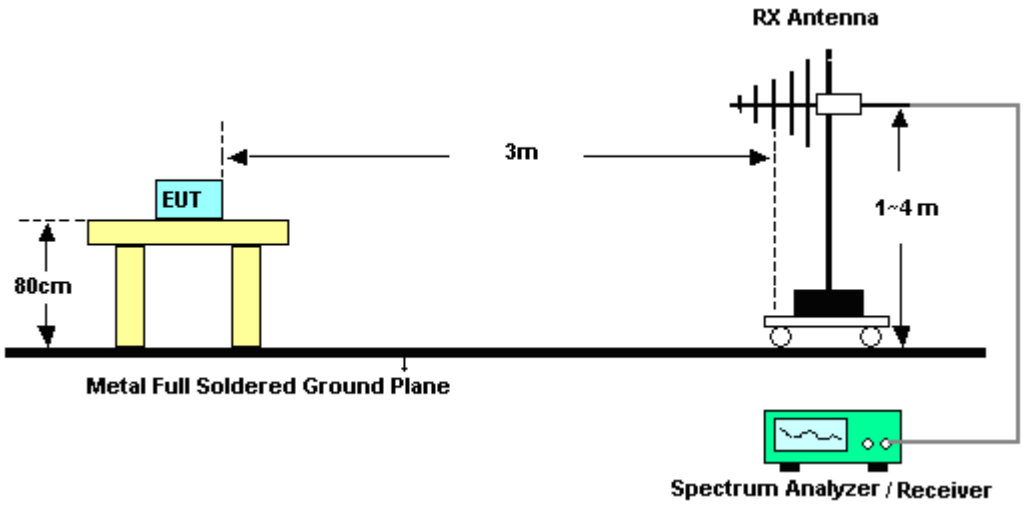
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as "-".
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW = 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW = 3 MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.2.4 Test Setup

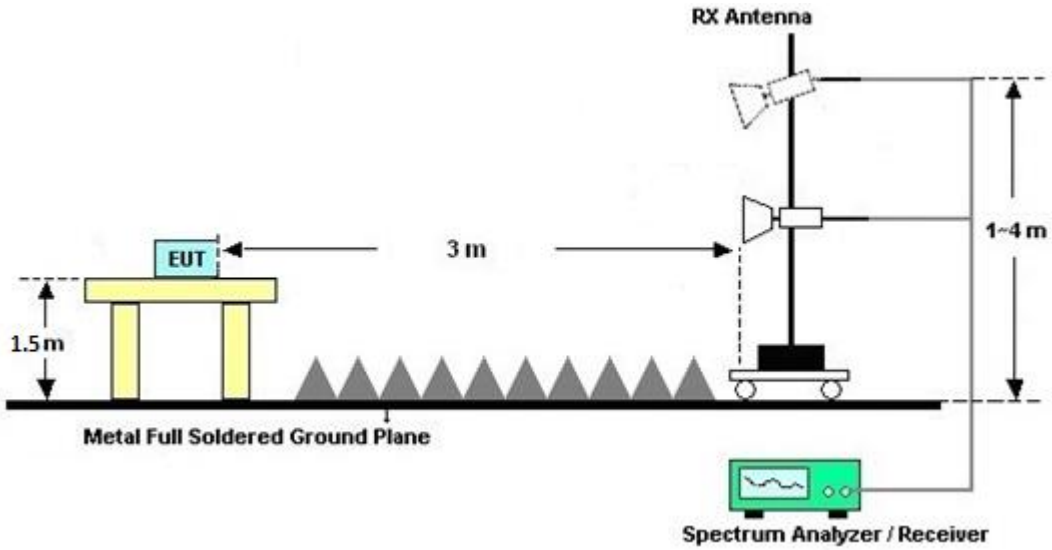
For radiated test below 30MHz



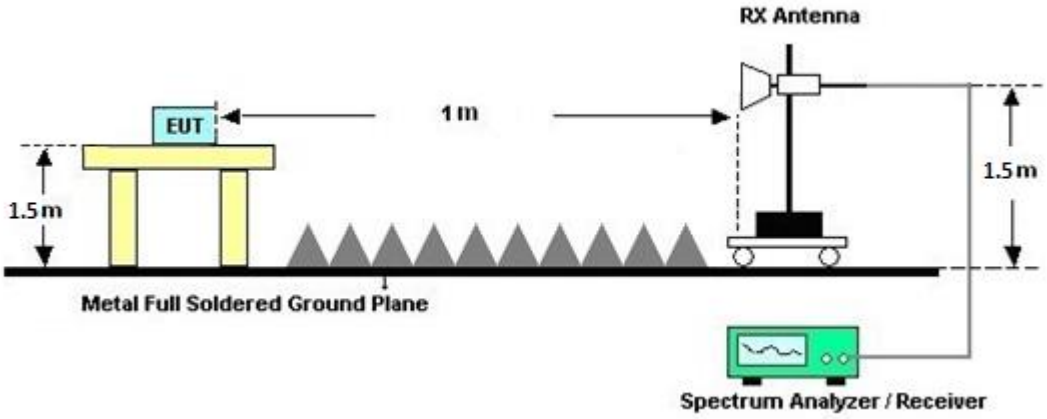
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.2.7 Duty Cycle

Please refer to Appendix D.

3.2.8 Test Result of Radiated Spurious Emission (30 MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.3 AC Conducted Emission Measurement

3.3.1 Limit 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.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

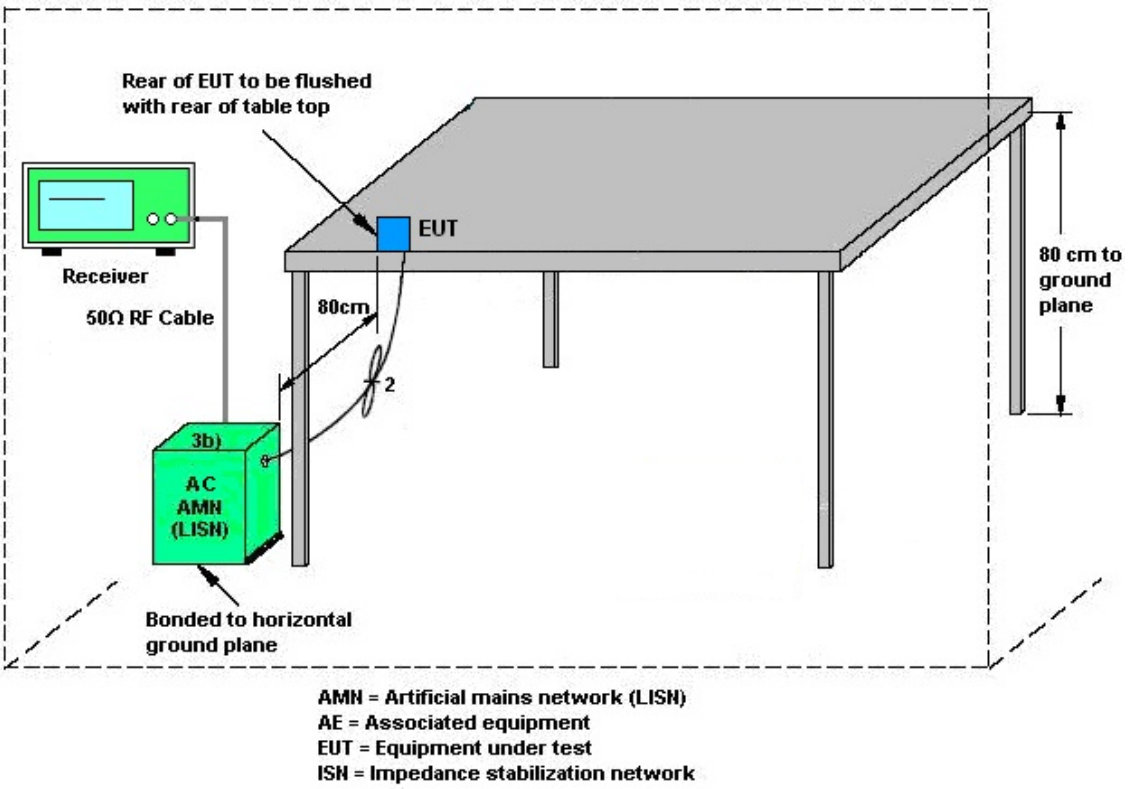
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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.

3.3.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

3.4 Antenna Requirements

3.4.1 Standard Applicable

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

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	Jun. 28, 2024	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 06, 2023	Jun. 28, 2024	Dec. 05, 2024	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Oct. 26, 2023	Jun. 28, 2024	Oct. 25, 2024	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 22, 2023	Jun. 28, 2024	Nov. 21, 2024	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Jun. 28, 2024	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Jul. 28, 2023	Jun. 28, 2024	Jul. 27, 2024	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 28, 2023	Jun. 28, 2024	Dec. 27, 2024	Conduction (CO05-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 07, 2023	Jun. 14, 2024~ Jul. 01, 2024	Oct. 06, 2024	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	Jun. 14, 2024~ Jul. 01, 2024	Sep. 11, 2024	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-01620	1GHz~18GHz	Aug. 17, 2023	Jun. 14, 2024~ Jul. 01, 2024	Aug. 16, 2024	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00993	18GHz~40GHz	Nov. 24, 2023	Jun. 14, 2024~ Jul. 01, 2024	Nov. 23, 2024	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 08, 2023	Jun. 14, 2024~ Jul. 01, 2024	Dec. 07, 2024	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Mar. 25, 2024	Jun. 14, 2024~ Jul. 01, 2024	Mar. 24, 2025	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-303	17100018000 55007	1GHz~18GHz	Jun. 13, 2024	Jun. 14, 2024~ Jul. 01, 2024	Jun. 12, 2025	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060871	18GHz~40GHz	Aug. 30, 2024	Jun. 14, 2024~ Jul. 01, 2024	Aug. 29, 2025	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 05, 2023	Jun. 14, 2024~ Jul. 01, 2024	Oct. 04, 2024	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20MHz~8.4GHz	Oct. 06, 2023	Jun. 14, 2024~ Jul. 01, 2024	Oct. 05, 2024	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Jun. 14, 2024~ Jul. 01, 2024	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jun. 14, 2024~ Jul. 01, 2024	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jun. 14, 2024~ Jul. 01, 2024	N/A	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Jun. 14, 2024~ Jul. 01, 2024	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz~40GHz	Mar. 06, 2024	Jun. 14, 2024~ Jul. 01, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804013/2	30M~40G	May 23, 2024	Jun. 14, 2024~ Jul. 01, 2024	May 22, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 06, 2024	Jun. 14, 2024~ Jul. 01, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	30M~40G	Mar. 06, 2024	Jun. 14, 2024~ Jul. 01, 2024	Mar. 05, 2025	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN11	1.53G Low Pass	Sep. 11, 2023	Jun. 14, 2024~ Jul. 01, 2024	Sep. 10, 2024	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN3	3GHz High Pass Filter	Sep. 11, 2023	Jun. 14, 2024~ Jul. 01, 2024	Sep. 10, 2024	Radiation (03CH11-HY)

5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.5 dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.10 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.30 dB**

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.30 dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.30 dB**

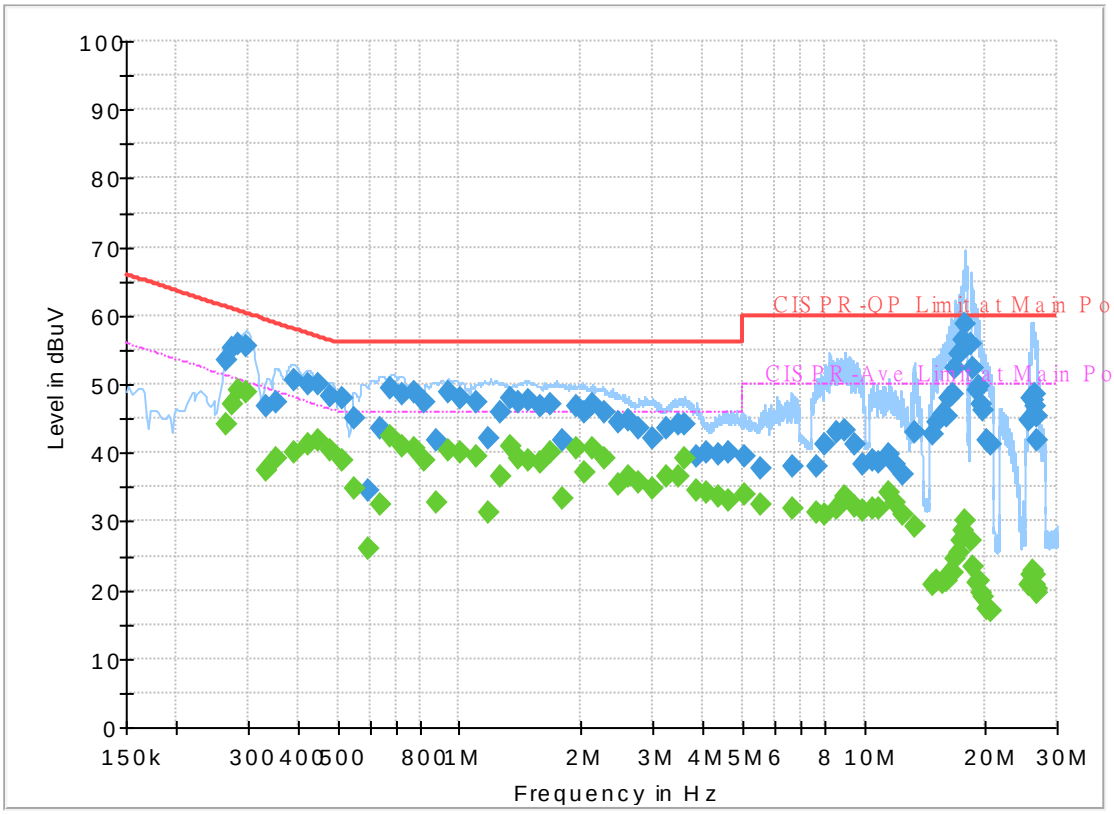
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	**Temperature :**	23~26℃
		Relative Humidity :	45~55%

EUT Information

Report NO :	432616
Test Mode :	Mode 1
Test Voltage :	240Vac/60Hz
Phase :	Line

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.264750	---	44.27	51.28	7.01	L1	OFF	19.8
0.264750	53.50	---	61.28	7.78	L1	OFF	19.8
0.273750	---	46.99	51.00	4.01	L1	OFF	19.8
0.273750	55.27	---	61.00	5.73	L1	OFF	19.8
0.282750	---	49.24	50.74	1.50	L1	OFF	19.8
0.282750	55.78	---	60.74	4.96	L1	OFF	19.8
0.298500	---	48.95	50.28	1.33	L1	OFF	19.8
0.298500	55.45	---	60.28	4.83	L1	OFF	19.8
0.334500	---	37.29	49.34	12.05	L1	OFF	19.8
0.334500	46.79	---	59.34	12.55	L1	OFF	19.8
0.352500	---	39.19	48.90	9.71	L1	OFF	19.8
0.352500	47.32	---	58.90	11.58	L1	OFF	19.8
0.390750	---	40.12	48.05	7.93	L1	OFF	19.8
0.390750	50.69	---	58.05	7.36	L1	OFF	19.8
0.422250	---	41.36	47.40	6.04	L1	OFF	19.8
0.422250	49.89	---	57.40	7.51	L1	OFF	19.8
0.449250	---	41.70	46.89	5.19	L1	OFF	19.8
0.449250	49.95	---	56.89	6.94	L1	OFF	19.8
0.480750	---	40.31	46.33	6.02	L1	OFF	19.8
0.480750	48.24	---	56.33	8.09	L1	OFF	19.8
0.514500	---	39.01	46.00	6.99	L1	OFF	19.8

0.514500	47.83	---	56.00	8.17	L1	OFF	19.8
0.552750	---	34.85	46.00	11.15	L1	OFF	19.8
0.552750	44.96	---	56.00	11.04	L1	OFF	19.8
0.595500	---	26.08	46.00	19.92	L1	OFF	19.8
0.595500	34.62	---	56.00	21.38	L1	OFF	19.8
0.638250	---	32.53	46.00	13.47	L1	OFF	19.8
0.638250	43.65	---	56.00	12.35	L1	OFF	19.8
0.676500	---	42.28	46.00	3.72	L1	OFF	19.8
0.676500	49.39	---	56.00	6.61	L1	OFF	19.8
0.726000	---	40.86	46.00	5.14	L1	OFF	19.8
0.726000	48.59	---	56.00	7.41	L1	OFF	19.8
0.771000	---	40.74	46.00	5.26	L1	OFF	19.8
0.771000	48.74	---	56.00	7.26	L1	OFF	19.8
0.818250	---	38.99	46.00	7.01	L1	OFF	19.8
0.818250	47.44	---	56.00	8.56	L1	OFF	19.8
0.872250	---	32.72	46.00	13.28	L1	OFF	19.8
0.872250	41.93	---	56.00	14.07	L1	OFF	19.8
0.937500	---	40.30	46.00	5.70	L1	OFF	19.8
0.937500	48.76	---	56.00	7.24	L1	OFF	19.8
1.009500	---	40.07	46.00	5.93	L1	OFF	19.8
1.009500	47.95	---	56.00	8.05	L1	OFF	19.8
1.101750	---	39.44	46.00	6.56	L1	OFF	19.8
1.101750	47.49	---	56.00	8.51	L1	OFF	19.8
1.180500	---	31.39	46.00	14.61	L1	OFF	19.8
1.180500	42.04	---	56.00	13.96	L1	OFF	19.8
1.266000	---	36.58	46.00	9.42	L1	OFF	19.8
1.266000	45.79	---	56.00	10.21	L1	OFF	19.8
1.342500	---	41.02	46.00	4.98	L1	OFF	19.8
1.342500	48.02	---	56.00	7.98	L1	OFF	19.8
1.405500	---	39.07	46.00	6.93	L1	OFF	19.8
1.405500	47.24	---	56.00	8.76	L1	OFF	19.8
1.482000	---	39.01	46.00	6.99	L1	OFF	19.8
1.482000	47.57	---	56.00	8.43	L1	OFF	19.8
1.585500	---	38.64	46.00	7.36	L1	OFF	19.8
1.585500	46.91	---	56.00	9.09	L1	OFF	19.8
1.682250	---	39.95	46.00	6.05	L1	OFF	19.8
1.682250	47.18	---	56.00	8.82	L1	OFF	19.8
1.794750	---	33.42	46.00	12.58	L1	OFF	19.8
1.794750	41.91	---	56.00	14.09	L1	OFF	19.8
1.938750	---	40.72	46.00	5.28	L1	OFF	19.8
1.938750	46.90	---	56.00	9.10	L1	OFF	19.8
2.033250	---	37.14	46.00	8.86	L1	OFF	19.8
2.033250	45.86	---	56.00	10.14	L1	OFF	19.8
2.134500	---	40.59	46.00	5.41	L1	OFF	19.8
2.134500	47.05	---	56.00	8.95	L1	OFF	19.8
2.278500	---	39.23	46.00	6.77	L1	OFF	19.8
2.278500	45.80	---	56.00	10.20	L1	OFF	19.8
2.463000	---	35.45	46.00	10.55	L1	OFF	19.8
2.463000	44.59	---	56.00	11.41	L1	OFF	19.8
2.625000	---	36.56	46.00	9.44	L1	OFF	19.8
2.625000	44.70	---	56.00	11.30	L1	OFF	19.8
2.784750	---	35.59	46.00	10.41	L1	OFF	19.8
2.784750	43.58	---	56.00	12.42	L1	OFF	19.8
3.000750	---	34.81	46.00	11.19	L1	OFF	19.8
3.000750	41.96	---	56.00	14.04	L1	OFF	19.8
3.248250	---	36.41	46.00	9.59	L1	OFF	19.8
3.248250	43.61	---	56.00	12.39	L1	OFF	19.8
3.495750	---	36.60	46.00	9.40	L1	OFF	19.8
3.495750	44.03	---	56.00	11.97	L1	OFF	19.8
3.612750	---	39.10	46.00	6.90	L1	OFF	19.8
3.612750	44.08	---	56.00	11.92	L1	OFF	19.8
3.864750	---	34.42	46.00	11.58	L1	OFF	19.8
3.864750	39.50	---	56.00	16.50	L1	OFF	19.8
4.103250	---	34.10	46.00	11.90	L1	OFF	19.8
4.103250	40.12	---	56.00	15.88	L1	OFF	19.8
4.350750	---	33.48	46.00	12.52	L1	OFF	19.8
4.350750	39.73	---	56.00	16.27	L1	OFF	19.8
4.638750	---	32.91	46.00	13.09	L1	OFF	19.8
4.638750	40.01	---	56.00	15.99	L1	OFF	19.8
5.073000	---	33.95	50.00	16.05	L1	OFF	19.8
5.073000	39.41	---	60.00	20.59	L1	OFF	19.8

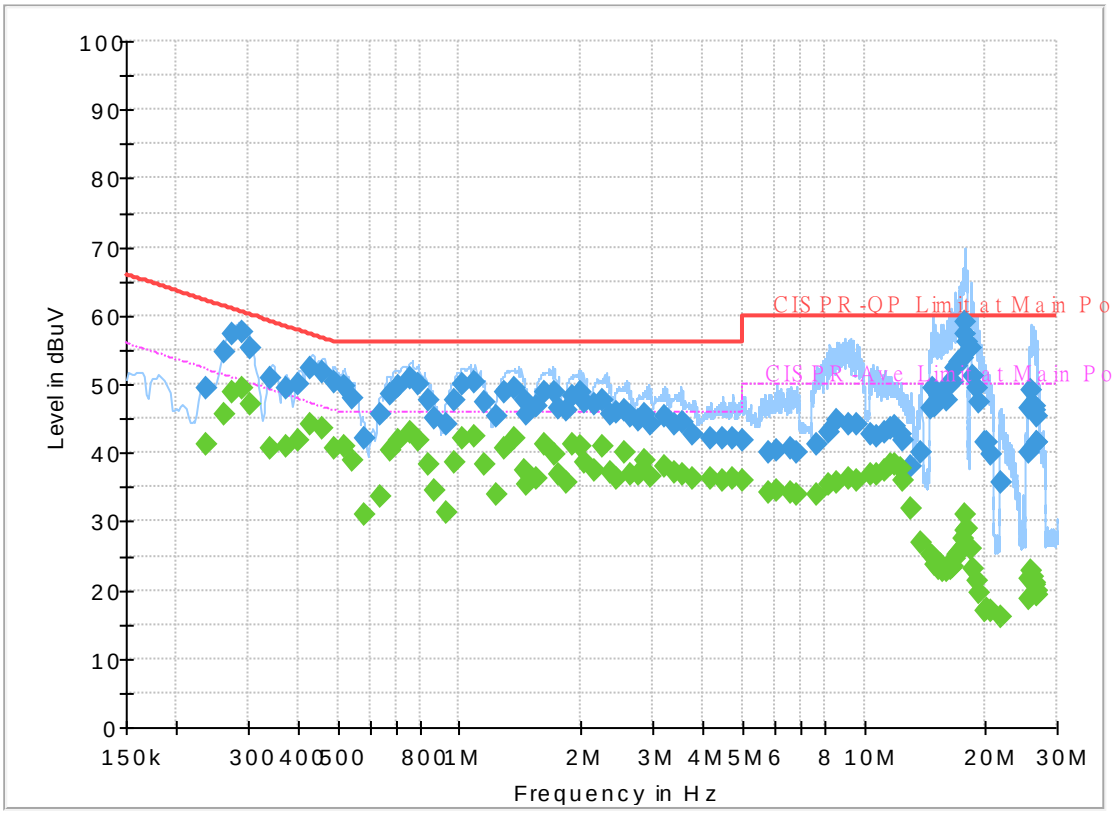
5.525250	---	32.44	50.00	17.56	L1	OFF	19.8
5.525250	37.59	---	60.00	22.41	L1	OFF	19.8
6.639000	---	31.96	50.00	18.04	L1	OFF	19.9
6.639000	37.99	---	60.00	22.01	L1	OFF	19.9
7.653750	---	31.28	50.00	18.72	L1	OFF	19.9
7.653750	37.88	---	60.00	22.12	L1	OFF	19.9
7.986750	---	31.00	50.00	19.00	L1	OFF	19.9
7.986750	41.12	---	60.00	18.88	L1	OFF	19.9
8.574000	---	31.90	50.00	18.10	L1	OFF	19.9
8.574000	42.85	---	60.00	17.15	L1	OFF	19.9
8.967750	---	33.76	50.00	16.24	L1	OFF	19.9
8.967750	43.38	---	60.00	16.62	L1	OFF	19.9
9.469500	---	32.11	50.00	17.89	L1	OFF	19.9
9.469500	41.12	---	60.00	18.88	L1	OFF	19.9
9.957750	---	31.63	50.00	18.37	L1	OFF	19.9
9.957750	38.36	---	60.00	21.64	L1	OFF	19.9
10.558500	---	31.89	50.00	18.11	L1	OFF	19.9
10.558500	38.91	---	60.00	21.09	L1	OFF	19.9
10.938750	---	31.94	50.00	18.06	L1	OFF	19.9
10.938750	38.67	---	60.00	21.33	L1	OFF	19.9
11.544000	---	34.24	50.00	15.76	L1	OFF	19.9
11.544000	39.64	---	60.00	20.36	L1	OFF	19.9
11.955750	---	32.77	50.00	17.23	L1	OFF	19.9
11.955750	38.24	---	60.00	21.76	L1	OFF	19.9
12.477750	---	30.94	50.00	19.06	L1	OFF	19.9
12.477750	36.85	---	60.00	23.15	L1	OFF	19.9
13.285500	---	29.11	50.00	20.89	L1	OFF	19.9
13.285500	42.98	---	60.00	17.02	L1	OFF	19.9
14.824500	---	20.87	50.00	29.13	L1	OFF	19.9
14.824500	42.66	---	60.00	17.34	L1	OFF	19.9
15.209250	---	21.43	50.00	28.57	L1	OFF	19.9
15.209250	44.38	---	60.00	15.62	L1	OFF	19.9
15.675000	---	21.01	50.00	28.99	L1	OFF	19.9
15.675000	45.52	---	60.00	14.48	L1	OFF	19.9
15.992250	---	21.46	50.00	28.54	L1	OFF	19.9
15.992250	45.39	---	60.00	14.61	L1	OFF	19.9
16.190250	---	22.16	50.00	27.84	L1	OFF	19.9
16.190250	48.06	---	60.00	11.94	L1	OFF	19.9
16.577250	---	22.58	50.00	27.42	L1	OFF	19.9
16.577250	48.56	---	60.00	11.44	L1	OFF	19.9
16.791000	---	24.65	50.00	25.35	L1	OFF	19.9
16.791000	52.39	---	60.00	7.61	L1	OFF	19.9
17.085750	---	25.44	50.00	24.56	L1	OFF	19.9
17.085750	54.28	---	60.00	5.72	L1	OFF	19.9
17.398500	---	27.26	50.00	22.74	L1	OFF	19.9
17.398500	54.80	---	60.00	5.20	L1	OFF	19.9
17.583000	---	28.62	50.00	21.38	L1	OFF	19.9
17.583000	56.45	---	60.00	3.55	L1	OFF	19.9
17.783250	---	30.01	50.00	19.99	L1	OFF	19.9
17.783250	58.82	---	60.00	1.18	L1	OFF	19.9
18.350250	---	27.30	50.00	22.70	L1	OFF	19.9
18.350250	55.92	---	60.00	4.08	L1	OFF	19.9
18.631500	---	23.45	50.00	26.55	L1	OFF	19.9
18.631500	52.45	---	60.00	7.55	L1	OFF	19.9
18.935250	---	20.96	50.00	29.04	L1	OFF	19.9
18.935250	49.10	---	60.00	10.90	L1	OFF	19.9
19.144500	---	21.31	50.00	28.69	L1	OFF	19.9
19.144500	49.71	---	60.00	10.29	L1	OFF	19.9
19.356000	---	19.57	50.00	30.43	L1	OFF	19.9
19.356000	47.19	---	60.00	12.81	L1	OFF	19.9
19.727250	---	19.07	50.00	30.93	L1	OFF	19.9
19.727250	46.27	---	60.00	13.73	L1	OFF	19.9
20.213250	---	17.17	50.00	32.83	L1	OFF	19.9
20.213250	41.93	---	60.00	18.07	L1	OFF	19.9
20.604750	---	16.92	50.00	33.08	L1	OFF	19.9
20.604750	41.30	---	60.00	18.70	L1	OFF	19.9
25.638000	---	20.90	50.00	29.10	L1	OFF	20.0
25.638000	44.77	---	60.00	15.23	L1	OFF	20.0
25.903500	---	22.26	50.00	27.74	L1	OFF	20.0
25.903500	47.94	---	60.00	12.06	L1	OFF	20.0
26.148750	---	22.83	50.00	27.17	L1	OFF	20.0

26.148750	**47.70**	**---**	**60.00**	**12.30**	**L1**	**OFF**	**20.0**
26.371500	**---**	**22.19**	**50.00**	**27.81**	**L1**	**OFF**	**20.0**
26.371500	**48.66**	**---**	**60.00**	**11.34**	**L1**	**OFF**	**20.0**
26.515500	**---**	**20.81**	**50.00**	**29.19**	**L1**	**OFF**	**20.0**
26.515500	**46.81**	**---**	**60.00**	**13.19**	**L1**	**OFF**	**20.0**
26.682000	**---**	**20.07**	**50.00**	**29.93**	**L1**	**OFF**	**20.0**
26.682000	**45.22**	**---**	**60.00**	**14.78**	**L1**	**OFF**	**20.0**
26.835000	**---**	**19.48**	**50.00**	**30.52**	**L1**	**OFF**	**20.0**
26.835000	**41.78**	**---**	**60.00**	**18.22**	**L1**	**OFF**	**20.0**

EUT Information

Report NO :	432616
Test Mode :	Mode 1
Test Voltage :	240Vac/60Hz
Phase :	Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.235500	---	41.14	52.25	11.11	N	OFF	19.8
0.235500	49.51	---	62.25	12.74	N	OFF	19.8
0.262500	---	45.57	51.35	5.78	N	OFF	19.8
0.262500	54.63	---	61.35	6.72	N	OFF	19.8
0.273750	---	48.88	51.00	2.12	N	OFF	19.8
0.273750	57.19	---	61.00	3.81	N	OFF	19.8
0.289500	---	49.41	50.54	1.13	N	OFF	19.8
0.289500	57.65	---	60.54	2.89	N	OFF	19.8
0.303000	---	47.01	50.16	3.15	N	OFF	19.8
0.303000	55.29	---	60.16	4.87	N	OFF	19.8
0.341250	---	40.77	49.17	8.40	N	OFF	19.8
0.341250	50.97	---	59.17	8.20	N	OFF	19.8
0.375000	---	41.00	48.39	7.39	N	OFF	19.8
0.375000	49.28	---	58.39	9.11	N	OFF	19.8
0.399750	---	41.78	47.86	6.08	N	OFF	19.8
0.399750	50.03	---	57.86	7.83	N	OFF	19.8
0.429000	---	44.16	47.27	3.11	N	OFF	19.8
0.429000	52.27	---	57.27	5.00	N	OFF	19.8
0.458250	---	43.56	46.72	3.16	N	OFF	19.8
0.458250	51.77	---	56.72	4.95	N	OFF	19.8
0.492000	---	40.77	46.13	5.36	N	OFF	19.8

0.492000	50.30	---	56.13	5.83	N	OFF	19.8
0.516750	---	40.90	46.00	5.10	N	OFF	19.8
0.516750	49.85	---	56.00	6.15	N	OFF	19.8
0.546000	---	39.01	46.00	6.99	N	OFF	19.8
0.546000	48.09	---	56.00	7.91	N	OFF	19.8
0.579750	---	30.91	46.00	15.09	N	OFF	19.8
0.579750	41.97	---	56.00	14.03	N	OFF	19.8
0.636000	---	33.59	46.00	12.41	N	OFF	19.8
0.636000	45.48	---	56.00	10.52	N	OFF	19.8
0.672000	---	40.49	46.00	5.51	N	OFF	19.8
0.672000	48.51	---	56.00	7.49	N	OFF	19.8
0.703500	---	41.73	46.00	4.27	N	OFF	19.8
0.703500	49.62	---	56.00	6.38	N	OFF	19.8
0.757500	---	42.89	46.00	3.11	N	OFF	19.8
0.757500	50.84	---	56.00	5.16	N	OFF	19.8
0.791250	---	41.75	46.00	4.25	N	OFF	19.8
0.791250	50.15	---	56.00	5.85	N	OFF	19.8
0.834000	---	38.27	46.00	7.73	N	OFF	19.8
0.834000	47.61	---	56.00	8.39	N	OFF	19.8
0.863250	---	34.47	46.00	11.53	N	OFF	19.8
0.863250	45.16	---	56.00	10.84	N	OFF	19.8
0.924000	---	31.26	46.00	14.74	N	OFF	19.8
0.924000	44.13	---	56.00	11.87	N	OFF	19.8
0.966750	---	38.55	46.00	7.45	N	OFF	19.8
0.966750	47.79	---	56.00	8.21	N	OFF	19.8
1.020750	---	42.17	46.00	3.83	N	OFF	19.8
1.020750	49.96	---	56.00	6.04	N	OFF	19.8
1.092750	---	42.54	46.00	3.46	N	OFF	19.8
1.092750	50.34	---	56.00	5.66	N	OFF	19.8
1.146750	---	38.42	46.00	7.58	N	OFF	19.8
1.146750	47.36	---	56.00	8.64	N	OFF	19.8
1.234500	---	33.85	46.00	12.15	N	OFF	19.8
1.234500	45.31	---	56.00	10.69	N	OFF	19.8
1.290750	---	40.66	46.00	5.34	N	OFF	19.8
1.290750	48.78	---	56.00	7.22	N	OFF	19.8
1.371750	---	42.16	46.00	3.84	N	OFF	19.8
1.371750	49.32	---	56.00	6.68	N	OFF	19.8
1.450500	---	37.53	46.00	8.47	N	OFF	19.8
1.450500	47.77	---	56.00	8.23	N	OFF	19.8
1.466250	---	35.45	46.00	10.55	N	OFF	19.8
1.466250	45.48	---	56.00	10.52	N	OFF	19.8
1.551750	---	36.23	46.00	9.77	N	OFF	19.8
1.551750	46.90	---	56.00	9.10	N	OFF	19.8
1.628250	---	41.37	46.00	4.63	N	OFF	19.8
1.628250	48.88	---	56.00	7.12	N	OFF	19.8
1.725000	---	39.87	46.00	6.13	N	OFF	19.8
1.725000	48.97	---	56.00	7.03	N	OFF	19.8
1.756500	---	36.80	46.00	9.20	N	OFF	19.8
1.756500	46.50	---	56.00	9.50	N	OFF	19.8
1.839750	---	35.64	46.00	10.36	N	OFF	19.8
1.839750	46.32	---	56.00	9.68	N	OFF	19.8
1.911750	---	41.31	46.00	4.69	N	OFF	19.8
1.911750	48.36	---	56.00	7.64	N	OFF	19.8
1.997250	---	40.98	46.00	5.02	N	OFF	19.8
1.997250	48.90	---	56.00	7.10	N	OFF	19.8
2.033250	---	38.64	46.00	7.36	N	OFF	19.8
2.033250	47.27	---	56.00	8.73	N	OFF	19.8
2.159250	---	37.34	46.00	8.66	N	OFF	19.8
2.159250	47.01	---	56.00	8.99	N	OFF	19.8
2.269500	---	41.00	46.00	5.00	N	OFF	19.8
2.269500	47.55	---	56.00	8.45	N	OFF	19.8
2.357250	---	37.15	46.00	8.85	N	OFF	19.8
2.357250	45.63	---	56.00	10.37	N	OFF	19.8
2.451750	---	36.26	46.00	9.74	N	OFF	19.8
2.451750	45.77	---	56.00	10.23	N	OFF	19.8
2.553000	---	39.91	46.00	6.09	N	OFF	19.8
2.553000	46.23	---	56.00	9.77	N	OFF	19.8
2.656500	---	36.91	46.00	9.09	N	OFF	19.8
2.656500	45.20	---	56.00	10.80	N	OFF	19.8
2.787000	---	36.79	46.00	9.21	N	OFF	19.8
2.787000	44.71	---	56.00	11.29	N	OFF	19.8

2.877000	---	38.79	46.00	7.21	N	OFF	19.8
2.877000	45.71	---	56.00	10.29	N	OFF	19.8
2.985000	---	36.62	46.00	9.38	N	OFF	19.8
2.985000	44.13	---	56.00	11.87	N	OFF	19.8
3.203250	---	38.06	46.00	7.94	N	OFF	19.8
3.203250	45.33	---	56.00	10.67	N	OFF	19.8
3.401250	---	37.17	46.00	8.83	N	OFF	19.8
3.401250	44.04	---	56.00	11.96	N	OFF	19.8
3.558750	---	36.96	46.00	9.04	N	OFF	19.8
3.558750	44.43	---	56.00	11.57	N	OFF	19.8
3.779250	---	36.23	46.00	9.77	N	OFF	19.8
3.779250	42.78	---	56.00	13.22	N	OFF	19.8
4.191000	---	36.19	46.00	9.81	N	OFF	19.8
4.191000	42.05	---	56.00	13.95	N	OFF	19.8
4.490250	---	35.94	46.00	10.06	N	OFF	19.8
4.490250	42.19	---	56.00	13.81	N	OFF	19.8
4.735500	---	36.22	46.00	9.78	N	OFF	19.8
4.735500	42.22	---	56.00	13.78	N	OFF	19.8
5.039250	---	35.84	50.00	14.16	N	OFF	19.8
5.039250	41.76	---	60.00	18.24	N	OFF	19.8
5.786250	---	34.19	50.00	15.81	N	OFF	19.9
5.786250	39.95	---	60.00	20.05	N	OFF	19.9
6.076500	---	34.56	50.00	15.44	N	OFF	19.9
6.076500	40.44	---	60.00	19.56	N	OFF	19.9
6.609750	---	34.27	50.00	15.73	N	OFF	19.9
6.609750	40.63	---	60.00	19.37	N	OFF	19.9
6.839250	---	34.04	50.00	15.96	N	OFF	19.9
6.839250	40.05	---	60.00	19.95	N	OFF	19.9
7.611000	---	33.83	50.00	16.17	N	OFF	19.9
7.611000	41.37	---	60.00	18.63	N	OFF	19.9
8.180250	---	35.26	50.00	14.74	N	OFF	19.9
8.180250	42.92	---	60.00	17.08	N	OFF	19.9
8.596500	---	35.56	50.00	14.44	N	OFF	19.9
8.596500	44.79	---	60.00	15.21	N	OFF	19.9
9.152250	---	36.26	50.00	13.74	N	OFF	19.9
9.152250	44.16	---	60.00	15.84	N	OFF	19.9
9.597750	---	36.05	50.00	13.95	N	OFF	19.9
9.597750	44.21	---	60.00	15.79	N	OFF	19.9
10.403250	---	36.70	50.00	13.30	N	OFF	19.9
10.403250	42.66	---	60.00	17.34	N	OFF	19.9
10.713750	---	36.77	50.00	13.23	N	OFF	19.9
10.713750	42.46	---	60.00	17.54	N	OFF	19.9
11.319000	---	37.30	50.00	12.70	N	OFF	20.0
11.319000	42.98	---	60.00	17.02	N	OFF	20.0
11.618250	---	38.21	50.00	11.79	N	OFF	20.0
11.618250	43.58	---	60.00	16.42	N	OFF	20.0
11.964750	---	38.42	50.00	11.58	N	OFF	20.0
11.964750	43.84	---	60.00	16.16	N	OFF	20.0
12.329250	---	37.62	50.00	12.38	N	OFF	20.0
12.329250	42.67	---	60.00	17.33	N	OFF	20.0
12.473250	---	36.04	50.00	13.96	N	OFF	20.0
12.473250	41.68	---	60.00	18.32	N	OFF	20.0
13.089750	---	31.98	50.00	18.02	N	OFF	20.0
13.089750	37.94	---	60.00	22.06	N	OFF	20.0
13.863750	---	26.85	50.00	23.15	N	OFF	20.0
13.863750	39.91	---	60.00	20.09	N	OFF	20.0
14.637750	---	25.00	50.00	25.00	N	OFF	20.0
14.637750	46.46	---	60.00	13.54	N	OFF	20.0
14.817750	---	24.98	50.00	25.02	N	OFF	20.0
14.817750	49.44	---	60.00	10.56	N	OFF	20.0
15.027000	---	23.76	50.00	26.24	N	OFF	20.0
15.027000	46.76	---	60.00	13.24	N	OFF	20.0
15.306000	---	22.96	50.00	27.04	N	OFF	20.0
15.306000	48.21	---	60.00	11.79	N	OFF	20.0
15.425250	---	23.71	50.00	26.29	N	OFF	20.0
15.425250	48.63	---	60.00	11.37	N	OFF	20.0
15.726750	---	22.67	50.00	27.33	N	OFF	20.0
15.726750	48.16	---	60.00	11.84	N	OFF	20.0
16.023750	---	22.78	50.00	27.22	N	OFF	20.0
16.023750	47.79	---	60.00	12.21	N	OFF	20.0
16.188000	---	23.29	50.00	26.71	N	OFF	20.0

16.188000	49.80	---	60.00	10.20	N	OFF	20.0
16.399500	---	23.20	50.00	26.80	N	OFF	20.0
16.399500	50.15	---	60.00	9.85	N	OFF	20.0
16.602000	---	23.46	50.00	26.54	N	OFF	20.0
16.602000	50.24	---	60.00	9.76	N	OFF	20.0
16.793250	---	24.62	50.00	25.38	N	OFF	20.0
16.793250	52.46	---	60.00	7.54	N	OFF	20.0
17.065500	---	25.10	50.00	24.90	N	OFF	20.0
17.065500	52.71	---	60.00	7.29	N	OFF	20.0
17.259000	---	25.45	50.00	24.55	N	OFF	20.0
17.259000	53.17	---	60.00	6.83	N	OFF	20.0
17.542500	---	27.38	50.00	22.62	N	OFF	20.0
17.542500	53.67	---	60.00	6.33	N	OFF	20.0
17.702250	---	28.66	50.00	21.34	N	OFF	20.0
17.702250	57.35	---	60.00	2.65	N	OFF	20.0
17.783250	---	30.86	50.00	19.14	N	OFF	20.0
17.783250	58.95	---	60.00	1.05	N	OFF	20.0
17.920500	---	28.82	50.00	21.18	N	OFF	20.0
17.920500	56.14	---	60.00	3.86	N	OFF	20.0
18.352500	---	25.96	50.00	24.04	N	OFF	20.0
18.352500	55.15	---	60.00	4.85	N	OFF	20.0
18.530250	---	23.18	50.00	26.82	N	OFF	20.0
18.530250	51.12	---	60.00	8.88	N	OFF	20.0
18.919500	---	21.23	50.00	28.77	N	OFF	20.0
18.919500	49.55	---	60.00	10.45	N	OFF	20.0
19.342500	---	19.63	50.00	30.37	N	OFF	20.1
19.342500	47.26	---	60.00	12.74	N	OFF	20.1
19.828500	---	17.09	50.00	32.91	N	OFF	20.1
19.828500	41.42	---	60.00	18.58	N	OFF	20.1
20.166000	---	17.18	50.00	32.82	N	OFF	20.1
20.166000	41.44	---	60.00	18.56	N	OFF	20.1
20.710500	---	16.83	50.00	33.17	N	OFF	20.1
20.710500	39.76	---	60.00	20.24	N	OFF	20.1
21.725250	---	16.10	50.00	33.90	N	OFF	20.1
21.725250	35.69	---	60.00	24.31	N	OFF	20.1
25.525500	---	18.85	50.00	31.15	N	OFF	20.1
25.525500	40.20	---	60.00	19.80	N	OFF	20.1
25.710000	---	21.50	50.00	28.50	N	OFF	20.1
25.710000	46.59	---	60.00	13.41	N	OFF	20.1
25.928250	---	22.72	50.00	27.28	N	OFF	20.1
25.928250	49.12	---	60.00	10.88	N	OFF	20.1
26.196000	---	21.85	50.00	28.15	N	OFF	20.2
26.196000	46.92	---	60.00	13.08	N	OFF	20.2
26.391750	---	20.85	50.00	29.15	N	OFF	20.2
26.391750	46.12	---	60.00	13.88	N	OFF	20.2
26.578500	---	21.01	50.00	28.99	N	OFF	20.2
26.578500	46.85	---	60.00	13.15	N	OFF	20.2
26.709000	---	20.01	50.00	29.99	N	OFF	20.2
26.709000	45.23	---	60.00	14.77	N	OFF	20.2
26.859750	---	19.37	50.00	30.63	N	OFF	20.2
26.859750	41.47	---	60.00	18.53	N	OFF	20.2
26.904750	---	19.31	50.00	30.69	N	OFF	20.2
26.904750	41.47	---	60.00	18.53	N	OFF	20.2

Appendix B. Radiated Spurious Emission

Test Engineer :	Yuan Lee, Fu Chen and Troye Hsieh	Temperature :	19.9~20.9°C
		Relative Humidity :	52.1~65.6%

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 19 2440MHz		4880	46.15	-27.85	74	59.89	32.7	12.14	58.58	115	259	P	H
		4880	40.21	-13.79	54	53.95	32.7	12.14	58.58	115	259	A	H
		7320	43.94	-30.06	74	50.91	36.82	15.2	58.99	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		4880	44.95	-29.05	74	58.69	32.7	12.14	58.58	120	100	P	V
		4880	38.67	-15.33	54	52.41	32.7	12.14	58.58	120	100	A	V
		7320	44.23	-29.77	74	51.2	36.82	15.2	58.99	-	-	P	V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 39 2480MHz	*	2480	84.92	-	-	73.66	27.7	16.84	33.28	143	354	P	H
	*	2480	83.46	-	-	72.2	27.7	16.84	33.28	143	354	A	H
		2496.24	53.4	-20.6	74	42.11	27.7	16.86	33.27	143	354	P	H
		2488.08	44.58	-9.42	54	33.31	27.7	16.85	33.28	143	354	A	H
													H
													H
	*	2480	84.82	-	-	73.56	27.7	16.84	33.28	202	158	P	V
	*	2480	83.2	-	-	71.94	27.7	16.84	33.28	202	158	A	V
		2486.08	53.47	-20.53	74	42.21	27.7	16.84	33.28	202	158	P	V
		2484.2	44.68	-9.32	54	33.42	27.7	16.84	33.28	202	158	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 19 2440MHz		4880	45.51	-28.49	74	59.25	32.7	12.14	58.58	120	259	P	H
		4880	40.41	-13.59	54	54.15	32.7	12.14	58.58	120	259	A	H
		7320	43.72	-30.28	74	50.69	36.82	15.2	58.99	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4880	41.8	-32.2	74	55.54	32.7	12.14	58.58	-	-	P	V
		7320	44.09	-29.91	74	51.06	36.82	15.2	58.99	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V

BLE	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 39 2480MHz		4960	46.85	-27.15	74	60.3	33.04	12.15	58.64	100	258	P	H
		4960	41.89	-12.11	54	55.34	33.04	12.15	58.64	100	258	A	H
		7440	44.38	-29.62	74	51.61	36.32	15.35	58.9	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4960	45.53	-28.47	74	58.98	33.04	12.15	58.64	400	259	P	V
		4960	39.73	-14.27	54	53.18	33.04	12.15	58.64	400	259	A	V
		7440	43.52	-30.48	74	50.75	36.32	15.35	58.9	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Emission above 18GHz

2.4GHz BLE (SHF)

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE SHF		22640	36.41	-37.59	74	41.33	38.48	16.97	60.37	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		23368	37.13	-36.87	74	41.12	38.74	17.28	60.01	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		48.09	30.24	-9.76	40	46.52	15.21	0.75	32.24	200	123	QP	H
		70.5	27.49	-12.51	40	46.54	12.11	1.01	32.17	245	299	QP	H
		195.24	27.04	-16.46	43.5	42.84	14.61	1.86	32.27	150	250	QP	H
		417.6	37.82	-8.18	46	44.51	22.37	2.82	31.88	150	198	QP	H
		790	41.02	-4.98	46	40.28	28.18	4.08	31.52	200	265	QP	H
		882.4	35.89	-10.11	46	34.14	29.02	4.28	31.55	100	270	QP	H
													H
													H
													H
													H
													H
													H
		52.41	24.23	-15.77	40	42.47	13.17	0.78	32.19	100	65	QP	V
		80.76	26	-14	40	43.97	13.23	1.13	32.33	102	42	QP	V
		177.96	35.2	-8.3	43.5	50.64	14.8	1.75	31.99	-	-	P	V
		418.3	34.56	-11.44	46	41.23	22.4	2.82	31.89	233	252	QP	V
		789.3	38.94	-7.06	46	38.22	28.16	4.08	31.52	242	200	QP	V
		882.4	39.89	-6.11	46	38.14	29.02	4.28	31.55	250	187	QP	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **Margin** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Radiated Spurious Emission Plots

Test Engineer :	Yuan Lee, Fu Chen and Troye Hsieh	**Temperature :**	19.9~20.9°C
		Relative Humidity :	52.1~65.6%

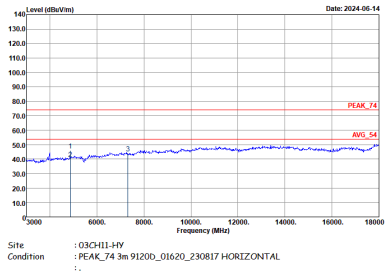
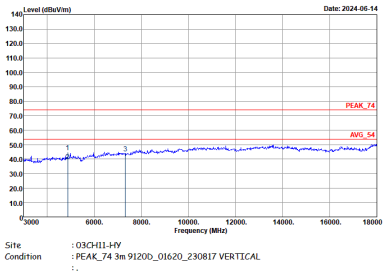
Note symbol

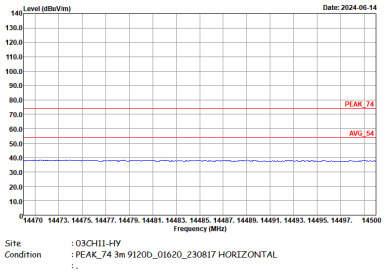
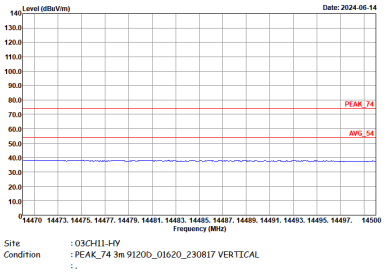
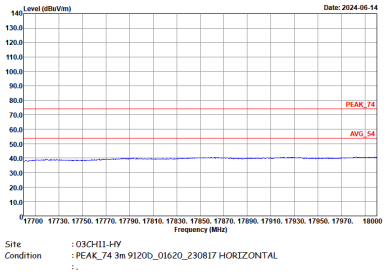
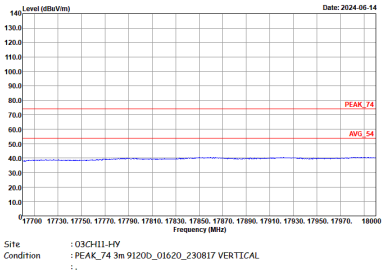
-L	**Low channel location**
-R	**High channel location**

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

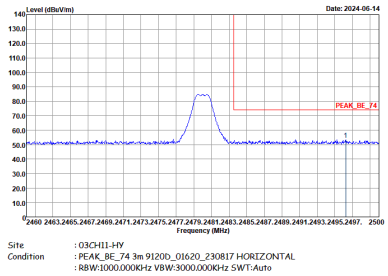
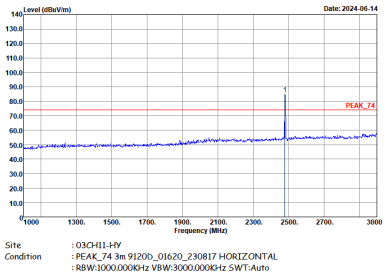
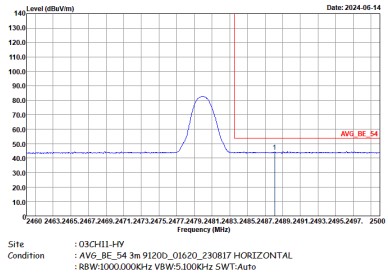
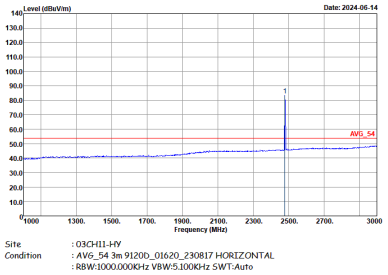
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.		

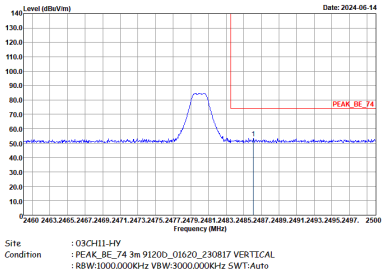
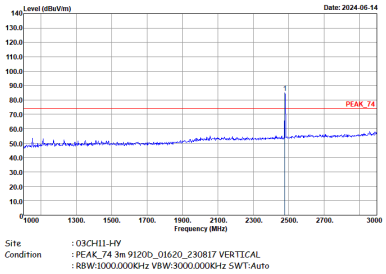
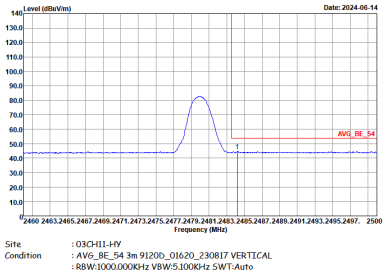
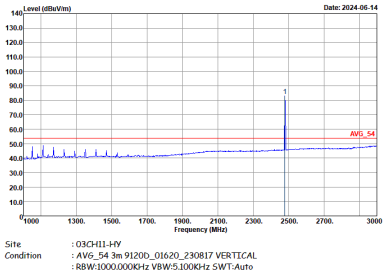
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.		
17.7G ~18G Avg		

<2Mbps>

2.4GHz 2400~2483.5MHz

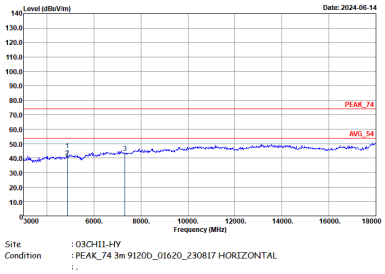
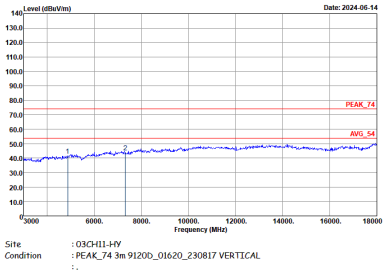
BLE (Band Edge @ 3m)

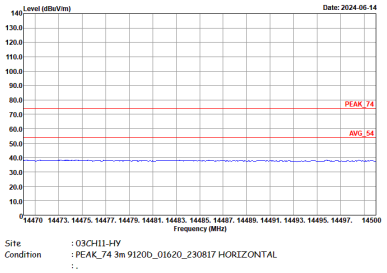
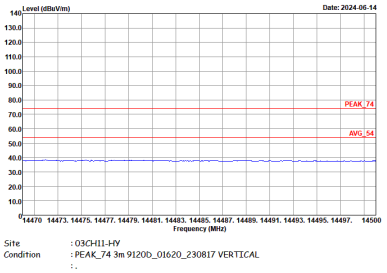
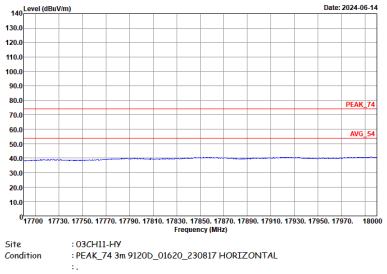
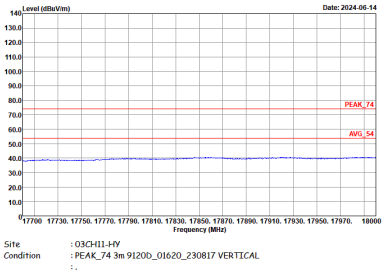
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

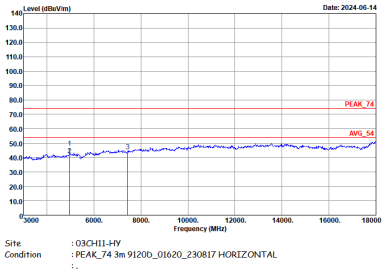
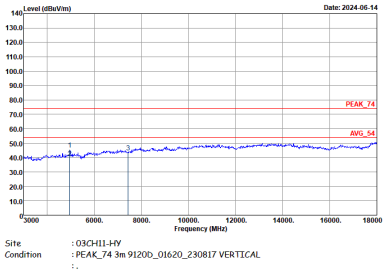
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-HV Condition : PEAK_BE_74 3m 9120D_01620_230817 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HV Condition : PEAK_74 3m 9120D_01620_230817 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HV Condition : AVG_BE_54 3m 9120D_01620_230817 VERTICAL : RBW:1000.000KHz VBW:5.100KHz SWT:Auto	 Site : 03CH11-HV Condition : AVG_54 3m 9120D_01620_230817 VERTICAL : RBW:1000.000KHz VBW:5.100KHz SWT:Auto

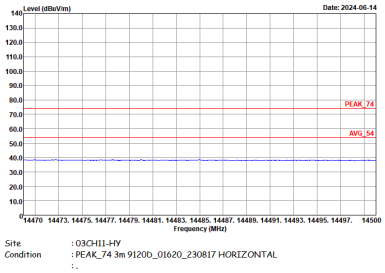
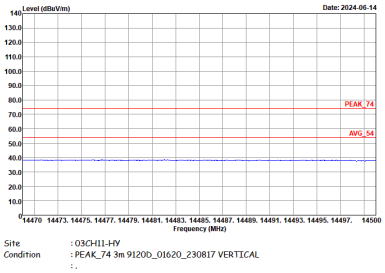
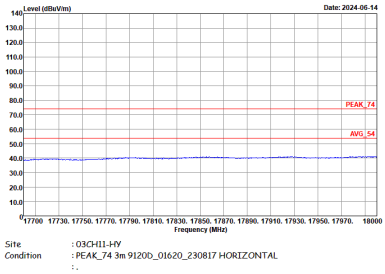
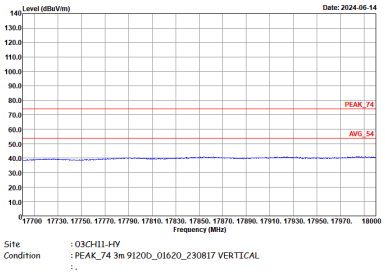
2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.		

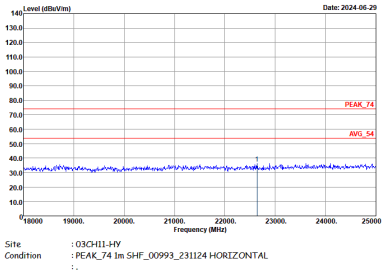
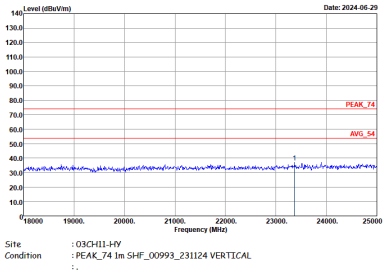
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.		
17.7G ~18G Avg		

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak		

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.		
17.7G ~18G Avg		

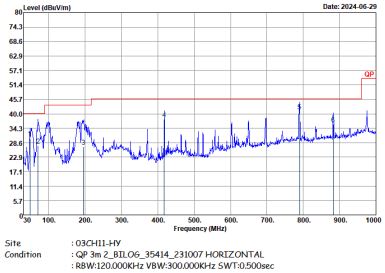
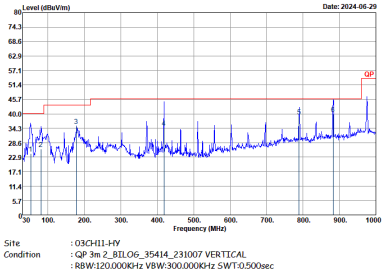
Emission above 18GHz

2.4GHz BLE (SHF @ 1m)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz BLE (LF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak		

Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth – LE for 1Mbps	62.82	392	2.55	2.7kHz
Bluetooth – LE for 2Mbps	32.91	206	4.85	5.1kHz

Bluetooth – LE for 1Mbps	Bluetooth – LE for 2Mbps