



FCC RADIO TEST REPORT

FCC ID : B32V400M2
Equipment : Point of Sale Terminal
Brand Name : Verifone
Model Name : V400m-2
V400m Plus 4G WW2
Applicant : VeriFone, Inc.
1400 West Stanford Ranch Road
Suite 150 Rocklin CA 95765 USA
Manufacturer : VeriFone, Inc.
Standard : FCC Part 15 Subpart C §15.247

The product was received on Jul. 25, 2023 and testing was performed from Aug. 11, 2023 to Aug. 24, 2023. We, Sporton International Inc. Wensan 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. Wensan Laboratory, the test report shall not be reproduced except in full.

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No. 58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(b)	Power Output Measurement	Pass	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	9.36 dB under the limit at 2483.52 MHz
3.3	15.203	Antenna Requirement	Pass	-

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:

1. 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.
2. The purpose of different model name is for marketing segmentation.

Reviewed by: Yun Huang
Report Producer: Michelle Chen



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
General Specs GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac and NFC.	
Antenna Type WWAN: Fixed Internal Antenna WLAN: PCB Antenna Bluetooth: PCB Antenna NFC: Loop Antenna	

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	-0.40

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. 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. TH05-HY, 03CH22-HY

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

FCC designation No.: 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.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

- 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: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

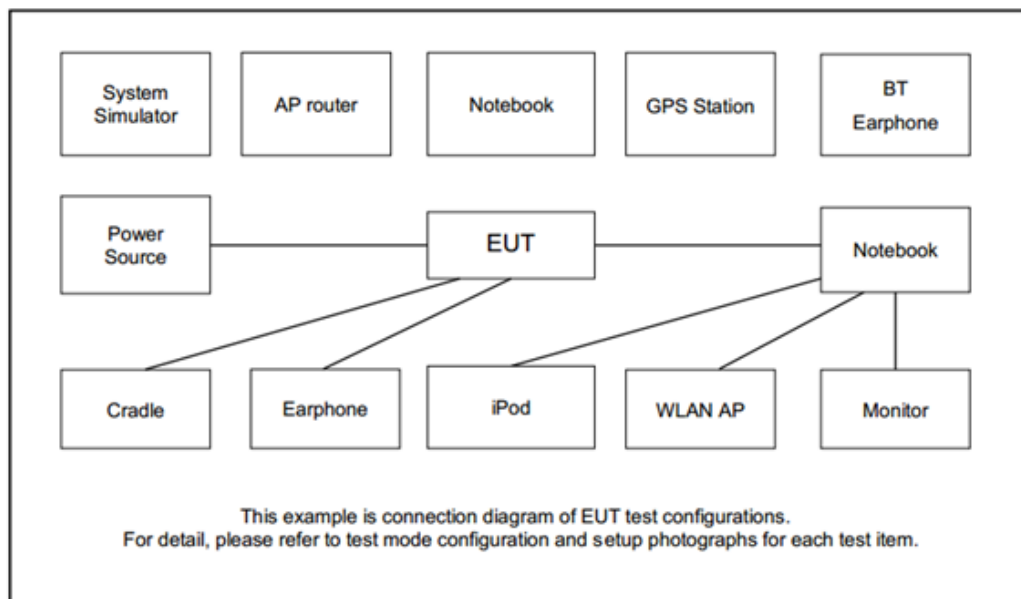
The final test modes include the worst data rates for each modulation shown in the table below.

Modulation	Data Rate
802.11g	6 Mbps
802.11n HT20	MCS0

Ch. #	2400-2483.5 MHz	
	802.11g	802.11n HT20
High	11	11

Remark: For Radiated Test Cases, the tests were performed with AC Adapter.

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.	Bluetooth Base Station	CBT	101135	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Lenovo	MP2CWZYZ	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility “Tera Term 4.105” 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 with 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.

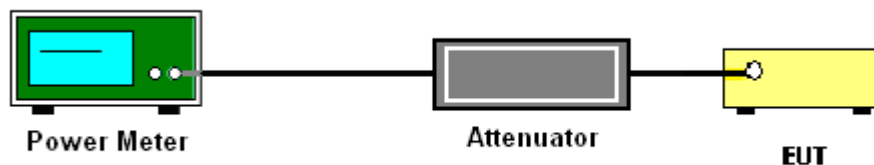
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. For Peak Power, the testing follows ANSI C63.10 Section 11.9.1.3 PKPM1
2. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
3. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Measure the conducted output power and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.1.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.



3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

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 output power of this device is measured by spectrum analyzer, the attenuation under this paragraph 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.

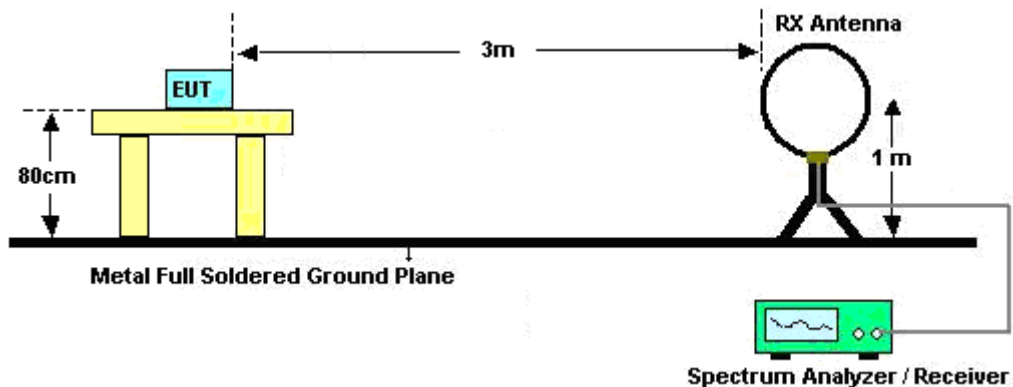
3.2.3 Test Procedures

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 “-“.

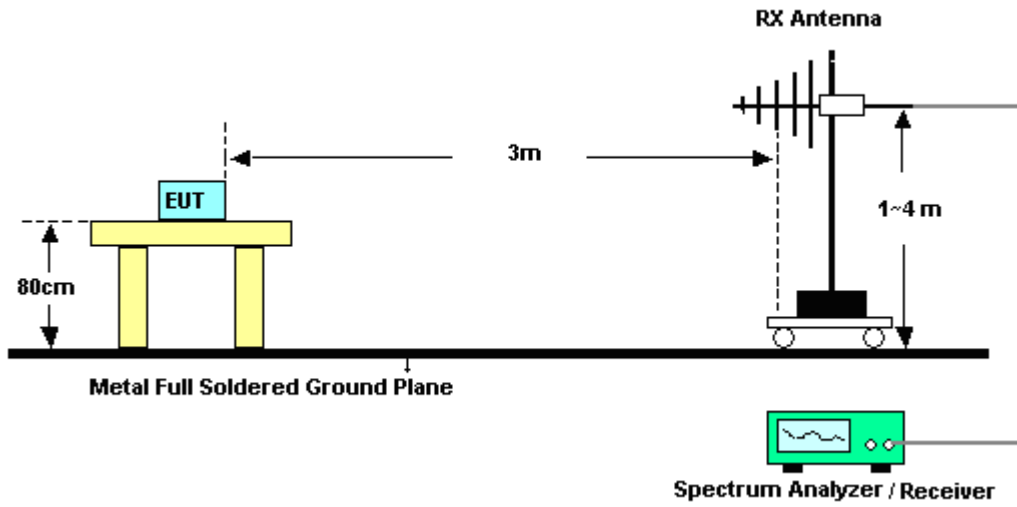
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with 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 \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW = 3 MHz for $f \geq 1$ GHz for peak measurement.For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, 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

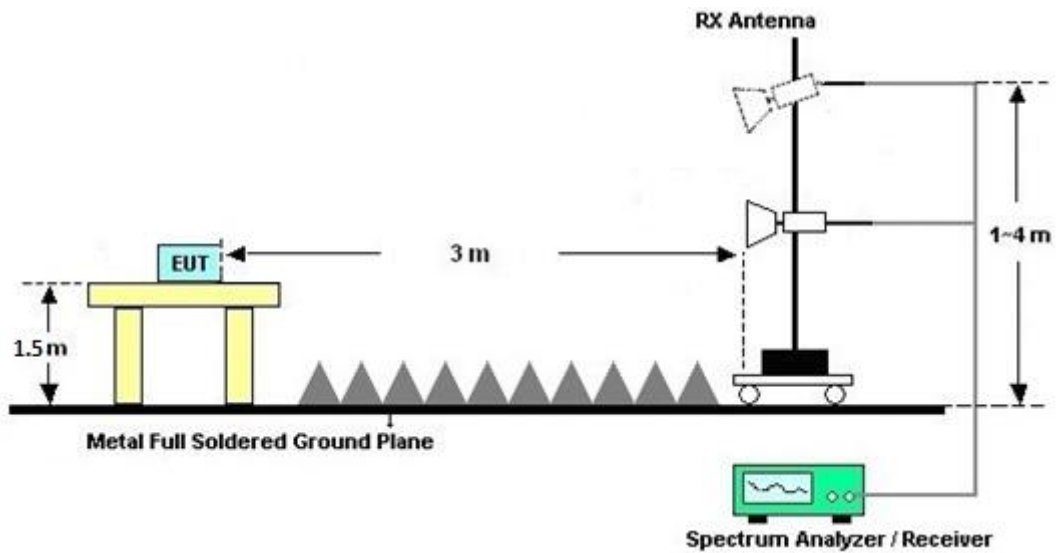
For radiated emissions below 30MHz



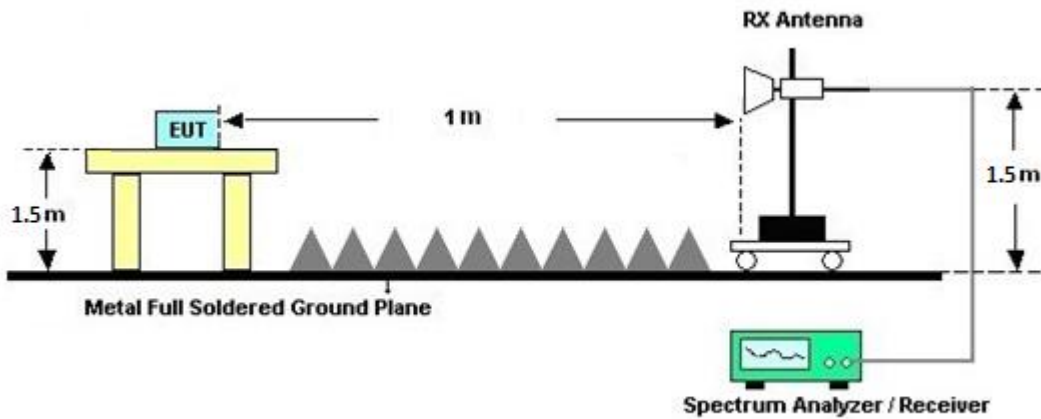
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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 (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.



3.3 Antenna Requirements

3.3.1 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.

3.3.2 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
Bilog Antenna with 6dB pad	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	63304 & 002	N/A	Oct. 04, 2022	Aug. 22, 2023~ Aug. 24, 2023	Oct. 03, 2023	Radiation (03CH22-HY)
Amplifier	SONOMA	310N	421581	N/A	Jul. 15, 2023	Aug. 22, 2023~ Aug. 24, 2023	Jul. 14, 2024	Radiation (03CH22-HY)
Horn Antenna	RFSPIN	DRH18-E	LE2C04A18E N	1GHz~18GHz	Jul. 12, 2023	Aug. 22, 2023~ Aug. 24, 2023	Jul. 11, 2024	Radiation (03CH22-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1224	18GHz-40GHz	Jul. 10, 2023	Aug. 22, 2023~ Aug. 24, 2023	Jul. 09, 2024	Radiation (03CH22-HY)
Amplifier	EMEC	EM01G18GA	060877	N/A	Sep. 29, 2022	Aug. 22, 2023~ Aug. 24, 2023	Sep. 28, 2023	Radiation (03CH22-HY)
Preamplifier	EMEC	EM18G40G	060872	18-40GHz	Sep. 28, 2022	Aug. 22, 2023~ Aug. 24, 2023	Sep. 27, 2023	Radiation (03CH22-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Sep. 06, 2023	Aug. 22, 2023~ Aug. 24, 2023	Sep. 05, 2024	Radiation (03CH22-HY)
Hygrometer	TECPEL	DTM-303A	TP211469	N/A	Jan. 06, 2023	Aug. 22, 2023~ Aug. 24, 2023	Jan. 05, 2024	Radiation (03CH22-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Aug. 22, 2023~ Aug. 24, 2023	N/A	Radiation (03CH22-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 22, 2023~ Aug. 24, 2023	N/A	Radiation (03CH22-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 22, 2023~ Aug. 24, 2023	N/A	Radiation (03CH22-HY)
Software	Audix	E3 6.09824_2019 122	RK-002347	N/A	N/A	Aug. 22, 2023~ Aug. 24, 2023	N/A	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 07, 2023	Aug. 22, 2023~ Aug. 24, 2023	Mar. 06, 2024	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804390/2,804 611/2,804615/ 2	N/A	Oct. 25, 2022	Aug. 22, 2023~ Aug. 24, 2023	Oct. 24, 2023	Radiation (03CH22-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 17, 2022	Aug. 11, 2023	Nov. 16, 2023	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	932001	N/A	Sep. 26, 2022	Aug. 11, 2023	Sep. 25, 2023	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	846202	300MHz~40GHz	Sep. 26, 2022	Aug. 11, 2023	Sep. 25, 2023	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101564	10Hz ~ 40GHz	Sep. 13, 2022	Aug. 11, 2023	Sep. 12, 2023	Conducted (TH05-HY)



5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.92 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.42 dB
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Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.40 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.38 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Ju Chang	Temperature:	21~25	°C
Test Date:	2023/8/18	Relative Humidity:	51~54	%

TEST RESULTS DATA
Peak Output Power

2.4GHz Band Single Antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11g	6Mbps	1	11	2462	23.12	-		30.00	-	-0.40	-	22.72	-	36.00	-	Pass
HT20	MCS0	1	11	2462	22.12	-		30.00	-	-0.40	-	21.72	-	36.00	-	Pass

TEST RESULTS DATA
Average Output Power
(Reporting Only)

2.4GHz Band Single Antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11g	6Mbps	1	11	2462	13.31	-		30.00	-	-0.40	-	12.91	-	36.00	-	Pass
HT20	MCS0	1	11	2462	11.79	-		30.00	-	-0.40	-	11.39	-	36.00	-	Pass

Note: Measured power (dBm) has offset with cable loss.



Appendix B. Radiated Spurious Emission

Test Engineer :	Bank Lin and Lu Wen-Kai	Temperature :	20.1~23.1°C
		Relative Humidity :	55.0~65.0%

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 11 2462MHz	*	2462	101.89	-	-	88.48	26.8	9.28	32.51	112	354	P	H
	*	2462	93.75	-	-	80.34	26.8	9.28	32.51	112	354	A	H
		2483.52	57.56	-16.44	74	44.03	26.9	9.32	32.53	112	354	P	H
		2483.52	44.64	-9.36	54	31.11	26.9	9.32	32.53	112	354	A	H
													H
													H
	*	2462	99.61	-	-	86.2	26.8	9.28	32.51	350	208	P	V
	*	2462	91.79	-	-	78.38	26.8	9.28	32.51	350	208	A	V
		2483.64	56.18	-17.82	74	42.65	26.9	9.32	32.53	350	208	P	V
		2483.56	44.06	-9.94	54	30.53	26.9	9.32	32.53	350	208	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
WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	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)	
802.11g CH 11 2462MHz		4924	45.69	-28.31	74	32.19	32.65	13.94	33.57	-	-	P	H	
		7386	51.27	-22.73	74	33.16	37.43	16.2	36	-	-	P	H	
		7386	40.08	-13.92	54	21.97	37.43	16.2	36	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4924	47.62	-26.38	74	34.12	32.65	13.94	33.57	-	-	P	V
			7386	51.5	-22.5	74	33.39	37.43	16.2	36	-	-	P	V
			7386	40.36	-13.64	54	22.25	37.43	16.2	36	-	-	A	V
														V
														V
														V
														V
													V	
													V	
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. 													



**2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1	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)
802.11n HT20 CH 11 2462MHz	*	2462	100.84	-	-	87.43	26.8	9.28	32.51	167	32	P	H
	*	2462	92.84	-	-	79.43	26.8	9.28	32.51	167	32	A	H
		2483.52	54	-20	74	40.47	26.9	9.32	32.53	167	32	P	H
		2483.52	41.25	-12.75	54	27.72	26.9	9.32	32.53	167	32	A	H
													H
													H
	*	2462	99.18	-	-	85.77	26.8	9.28	32.51	154	201	P	V
	*	2462	91.5	-	-	78.09	26.8	9.28	32.51	154	201	A	V
		2483.68	53.5	-20.5	74	39.97	26.9	9.32	32.53	154	201	P	V
		2483.64	41.08	-12.92	54	27.55	26.9	9.32	32.53	154	201	A	V
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission above 18GHz
2.4GHz WIFI 802.11g (SHF)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g SHF		24825	45.2	-28.8	74	42.8	39.6	32.16	59.82	-	-	P	H
													H
													H
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			24839	44.58	-29.42	74	42.02	39.71	32.18	59.79	-	-	P
													V
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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 WIFI 802.11g (LF)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
2.4GHz 802.11g LF		30	23.44	-16.56	40	29.97	25.2	1.02	32.76	-	-	P	H	
		120.21	23.82	-19.68	43.5	36.69	17.46	2.35	32.72	-	-	P	H	
		338.46	28.52	-17.48	46	37.59	19.94	3.66	32.74	-	-	P	H	
		562.53	29.28	-16.72	46	31.16	26.2	4.64	32.88	-	-	P	H	
		768.17	31.91	-14.09	46	30.84	28.14	5.38	32.6	-	-	P	H	
		967.99	36.51	-17.49	54	30.34	31.18	5.97	31.21	-	-	P	H	
														H
														H
														H
														H
														H
														H
			30.97	23.38	-16.62	40	30.48	24.62	1.03	32.76	-	-	P	V
			76.56	25.13	-14.87	40	42.93	12.96	1.93	32.73	-	-	P	V
			145.43	25.38	-18.12	43.5	38.47	17.04	2.55	32.71	-	-	P	V
			338.46	25.75	-20.25	46	34.82	19.94	3.66	32.74	-	-	P	V
			867.11	34.92	-11.08	46	31.79	29.32	5.68	32.08	-	-	P	V
			957.32	36.26	-9.74	46	30.2	31.25	5.93	31.33	-	-	P	V
														V
														V
													V	
													V	
													V	
													V	

Remark

- No other spurious found.
- All results are PASS against limit line.
- 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	Peak or Average
H/V	Horizontal or Vertical



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

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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”.

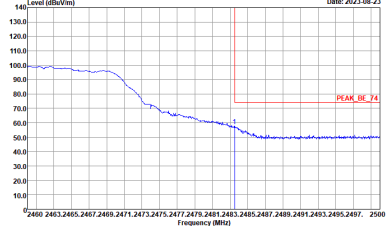
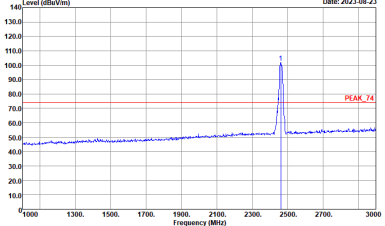
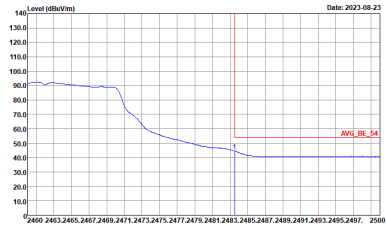
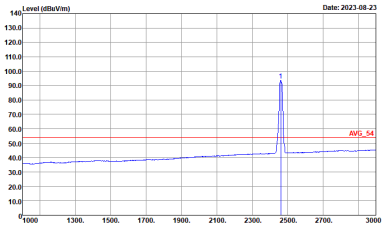


Appendix C. Radiated Spurious Emission Plots

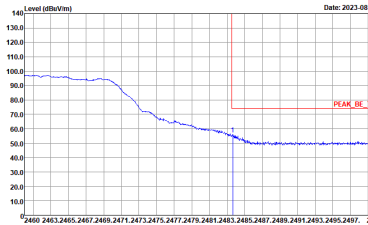
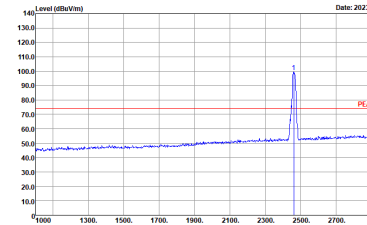
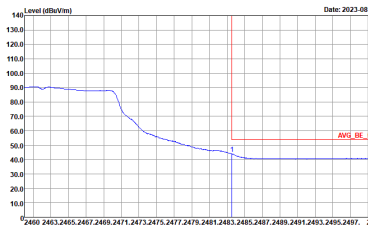
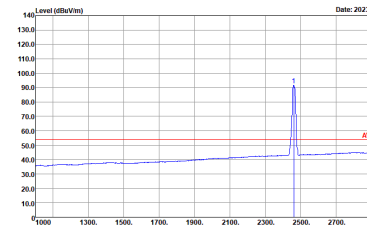
Test Engineer :	Bank Lin and Lu Wen-Kai	Temperature :	20.1~23.1°C
		Relative Humidity :	55.0~65.0%



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

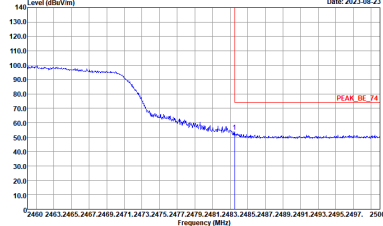
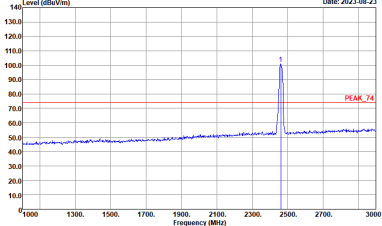
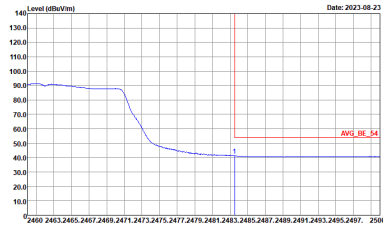
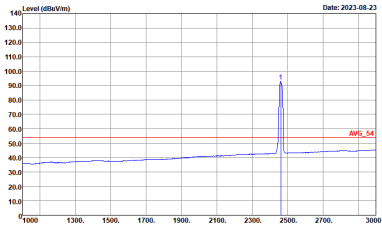
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : PEAK_74 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH22-HY Condition : AV6_BE_54 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : AV6_54 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>



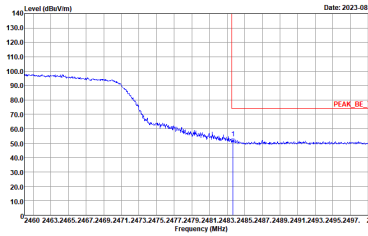
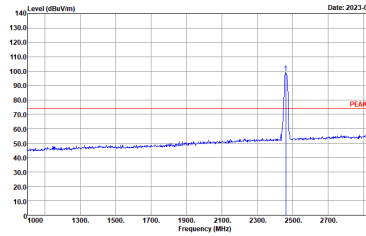
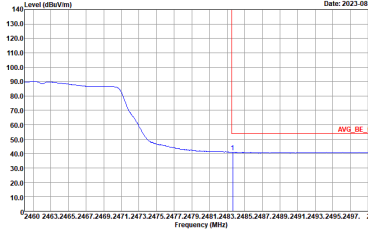
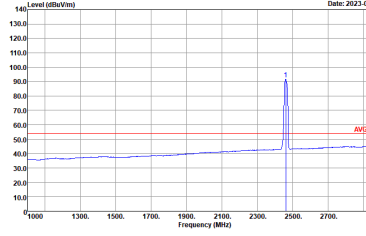
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : PEAK_74 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH22-HY Condition : AVG_BE_54 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : AVG_54 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 <p>Level (dBm/100MHz) vs Frequency (MHz) plot for Horizontal orientation. The plot shows a signal level starting at approximately 100 dBm/100MHz at 2400 MHz and decreasing to about 50 dBm/100MHz by 2462 MHz. A red vertical line marks the peak at 2462 MHz, labeled 'PEAK_BE_74'.</p> <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Level (dBm/100MHz) vs Frequency (MHz) plot for Fundamental orientation. The plot shows a sharp peak at 2462 MHz with a level of approximately 100 dBm/100MHz. A red vertical line marks the peak, labeled 'PEAK_74'.</p> <p>Site : 03CH22-HY Condition : PEAK_74 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Level (dBm/100MHz) vs Frequency (MHz) plot for Horizontal orientation showing the average signal. The signal level decreases from 100 dBm/100MHz at 2400 MHz to approximately 40 dBm/100MHz at 2462 MHz. A red vertical line marks the average level at 2462 MHz, labeled 'AVG_BE_54'.</p> <p>Site : 03CH22-HY Condition : AVG_BE_54 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>	 <p>Level (dBm/100MHz) vs Frequency (MHz) plot for Fundamental orientation showing the average signal. The plot shows a sharp peak at 2462 MHz with an average level of approximately 50 dBm/100MHz. A red vertical line marks the average level, labeled 'AVG_54'.</p> <p>Site : 03CH22-HY Condition : AVG_54 3m LEZ004A18EN_230712 HORIZONTAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>



WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH22-HY Condition : PEAK_BE_74 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : PEAK_74 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH22-HY Condition : AVG_BE_54 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>	 <p>Site : 03CH22-HY Condition : AVG_54 3m LE2004A18EN_230712 VERTICAL : RBW:1000.000KHz VBW:0.750KHz SWT:Auto</p>



**2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 3m)**

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH22-HY Condition : PEAK_74 3m LE2C04A18EN_230712 HORIZONTAL</p>	<p>Site : 03CH22-HY Condition : PEAK_74 3m LE2C04A18EN_230712 VERTICAL</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
10.6G ~18G Avg.	<p>Site : 03CH22-HY Condition : AV6_54 3m LE2C04A18EN_230712 HORIZONTAL</p>	<p>Site : 03CH22-HY Condition : AV6_54 3m LE2C04A18EN_230712 VERTICAL</p>



Emission above 18GHz
2.4GHz WIFI 802.11g (SHF @ 1m)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g SHF	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH22-HY Condition : PEAK_74 1m SHF_1224_230710 HORIZONTAL</p>	<p>Site : 03CH22-HY Condition : PEAK_74 1m SHF_1224_230710 VERTICAL</p>



Emission below 1GHz
2.4GHz WIFI 802.11g (LF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g LF	
1	Horizontal	Vertical
QP / Peak	<p>Site : 03CH22-HY Condition : QP 3m BIL06_63304_221004 HORIZONTAL</p>	<p>Site : 03CH22-HY Condition : QP 3m BIL06_63304_221004 VERTICAL</p>



Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11g	93.14	1425	0.70	750Hz
2.4GHz 802.11n HT20	93.03	1335	820Hz	

