Partial FCC Test Report

Report No.:	RFBECO-WTW-P20100054F
FCC ID:	TLZ-CM276NF
Test Model:	AW-CM276NF
Received Date:	Mar. 18, 2022
Test Date:	Jun. 06 ~ Jun. 14, 2022
Issued Date:	Jul. 01, 2022
Applicant:	AzureWave Technologies, Inc.
Address:	8F., No.94, Baozhong Rd. , Xindian Dist., New Taipei City , Taiwan 231
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan
FCC Registration / Designation Number (1):	788550 / TW0003
FCC Registration / Designation Number (2):	281270 / TW0032

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBECO-WTW-P20100054F	Original Release	Jul. 01, 2022

1 Certificate of Conformity

Product:	IEEE 802.11 2X2 MU-MIMO ac/a/b/g/n Wireless LAN + Bluetooth NGFF Module
Brand:	AzureWave
Test Model:	AW-CM276NF
Sample Status:	Engineering Sample
Applicant:	AzureWave Technologies, Inc.
Test Date:	Jun. 06 ~ Jun. 14, 2022
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Gina Liu , **Date:** Jul. 01, 2022

Gina Liu / Specialist

Approved by : Jeremy Lin , **Date:** Jul. 01, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	AC Power Conducted Emission	N/A	Refer to Note
15.247(a)(1)(iii)	Number of Hopping Frequency Used	N/A	Refer to Note
15.247(a)(1)(iii)	Dwell Time on Each Channel	N/A	Refer to Note
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	N/A	Refer to Note
15.247(b) (1)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.0 dB at 59.10 MHz.
15.247(d)	Band Edge Measurement	Pass	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

Note:

1. This report is a partial report, and only test items of RF Output Power, Spurious Emissions and Band Edge tests. The radiated emission test is performed on the worst channel of the original reported radiated emission. Other testing data please refer to BV CPS report no.: RFBECO-WTW-P20100054E-3 for module (Brand: AzureWave, Model: AW-CM276NF, FCC ID: TLZ-CM276NF).
2. If the Frequency Hopping System operating in 2400-2483.5 MHz band and the output power less than 125 mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of hopping channel whichever is greater.
3. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
4. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 200 MHz	2.91 dB
	200 MHz ~ 1000 MHz	2.92 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	IEEE 802.11 2X2 MU-MIMO ac/a/b/g/n Wireless LAN + Bluetooth NGFF Module
Brand	AzureWave
Test Model	AW-CM276NF
Status of EUT	Engineering Sample
Power Supply Rating	DC 3.3V from host equipment
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	1/2/3 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	79
Output Power	3.811 mW
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV CPS report no. RFBECO-WTW-P20100054E-3. The difference compared with original report is adding new antennas and specific End-product.
2. The EUT is authorized for use in specific End-product. All models are listed as below. Model TD540-W are the representative for final test.

Product	10” Touch Display	
Brand	Trimble	
Function	**Model**	
	TD540-W	TD540
Wireless	With	Without
Bluetooth	With	Without
NFC	With	With
Note: The difference between TD540 and TD540-W is software disable WIFI/BT.		

3. The antennas provided to the EUT, please refer to the following table:

Original

Antenna Set	Brand	Model	Chain No.	Antenna Net. Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type	Cable Length
1	MAG.LAYERS	MSA-4008-25GC1-A1	Chain 0(Aux)	2.98	2400~2500	PIFA	i-pex(MHF)	15cm
				5.16	4900~5900			
			Chain 1(Main)	2.98	2400~2500			15cm
				5.16	4900~5900			
2	Bondale	G-RA0K10090176-1436B	Chain 0(Aux)	1.9	2400~2500	Dipole	RP-SMA	120mm
				3.6	4900~5800			
			Chain 1(Main)	1.9	2400~2500			120mm
				3.6	4900~5800			
3	San Jose	UEN-201	Chain 0(Aux)	2.4	2400~2500	Dipole	RP-SMA	120mm
				4.4	4900~5800			
			Chain 1(Main)	2.4	2400~2500			120mm
				4.4	4900~5800			

Antenna Set	Brand	Model	Chain No.	Antenna Net. Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type	Cable Length
4	Unictron	H2B1PC1A1C175L	Chain 0(Aux)	1.6	2400-2500	PCB	I-pex	100±5mm
				4.8	5150~5850			
			Chain 1(Main)	1.6	2400-2500	PCB	I-pex	100±5mm
				4.8	5150~5850			
5	LSR	001-0012	Chain 0(Aux)	2	2400-2500	Dipole	RP-SMA	100mm
				2	5150~5850			
			Chain 1(Main)	2	2400-2500	Dipole	RP-SMA	100mm
				2	5150~5850			
6	Laird	MAF94051	Chain 0(Aux)	2.4	2400-2500	Dipole	RP-SMA	100mm
				3.4	5150~5850			
			Chain 1(Main)	2.4	2400-2500	Dipole	RP-SMA	100mm
				3.4	5150~5850			
7	Taoglas	GW.59.3153	Chain 0(Aux)	2.86	2400-2500	Dipole	RP-SMA	100mm
				4.74	5150~5850			
			Chain 1(Main)	2.86	2400-2500	Dipole	RP-SMA	100mm
				4.74	5150~5850			
8	Chang Hong	DA-2458-02-SMR	Chain 0(Aux)	2.85	2400-2500	Dipole	RP-SMA	100mm
				2.17	5150~5850			
			Chain 1(Main)	2.85	2400-2500	Dipole	RP-SMA	100mm
				3.13	5150~5850			
9	Unictron	H2B1PD1A1C385L	Chain 0(Aux)	2.8	2400-2500	PCB	I-pex	100mm
				4.2	5150~5850			
			Chain 1(Main)	2.8	2400-2500	PCB	I-pex	100mm
				4.2	5150~5850			
10	Molex	2042811100	Chain 0(Aux)	2.562	2400-2500	PCB	I-pex	100mm
				3.094	5150~5850			
			Chain 1(Main)	2.562	2400-2500	PCB	I-pex	100mm
				3.094	5150~5850			
11	Molex	1461531100	Chain 0(Aux)	1.829	2400-2500	PCB	I-pex	100mm
				2.485	5150~5850			
			Chain 1(Main)	1.829	2400-2500	PCB	I-pex	100mm
				2.485	5150~5850			
12	MAG.LAYERS	MSA-4008-25GC1-A2	Chain 0(Aux)	2.98	2400-2500	PIFA	i-pex(MHF)	NA
				5.16	5150~5850			
			Chain 1(Main)	2.98	2400-2500	PIFA	i-pex(MHF)	
				5.16	5150~5850			

Newly

Antenna Set	Brand	Model	Chain No.	Antenna Net. Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type	Cable Length
13	INPAQ	WA-M-LB-01-128	Chain 0(Aux)	2.68	2400-2500	PIFA	ipex(MHF)	145 mm
				4.19	5150-5850			
		WA-M-LB-02-262	Chain 1(Main)	2.44	2400-2500	PIFA	ipex(MHF)	215 mm
				4.08	5150-5850			

4. The above Antenna information refers to the manufacturer's antenna specifications, the laboratory shall not be held responsible.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

3.2 Description of Test Modes

79 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To			Description
	RE≥1G	RE<1G	Power	
-	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz

Power: Maximum Output Power Measurement

Note:

1. For Radiated emission test, pre-tested GFSK, π/4-DQPSK, 8DPSK modulation type and found 8DPSK was the worse, therefore chosen for the final test and presented in the test report.
2. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
3. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	78	FHSS	8DPSK	3DH5

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	78	FHSS	8DPSK	3DH5

Maximum Output Power Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

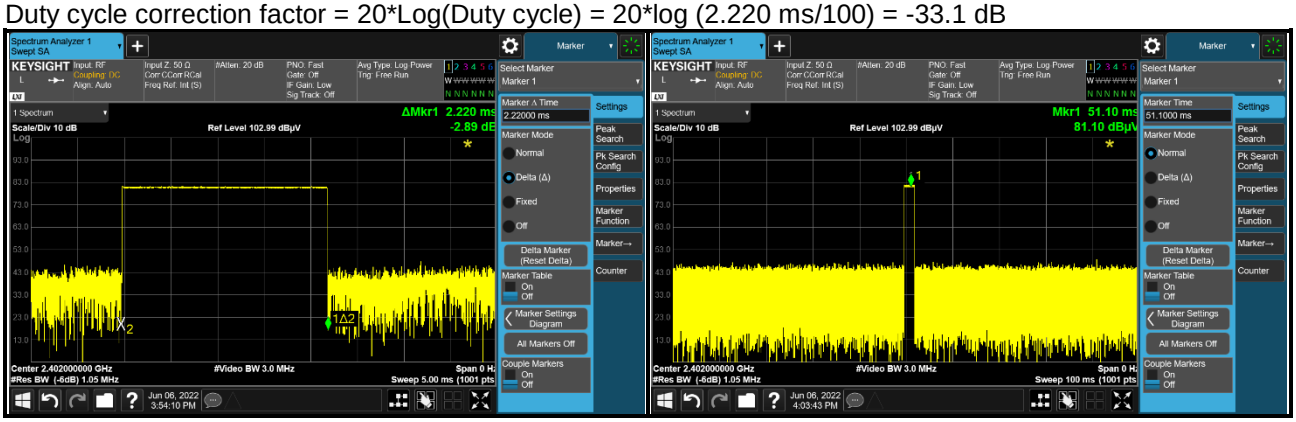
EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
-	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 67 % RH	12 Vdc	Edison Lee
RE<1G	23 deg. C, 67 % RH	12 Vdc	Edison Lee
Power	25 deg. C, 65 % RH	12 Vdc	Jay Chang

3.3 Duty Cycle of Test Signal

Duty cycle correction factor = 20*Log(Duty cycle) = 20*log (2.220 ms/100) = -33.1 dB



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

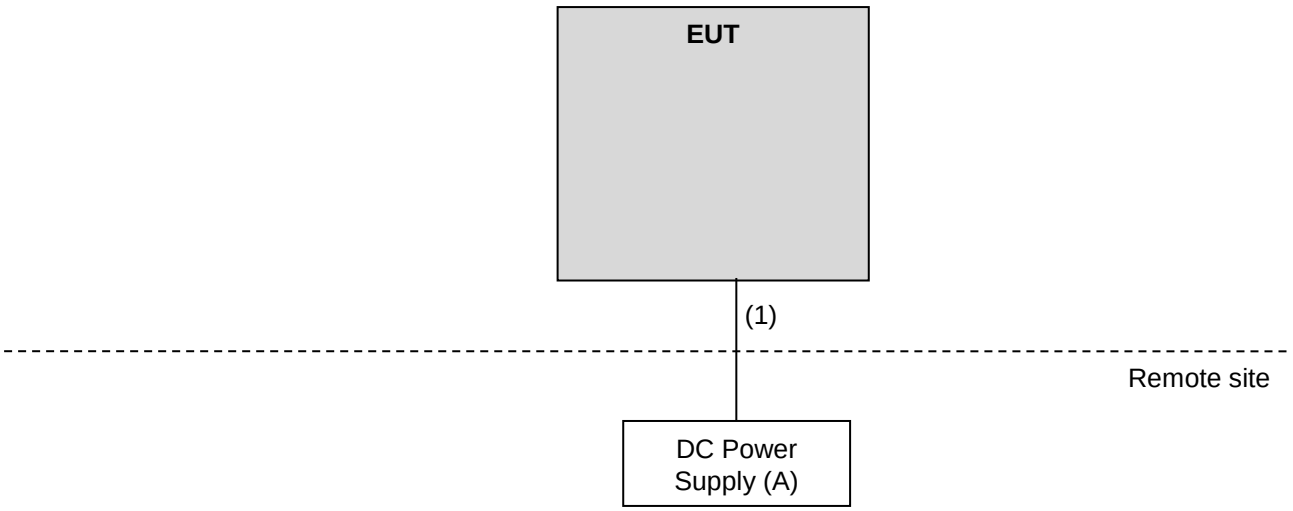
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DC Power Supply	NA	NA	NA	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partners to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.0	N	0	Provided by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (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

Note:

a. The lower limit shall apply at the transition frequencies.

b. Emission level (dBuV/m) = 20 log Emission level (uV/m).

c. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038B	MY60180018	Feb. 18, 2022	Feb. 17, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110462	Dec. 21, 2021	Dec. 20, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-995	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna RF SPIN	DRH18-E	210104A18E	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980783	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980810	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980787	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(9000+3000+2000+1000)	201230+ 201242+201238+ 210101	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+3000+500++500)	201252+ 201250+201247+ 201245	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201259+201256+201253	Jan. 17, 2022	Jan. 16, 2023
Software BV CPS	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Turn Table Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208675	NA	NA
Antenna Tower KaiTuo	NA	NA	NA	NA
Antenna Tower Controller KaiTuo	KT-2000	NA	NA	NA
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 17, 2022	Jan. 16, 2023
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 18, 2022	Jan. 17, 2023
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100979	Mar. 25, 2022	Mar. 24, 2023

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 7.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:
Note:

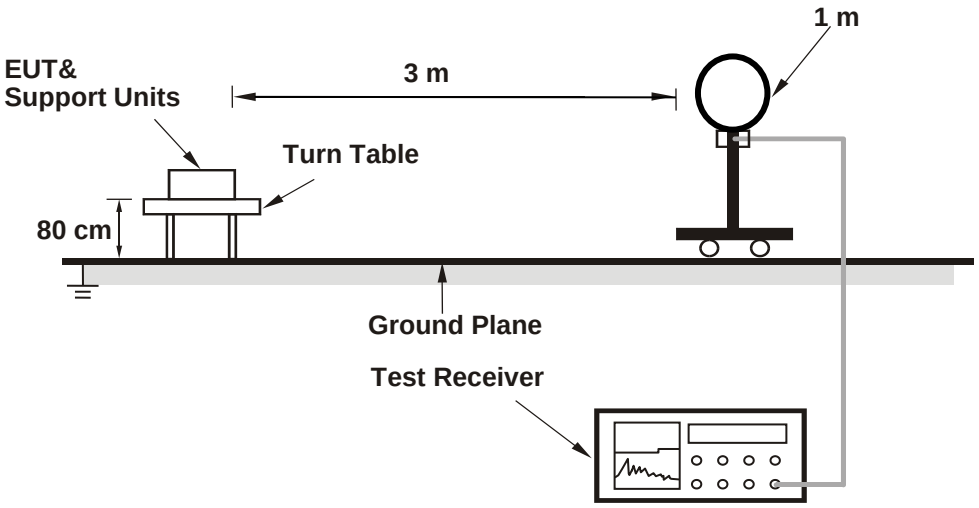
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
3. For Fundamental frequency and band edge & harmonic:
   The average value of fundamental frequency is :average value = peak value + 20*log(Duty cycle) where the duty cycle correction factor is calculated from following formula:
   20*Log(Duty cycle) = 20*log (2.220 ms/100) = -33.1 dB, please refer to the plotted duty (see section 3.3)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

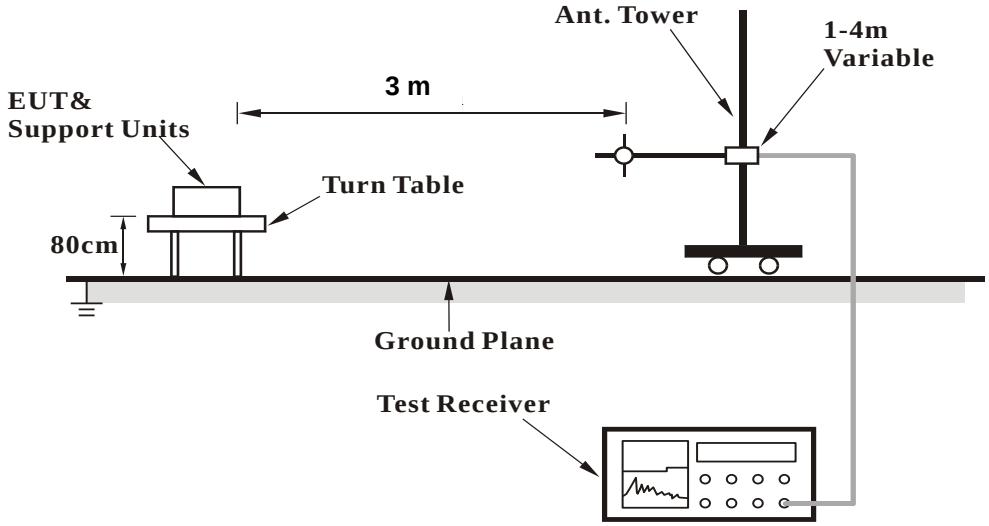
No deviation.

4.1.5 Test Set Up

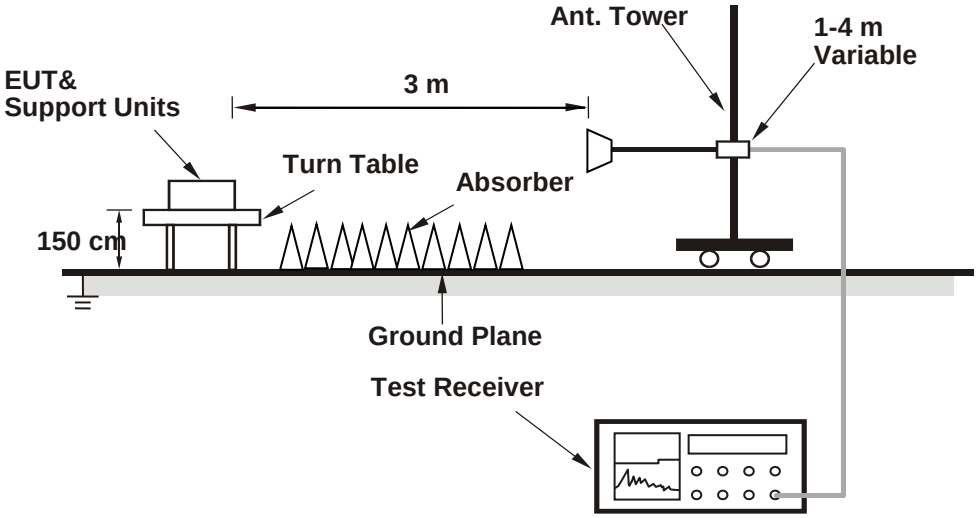
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data:

8DPSK

Frequency Range	1 GHz ~ 25 GHz	**Channel**	CH 78：2480 MHz
Input Power	12 Vdc	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Tested By	Edison Lee	**Environmental Conditions**	23°C, 67% RH

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	*2480.00	105.30 PK			2.44 H	60	73.50	31.80
2	*2480.00	72.20 AV			2.44 H	60	40.40	31.80
3	**2483.50**	**58.10 PK**	**74.00**	**-15.90**	**2.44 H**	**60**	**63.40**	**-5.30**
4	2483.50	25.00 AV	54.00	-29.00	2.51 H	60	30.30	-5.30
5	4960.00	47.30 PK	74.00	-26.70	1.59 H	208	44.90	2.40
6	4960.00	14.20 AV	54.00	-39.80	1.59 H	208	11.80	2.40
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	*2480.00	100.60 PK			1.57 V	291	68.80	31.80
2	*2480.00	67.50 AV			1.57 V	291	35.70	31.80
3	2483.50	57.00 PK	74.00	-17.00	1.57 V	291	62.30	-5.30
4	2483.50	23.90 AV	54.00	-30.10	1.57 V	291	29.20	-5.30
5	4960.00	47.30 PK	74.00	-26.70	1.74 V	150	44.90	2.40
6	4960.00	14.20 AV	54.00	-39.80	1.74 V	150	11.80	2.40

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. for Fundamental frequency and bandedge & harmonic:
   The average value of fundamental frequency is: average = peak value + 20log(Duty cycle) where the duty factor is calculated from following formula:
   20Log(Duty cycle) = 20 log (2.220ms*1/100) = -33.1dB please refer to the plotted duty (see section 3.3)

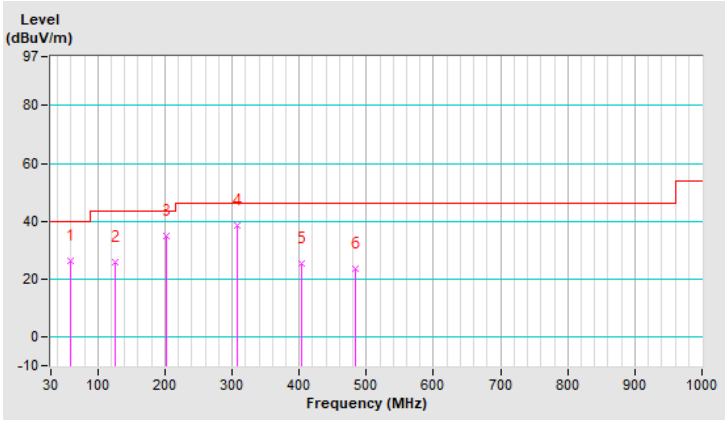
9 kHz ~ 1 GHz Worst-Case Data:

RF Mode	TX BT_8DPSK	Channel	CH 78：2480 MHz
Input Power	12 Vdc	Detector Function & Bandwidth	(QP) RB = 120kHz
Tested By	Edison Lee	Environmental Conditions	23°C, 67% RH

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	59.10	26.1 QP	40.0	-13.9	1.01 H	104	39.8	-13.7
2	126.03	26.0 QP	43.5	-17.5	1.01 H	78	40.8	-14.8
3	201.69	34.8 QP	43.5	-8.7	2.00 H	224	51.7	-16.9
4	307.42	38.5 QP	46.0	-7.5	1.01 H	236	51.3	-12.8
5	403.45	25.3 QP	46.0	-20.7	1.50 H	244	35.7	-10.4
6	483.96	23.4 QP	46.0	-22.6	1.01 H	295	32.0	-8.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

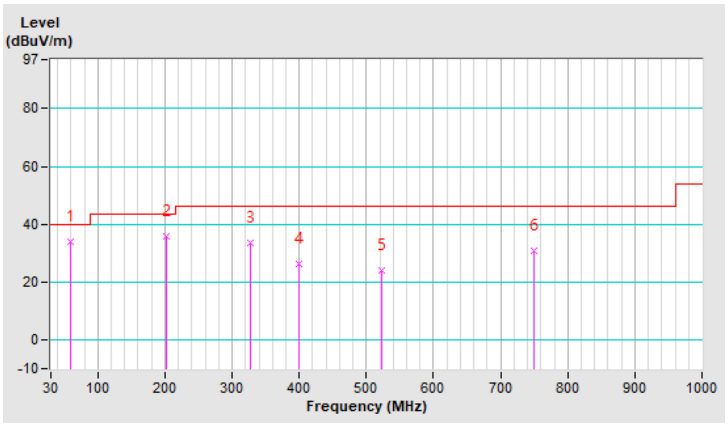


RF Mode	TX BT_8DPSK	**Channel**	CH 78：2480 MHz
Input Power	12 Vdc	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Tested By	Edison Lee	**Environmental Conditions**	23°C, 67% RH

Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	**59.10**	**34.0 QP**	**40.0**	**-6.0**	**2.00 V**	**338**	**47.7**	**-13.7**
2	201.69	36.0 QP	43.5	-7.5	1.01 V	236	52.9	-16.9
3	327.79	33.7 QP	46.0	-12.3	1.50 V	109	45.8	-12.1
4	399.57	26.3 QP	46.0	-19.7	1.50 V	149	36.8	-10.5
5	522.76	23.9 QP	46.0	-22.1	1.01 V	121	31.5	-7.6
6	749.74	30.8 QP	46.0	-15.2	1.01 V	106	34.1	-3.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



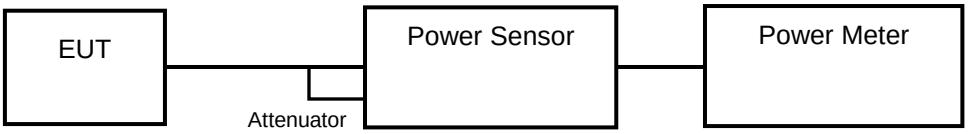
4.2 Maximum Output Power

4.2.1 Limits of Maximum Output Power Measurement

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.2.7 Test Results

<GFSK>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	2.301	3.62	2.275	3.57	125 / 1000 Note	Pass
39	2441	2.178	3.38	2.158	3.34	125 / 1000 Note	Pass
78	2480	2.018	3.05	2.004	3.02	125 / 1000 Note	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 3.2 of the results.

<8DPSK>

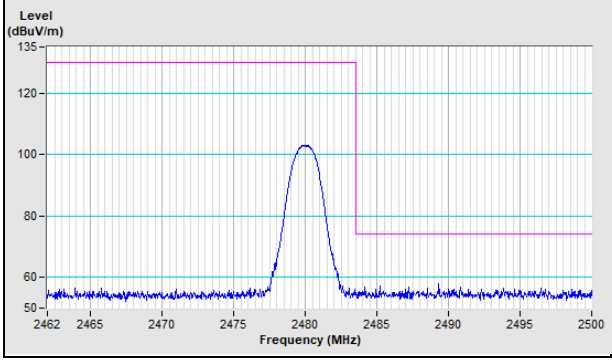
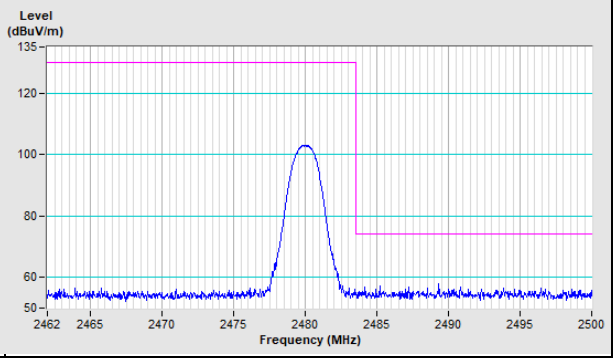
Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	3.811	5.81	2.249	3.52	125 / 1000 Note	Pass
39	2441	3.565	5.52	2.099	3.22	125 / 1000 Note	Pass
78	2480	3.573	5.53	2.104	3.23	125 / 1000 Note	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 3.2 of the results.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

BT 8DPSK Channel 78	
Horizontal (Peak)	**Horizontal (Peak)**
	

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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