

RF TEST REPORT

FCC ID: 2A49R-MS-01

Test Report No............ RF231116004-01-001

Product(s) Name......: MINI PC

Model(s)...... MS-01-S1245, MS-01-S1250, MS-01-S1260, MS-01-S1270, MS-01-

S1290, MS-01-S129K, MS-01-S1342, MS-01-S1350, MS-01-S1360,

MS-01-S1370, MS-01-S1380, MS-01-S1390, MS-01-S139K

Trade Mark..... N/A

Applicant...... MICRO COMPUTER (HK) TECH LIMITED

Address...... RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan

Chai, HK, China

Receipt Date...... 2024.01.04

Test Date...... 2024.01.11~2024.04.15

ANSI C63.10:2013

Testing Laboratory.....: Shenzhen Haiyun Standard Technical Co., Ltd.

Prepared By:	Checked By:	Approved By:	Standard
Jason Huang	Tim Zhang	Misue Su	H. H. Ganga
Jason huang	7 in. zhang	Misue Su	HAIYUN CO



Table of Contents

Hi	stor	y of this test report	4
1.	Gei	neral Information	5
	1.1	Applicant	5
	1.2	Manufacturer	
	1.3	Factory	5
	1.4	Basic Description of Equipment Under Test	5
	1.5	Transmit Operating Mode	7
2.	Sur	nmary of Test Results	8
	2.1	Summary of Test Items	8
	2.2	Application of Standard	8
	2.3	Test Instruments	9
	2.4	Test Mode	10
	2.5	Test Condition	11
	2.6	Duty Cycle of Test Signal	11
	2.7	Measurement Uncertainty	12
	2.8	Test Location	12
	2.9	Description of Support Units	12
	2.10	Deviation from Standards	12
3.	Tes	st Procedure And Results	13
	3.1	AC Power Line Conducted Emission	13
		3.1.1 Limit	13
		3.1.2 Test Procedure	13
		3.1.3 Test Setup	13
		3.1.4 Test Result	14
	3.2	Radiated Emission and Band Edge	16
		3.2.1 Limit	16
		3.2.2 Test Procedure	16
		3.2.3 Test Setup	18
		3.2.4 Test Result	19
	3.3	Spurious Emission at Antenna Port	52



	3.3.1	Limit	52
	3.3.2	Test Procedure	52
	3.3.3	Test Setup	53
	3.3.4	The Result	53
3.4	6dB	Bandwidth	54
	3.4.1	Limit	54
	3.4.2	Test Procedure	54
	3.4.3	Test Setup	54
	3.4.4	Test Result	55
3.5	Max	imum conducted output power	56
	3.5.1	Limit	56
	3.5.2	Test Procedure	56
	3.5.3	Test Setup	56
	3.5.4	The Result	57
3.6	Pow	er Spectral Density	59
	3.6.1	Limit	59
	3.6.2	Test Procedure	59
	3.6.3	Test Setup	59
	364	The Result	60



History of this test report

Original Report Issue Date: 2024.04.17

O No additional attachment

Additional attachments were issued following record

Attachment No.	Issue Date	Description
RFBARR-WTW-P21030485A	2021.06.10	Module report Module ID: RAS-MT7922A22M
RF231116004-01-001	2024.04.17	Compared to the original report of this module, it was used for MINI PC, with antenna replacement and reduced gain. Therefore, the maximum conducted power and radiated emission, band edge and AC power conducted emission were tested with reference to the original report, while the rest remained unchanged.



1. General Information

1.1 Applicant

MICRO COMPUTER (HK) TECH LIMITED

RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, China

1.2 Manufacturer

MICRO COMPUTER (HK) TECH LIMITED

RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, China

1.3 Factory

MICRO COMPUTER (HK) TECH LIMITED

RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, China

1.4 Basic Description of Equipment Under Test

Product No.	POC231116004-S003						
Equipment Name	MINI PC						
		250, MS-01-S1260, MS-01-S1270, MS-01-					
Product Model	S1290, MS-01-S129K, MS-01-S1342, MS-01-S1350, MS-01-S1360,						
	MS-01-S1370, MS-01-S1380, MS-01-S1390, MS-01-S139K						
Test Model	MS-01-S1390						
Model Difference		amed according to the market demand,					
		opearance color are different.					
Trade Mark	N/A						
Power Supply	DC 19V from adapter						
	Model: SOY-1900947-454						
Adapter Information	Input: 100-240V~, 50/60Hz 2.5A Max						
	Output: 19V===4.47A, 179.93W						
Operate temperature	0℃-45℃						
EUT Stage	○ Product Unit • Final-Sample						
Operating Band and Conducted Output Power (Max power)	2400MHz ~ 2483.5MHz •IEEE 802.11b: 21.80dBm						
Product Type	IEEE 802.11b: WLAN (M IEEE 802.11g: WLAN(MI IEEE 802.11n: WLAN(MI IEEE 802.11ax: WLAN (N	MO) [´] MO)					
Nominal Bandwidth	20MHz / 40MHz						
Modulation	IEEE 802.11b: DSSS (DBPSK / DQPSK / CCK) IEEE 802.11g: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ax: OFDMA (BPSK / QPSK / 16QAM / 64QAM)						
Data Rate (Mbps)	IEEE 802.11b mode: 1/2/5.5/11 IEEE 802.11g mode: 6/9/12/18/24/36/48/54 IEEE 802.11n mode: up to 300 IEEE 802.11ax mode: up to 573.5						

HY-FCC part 15C Ver.1.1 Page 5 / 61 Report No.: RF231116004-01-001



Antenna gain	Ant1: 2.41dBi, Ant2: 2.29dBi
Antenna type	PIFA Antenna



Eleven channels are provided for 802.11b, 802.11g, 802.11n (20MHz), 802.11ax (20MHz):

Frequency Band	uency Band Channel No. Frequency		Channel No.	Frequency		
04000411- 0400 5 0411-	01	2412MHz	07	2442MHz		
	02	2417MHz	08	2447MHz		
	03	2422MHz	09	2452MHz		
2400MHz ~ 2483.5 MHz	04	2427MHz	10	2457MHz		
	05	2432MHz	11	2462MHz		
	06	2437MHz	/	/		

Seven channels are provided for 802.11n (40MHz), 802.11ax (40MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	03	2422 MHz	07	2442MHz
	04	2427MHz	08	2447MHz
	05	2432MHz	09	2452MHz
	06	2437MHz	/	/

Note: For 802.11ax mode only support full RU mode.

1.5 Transmit Operating Mode

Transmit Operating Mode				Transmit Multiple Antennas								
0	Operating mode 1 (s	ingle antenna)					0	1TX				
0	Operating mode 2 (m	nultiple antenna, no	bea	m formi	ng)		•	2TX	0	3TX	0	4TX
	Operating mode 3 (multiple antenna, with beam forming)				0	2TX	0	3TX	0	4TX		
	802.11b	Operating mode	0	1TX		2TX	0	3TX				
	802.11g	Operating mode	0	1TX		2TX	0	3TX				
	802.11n(20MHz)	Operating mode	0	1TX		2TX	0	3TX				
	802.11n(40MHz)	Operating mode	0	1TX		2TX	0	3TX				
	802.11ax(20MHz)	Operating mode	0	1TX		2TX	0	3TX				
	802.11ax(40MHz)	Operating mode	0	1TX		2TX	0	3TX				



2. Summary of Test Results

2.1 Summary of Test Items

47 CFR FCC Part 15, Subpart C (Section 15.247)								
Test item	FCC Clause	Results	Remarks					
AC Power Conducted Emission	15.207	Pass	Meet the requirement of the limit					
Radiated Emission and Band	15.205/15.209	Door	Meet the requirement of the limit					
Edge Measurement	/15.247(d)	Pass						
Spurious Emission at Antenna	15 047/d\	Note2	Most the requirement of the limit					
Port	15.247(d)	Notez	Meet the requirement of the limit					
6dB Bandwidth	15.247(a)(2)	Note2	Meet the requirement of the limit					
Maximum Conducted Power	15.247(b)	Pass	Meet the requirement of the limit					
Power Spectral Density	15.247(e)	Note2	Meet the requirement of the limit					
Antenna Requirements	15.203	Compliance	Note1					

Note:1. The EUT has 2 PIFA antennas arrangement which was permanently attached.

2. For test data, please refer to the report RFBARR-WTW-P21030485A.

2.2 Application of Standard

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 15.247 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013



2.3 Test Instruments

	Radiated Emissions							
No.	Equipment	Manufacturer	Type No.	Serial No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)		
1	Test receiver	Rohde&Schwarz	ESU	100184	2023/5/3	2024/5/2		
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D- 1273 2023/5/4		2024/5/3		
3	Low frequency amplifier	Unknown	LNA 0920N	2014	2023/5/3	2024/5/2		
4	High frequency amplifier	Schwarzbeck	BBV 9718	284	2023/5/3	2024/5/2		
5	Loop Antenna	Schwarzbeck	FMZB1519 B	00029	2023/7/16	2024/7/15		
6	Log periodic antenna	Schwarzbeck	VULB 9168	1151	2023/5/4	2024/5/3		
7	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D- 1273	2023/5/4	2024/5/3		
8	Horn Antenna	Schwarzbeck	BBHA 9170	9170#685	2023/7/16	2024/7/15		
9	Temp&Humidity Recorder	Meideshi	JR900	1	2023/5/3	2024/5/2		
10	RF cable(966 chamber)9kHz- 1GHz	Unknown	Unknown	Unknown	2023/5/3	2024/5/2		
11	RF cable(966 chamber)1GHz- 18GHz	Unknown	Unknown	Unknown	2023/5/3	2024/5/2		
12	RF cable(966 chamber)18GHz -40GHz	Unknown	Unknown	Unknown	2023/5/3	2024/5/2		
13	Test software	Farad Technology Co., Ltd		EZ-EMC	Ver.TW-03A2			
			nducted Emis	sion				
1	Test receiver	Rohde&Schwarz	ESCI	100718	2023/5/3	2024/5/2		
2	LISN	Rohde&Schwarz	ENV216	100075	2023/5/3	2024/5/2		
3	Pulse limiter	Rohde&Schwarz	ESH3-Z2	102299	2023/5/3	2024/5/2		
4	RF cable (9kHz-30MHz)	Unknown	Unknown	Unknown	2023/5/3	2024/5/2		
5	Test software	Farad Technology Co., Ltd			Ver.TW-03A2			
		RF C	onducted Em					
1	MXA Signal Analyzer	Keysight	N9021B	MY600801 69	2023/4/23	2024/4/22		
2	RF Control Unit	dsusoft	JS0806-2	21G806044 9	2023/4/23	2024/4/22		
3	power supply unit	dsusoft	JS0806- 4ADC	N/A	2023/4/23	2024/4/22		
4	VXG Signal Generator	Keysight	M9384B	MY612707 87	2023/4/23	2024/4/22		
5	EXG Analog Signal Generator	Keysight	N5173B	MY591012 82	2023/4/23	2024/4/22		
6	Test software	dsusoft	JS1120-3 Ver.3.2.22.0					



2.4 Test Mode

Test Items	Mode	Data Rate	Channel
	802.11B-CDD	1Mbps	01/06/11
	802.11G-CDD	6Mbps	01/06/11
Radiated Emission and Band Edge	802.11N20MIMO	MCS0	01/06/11
Measurement	802.11N40MIMO	MCS0	03/06/09
	802.11AX20MIMO	MCS0	01/06/11
	802.11AX40MIMO	MCS0	03/06/09
	802.11B-CDD	1Mbps	01/06/11
	802.11G-CDD	6Mbps	01/06/11
Maximum Conducted Power	802.11N20MIMO	MCS0	01/06/11
Maximum Conducted Power	802.11N40MIMO	MCS0	03/06/09
	802.11AX20MIMO	MCS0	01/06/11
	802.11AX40MIMO	MCS0	03/06/09



2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
Radiated Emission and Band Edge Measurement	23.4°C, 49% RH	AC 120V/60Hz	Freedom Zhuo
Maximum Conducted Power	24.2°C, 52% RH	AC 120V/60Hz	Albert Fan

Note: Adapter supply voltage AC 120V/60Hz.

The applicant declare the operating environment of EUT as below:

Normal conditions: 19V DC, 0~45°C

2.6 Duty Cycle of Test Signal

Test result: PASS

Note: For test data, please refer to the report RFBARR-WTW-P21030485A.



2.7 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty						
Parameter	Uncertainty					
Occupied Channel Bandwidth	±143.88kHz					
Power Spectral Density	±0.743dB					
Conducted Spurious Emission	±1.328dB					
RF power conducted	±0.384dB					
Conducted emission(9kHz~30MHz) AC main	±2.72dB					
Radiated emission(9kHz~30MHz)	±2.66dB					
Radiated emission (30MHz~1GHz)	±4.62dB					
Radiated emission (1GHz~18GHz)	±4.86dB					
Radiated emission (18GHz~40GHz)	±3.80dB					

2.8 Test Location

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110-113, 115, 116, Block B, Jinyuan Business Building, Bao'an
Address.	District, Shenzhen, China
CNAS Registration Number:	CNAS L18252
CAB identifier	CN0145
A2LA Certificate Number	6823.01
Telephone:	0755-26024411

2.9 Description of Support Units

None

2.10 Deviation from Standards

None



3. Test Procedure And Results

3.1 AC Power Line Conducted Emission

3.1.1 Limit

	Maximum RF Line Voltage					
Frequency	Quasi-Peak Level	Average Level				
	dB(μV)	dB(μV)				
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*				
500kHz ~ 5MHz	56	46				
5MHz ~ 30MHz	60	50				

Notes: 1. * Decreasing linearly with logarithm of frequency.

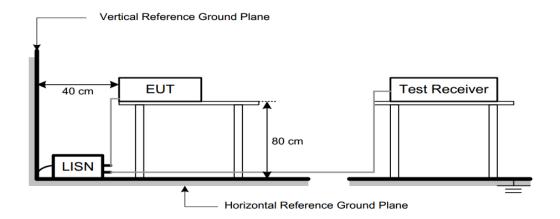
2. The lower limit shall apply at the transition frequencies.

3.1.2 Test Procedure

Test Method								
● Conducted Measurement	○Radiated Measurement							
Test (Channels							
OLowest, Middle and Highest Channel								
Environme	ntal conditions							
● Normal	○Normal and Extreme							
Note: ●: Test O: No Test								

- a) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c) The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit 20dB) was not recorded.

3.1.3 Test Setup



HY-FCC part 15C Ver.1.1 Page 13 / 61 Report No.: RF231116004-01-001



3.1.4 Test Result

12

16.3340

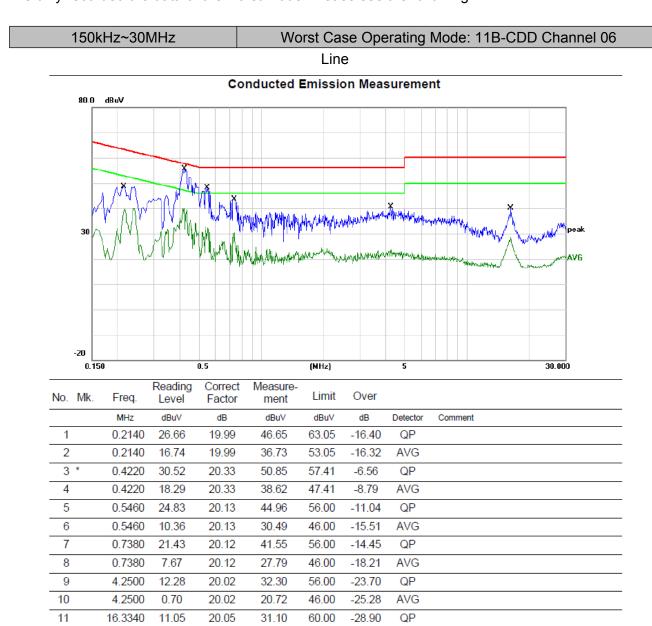
5.83

20.05

Note:

- 1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
- 2. Measurement = Reading + Correct Factor.
- 3. Over = Measurement Limit

We only recorded the data of the worst mode. Please see the following:



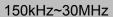
25.88

50.00

-24.12

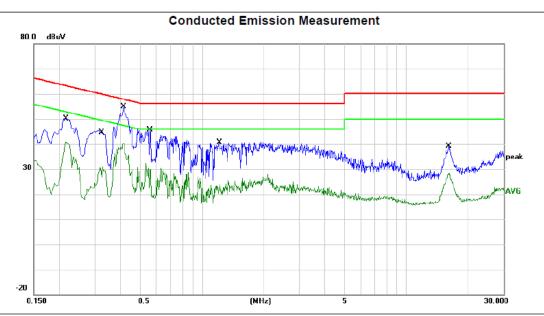
AVG





Worst Case Operating Mode: 11B-CDD Channel 06

Neutral



No. N	∕lk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2180	27.81	20.24	48.05	62.89	-14.84	QP	
2		0.2180	18.28	20.24	38.52	52.89	-14.37	AVG	
3		0.3260	21.55	19.98	41.53	59.55	-18.02	QP	
4		0.3260	8.70	19.98	28.68	49.55	-20.87	AVG	
5 *		0.4140	30.55	20.21	50.76	57.57	-6.81	QP	
6		0.4140	17.67	20.21	37.88	47.57	-9.69	AVG	
7		0.5580	19.25	20.16	39.41	56.00	-16.59	QP	
8		0.5580	3.88	20.16	24.04	46.00	-21.96	AVG	
9		1.2220	16.72	20.28	37.00	56.00	-19.00	QP	
10		1.2220	1.93	20.28	22.21	46.00	-23.79	AVG	
11		16.1780	11.72	20.19	31.91	60.00	-28.09	QP	
12		16.1780	6.47	20.19	26.66	50.00	-23.34	AVG	



3.2 Radiated Emission and Band Edge

3.2.1 Limit

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 20dB below the highest level of the desired power:

Frequency	Distance	Field Streng	th Limit	
(MHz)	Meters(m)	μV/m	dB(μV)/m	
0.009 - 0.49	300	2400/F(kHz)	-	
0.490 – 1.705	30	24000/F(kHz)	-	
1.705 – 30	30	30	-	
30~88	3	100	40.0	
88~216	3	150	43.5	
216~960	3	200	46.0	
960~1000	3	500	54.0	
Above 1000	3	74.0 dB(μV)/m (Peak)		
Above 1000) 	54.0 dB(μV)/m	(Average)	

Note: (1) Emission level $dB\mu V = 20 \log Emission level \mu V/m$

- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2.2 Test Procedure

Test Method							
○Conducted Measurement ●Radiated Measurement							
Test Channels							
●Lowest, Middle and Highest Channel							
Environmental conditions							
●Normal ONormal and Extreme							
Note: ● : Test							

- a) The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b) The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c) The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of

HY-FCC part 15C Ver.1.1 Page 16 / 61 Report No.: RF231116004-01-001



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 find the maximum reading (used Bore sight function).
- e) The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- f) The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g) All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1 GHz)
- h) All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1 GHz)
- i) For the actual test configuration, please refer to the related Item -EUT Test Photos.

The following table is the setting of the receiver:

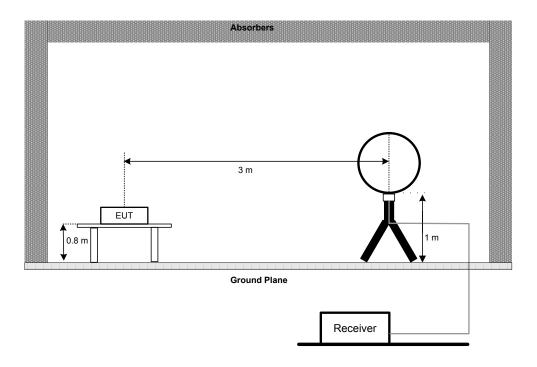
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW	1 MHz / 3 MHz for PK value
(Emission in restricted band)	1 MHz / 1/T Hz for AVG value

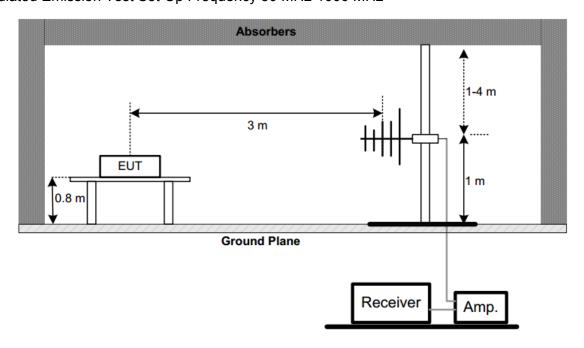


3.2.3 Test Setup

(A) Radiated Emission Test Set-Up Frequency Below 30MHz

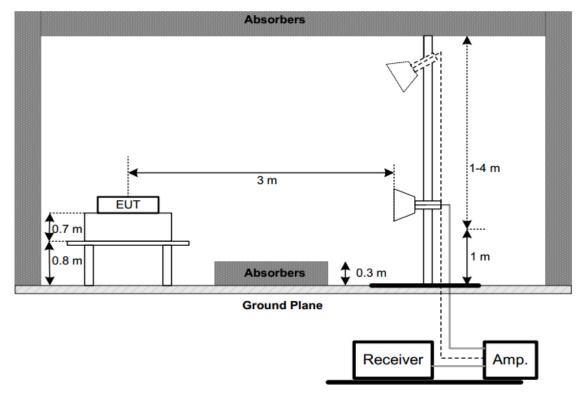


(B) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz





(C) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.4 Test Result

1) Radiated emission: 9kHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not recorded in this report.



2) Radiated emission: 30MHz-1G

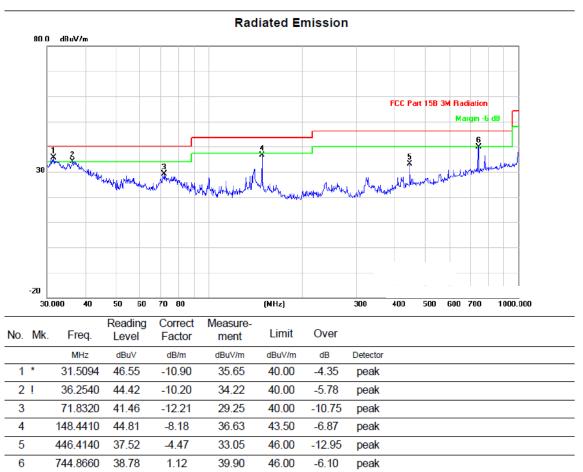
Note:

- 1. Measurement = Reading + Correct Factor.
- 2. Over = Measurement Limit

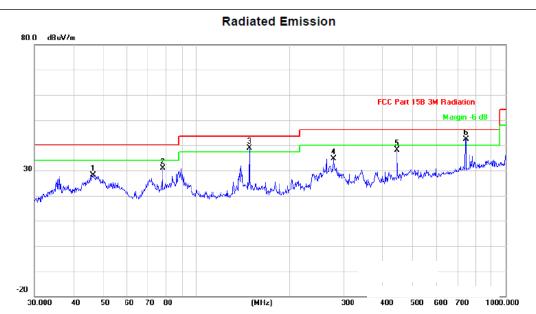
We only recorded the data of the worst mode. Please see the following:

Below 1G (30MHz~1GHz) Worst Case Operating Mode: 11B-CDD Channel 06

VERTICAL







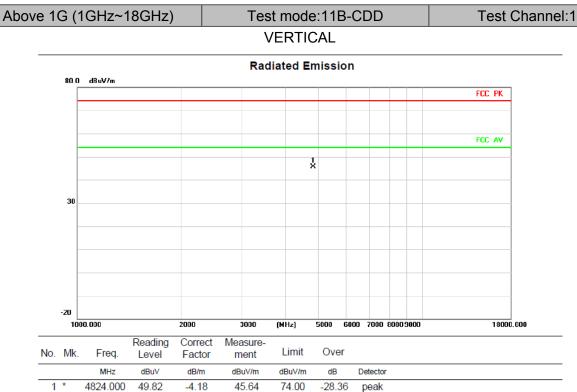
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1	46.3402	37.76	-9.53	28.23	40.00	-11.77	peak	
2	77.8653	43.67	-12.72	30.95	40.00	-9.05	peak	
3 !	148.4410	47.00	-8.18	38.82	43.50	-4.68	peak	
4	278.0668	44.62	-9.99	34.63	46.00	-11.37	peak	
5	446.4140	42.71	-4.47	38.24	46.00	-7.76	peak	
6 *	744.8660	41.34	1.12	42.46	46.00	-3.54	peak	

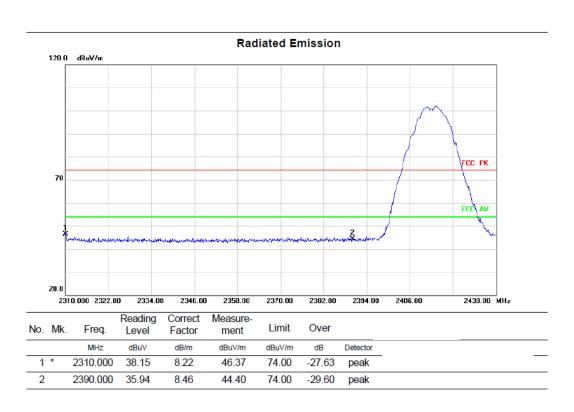


3) Radiated emission: Above 1G

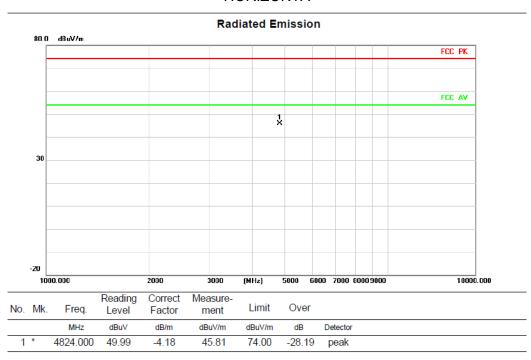
Note:

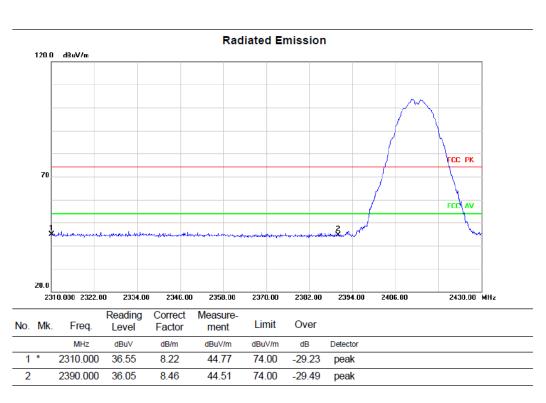
- 1. Measurement = Reading + Correct Factor.
- 2. Over = Measurement Limit





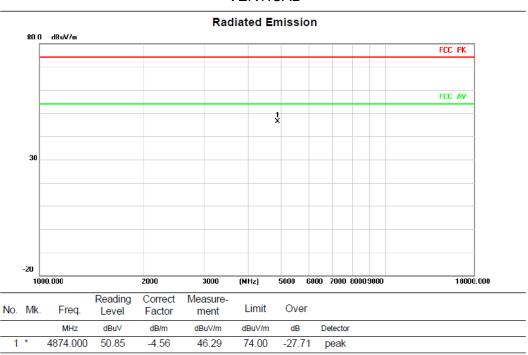












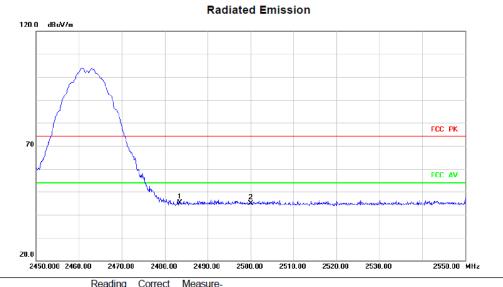






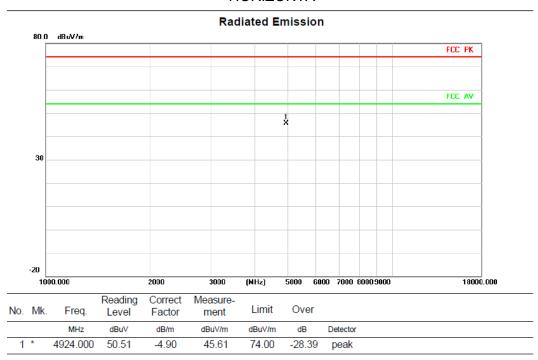
Radiated Emission 80.0 dB₀V/m FCC PK FCC AV 30 -20 Reading Correct Measure-

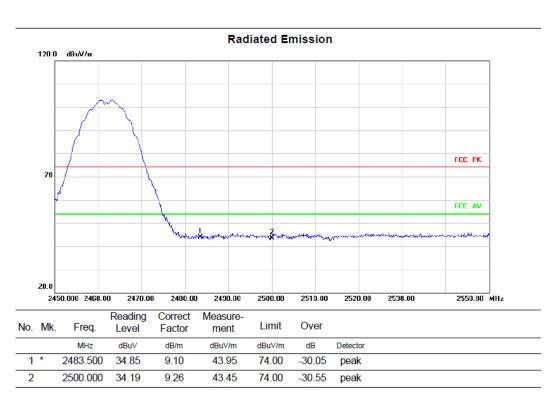
No. Mk.	Freq.			Measure- ment	Limit	Over	
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1 *	4924.000	50.67	-4.90	45.77	74.00	-28.23	peak



ı	No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over		
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
_	1	*	2483.500	36.11	9.10	45.21	74.00	-28.79	peak	
_	2		2500.000	35.52	9.26	44.78	74.00	-29.22	peak	



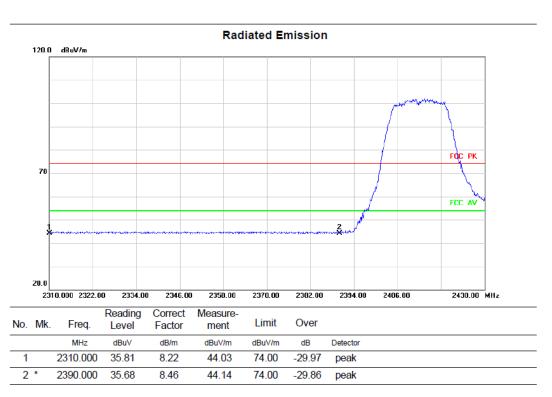




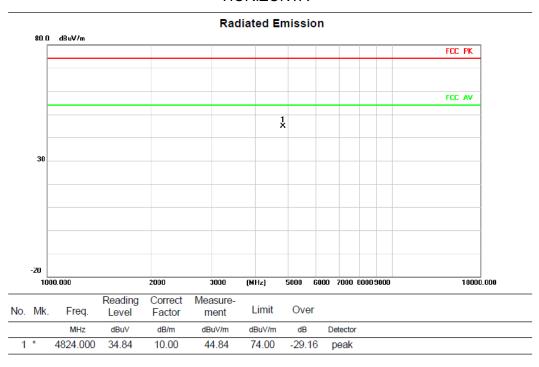


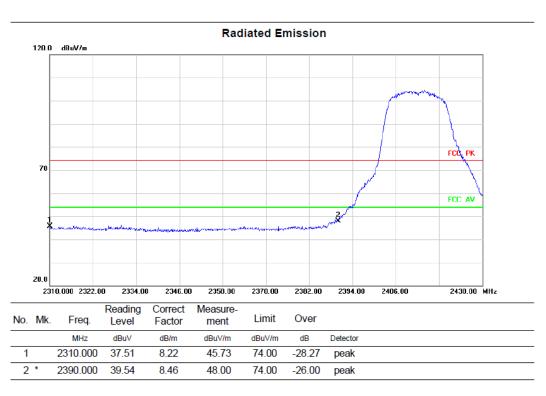




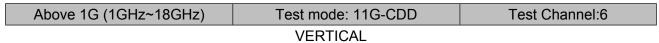




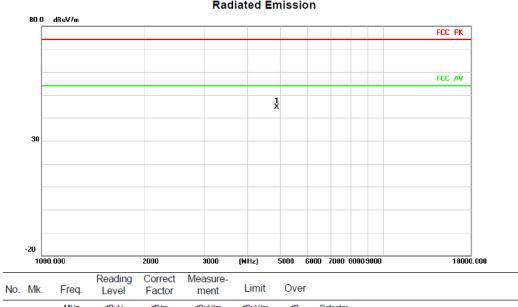






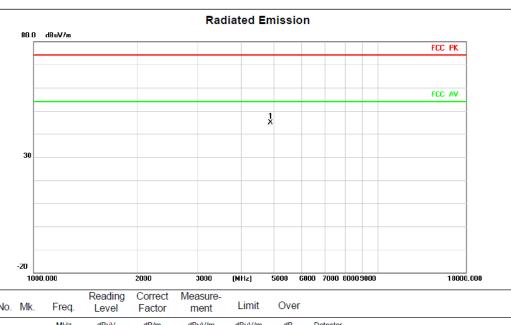


Radiated Emission

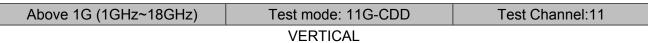


No. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1 *	4874.000	34.75	10.00	44.75	74.00	-29.25	peak	

HORIZONTA









74.00

-29.99 peak

Radiated Emission 120.0 dBuV/m FCC PK 70 20.0 Except Measure Poording Correct Measure

No.	Mk.	Freq.		Factor	ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1	*	2483.500	39.82	9.10	48.92	74.00	-25.08	peak	
2		2500.000	35.34	9.26	44.60	74.00	-29.40	peak	

4924.000

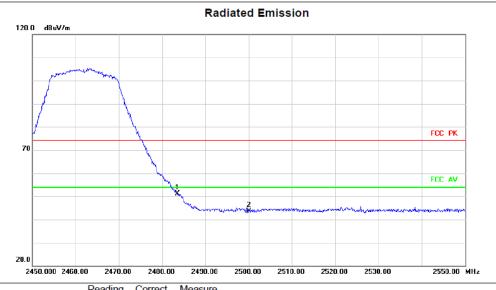
34.01

10.00

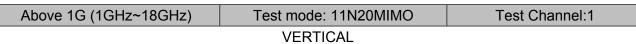
44.01

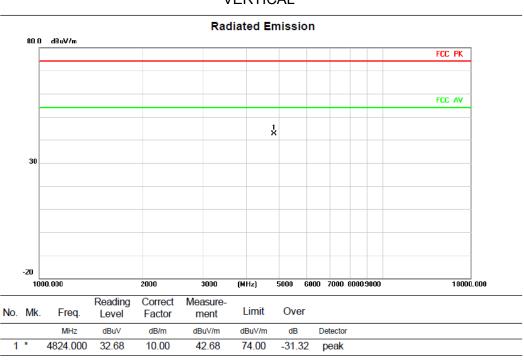


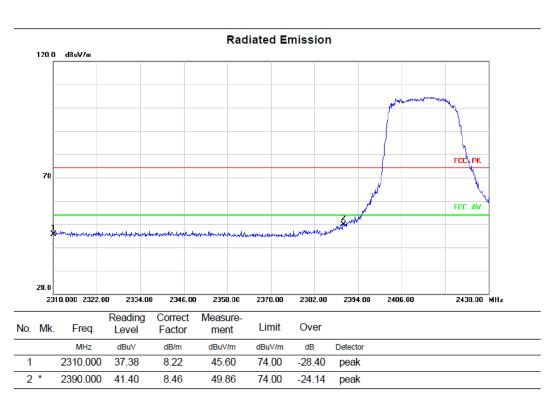




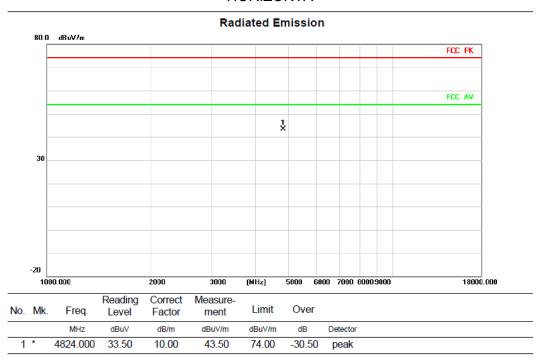


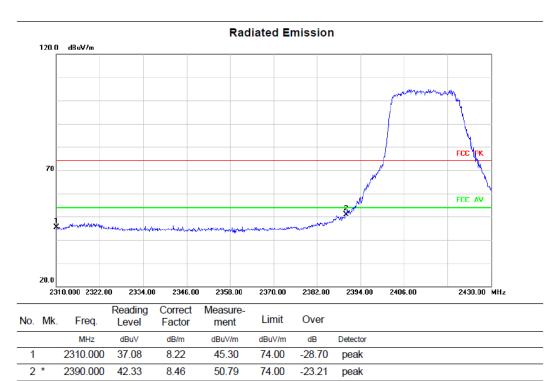








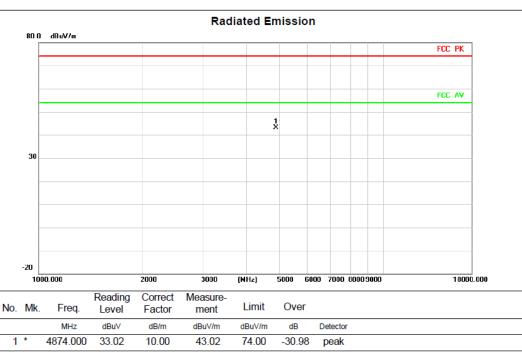










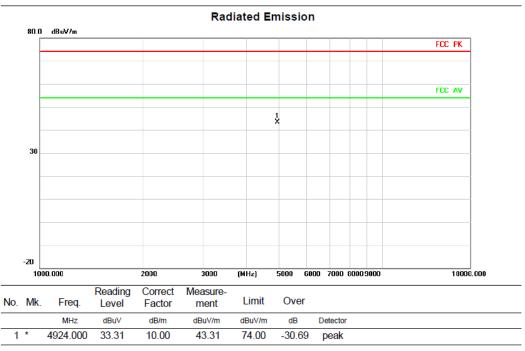




Above 1G (1GHz~18GHz) Test mode: 11N20MIMO Test Channel:11

VERTICAL

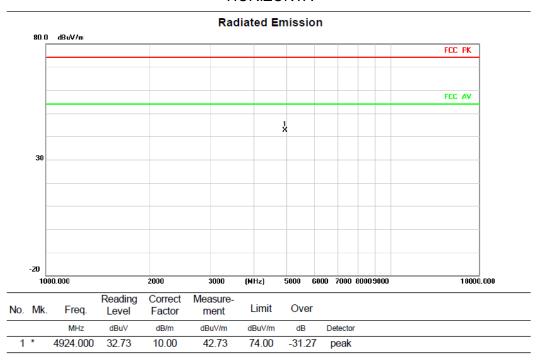
VEITHOAL

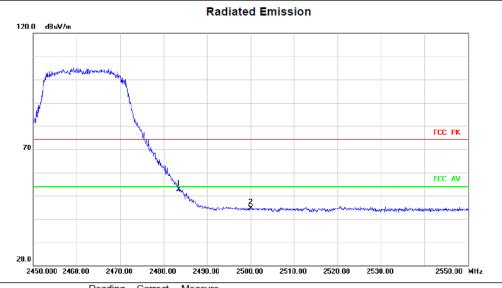


Radiated Emission 120.0 dBuV/m FCC PK 70 20.0 2450.000 2460.00 2470.00 2480.00 2490.00 2500.00 2510.00 2520.00 2530.00 2550.00 MHz

No.	Mk.	Freq.			Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1	*	2483.500	41.51	9.10	50.61	74.00	-23.39	peak	
2		2500.000	35.27	9.26	44.53	74.00	-29.47	peak	



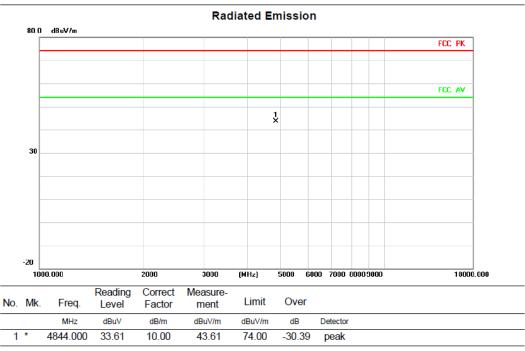


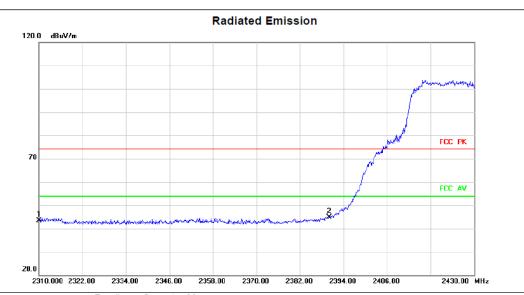


No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector		
1	*	2483.500	43.46	9.10	52.56	74.00	-21.44	peak		
2		2500.000	35.43	9.26	44.69	74.00	-29.31	peak		



Above 1G (1GHz~18GHz) Test mode: 11N40MIMO Test Channel:3 **VERTICAL**

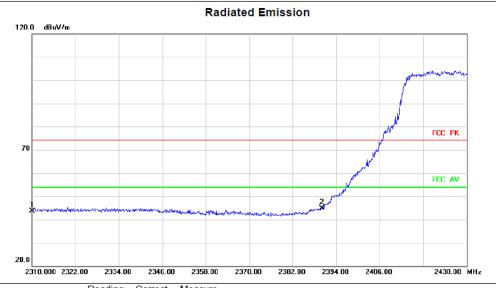




No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over				
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector			
1		2310.000	35.21	8.22	43.43	74.00	-30.57	peak			
2	*	2390.000	36.42	8.46	44.88	74.00	-29.12	peak			

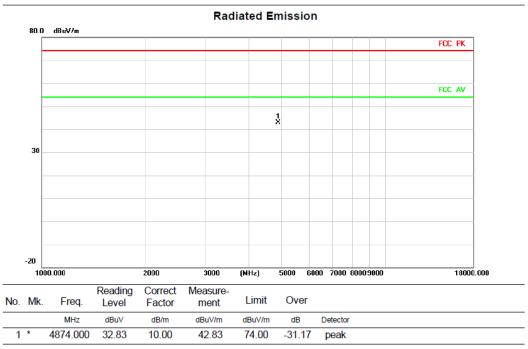




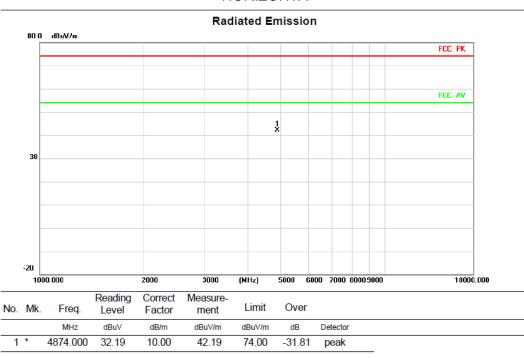




Above 1G (1GHz~18GHz) Test mode: 11N40MIMO Test Channel:6 **VERTICAL**



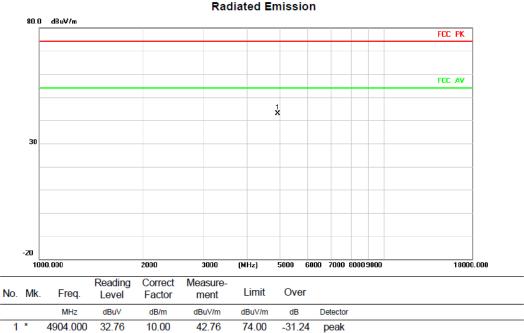
HORIZONTA





Above 1G (1GHz~18GHz) Test mode: 11N40MIMO Test Channel:9 **VERTICAL**

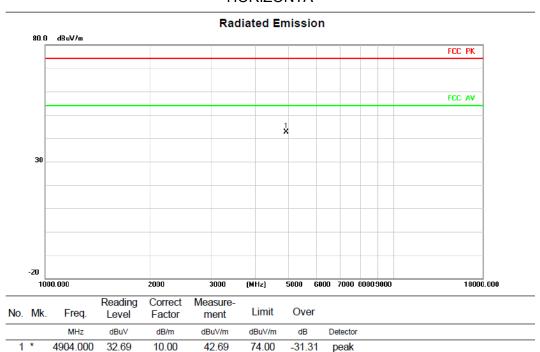
Radiated Emission

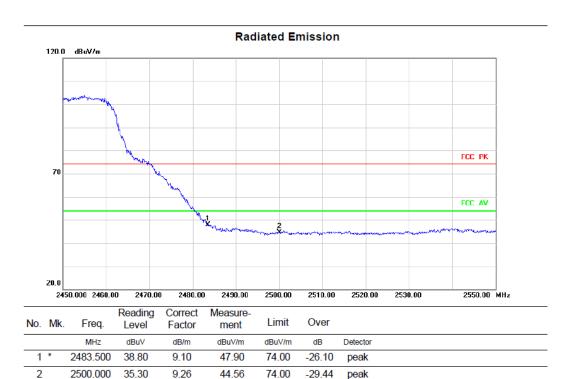


Radiated Emission 120.0 dBuV/m FCC PK 20.0 2450.000 2460.00 2470.00 2480.00 2490.00 2500.00 2510.00 2520.00 2530.00 2550.00 MHz

No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1	*	2483.500	35.95	9.10	45.05	74.00	-28.95	peak	
2		2500.000	35.24	9.26	44.50	74.00	-29.50	peak	



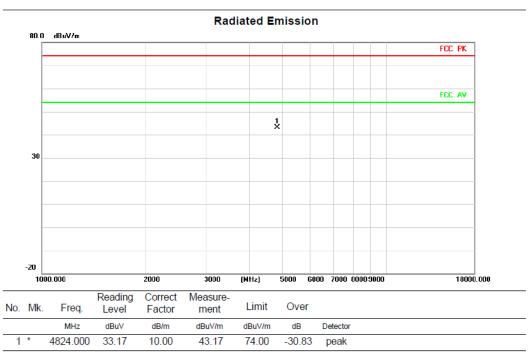


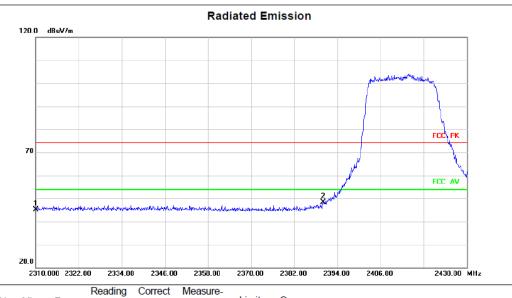




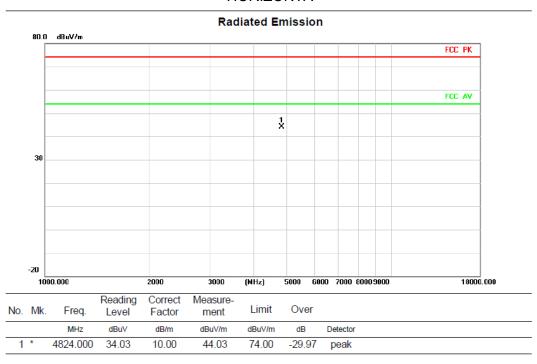
Above 1G (1GHz~18GHz) Test mode: 11AX20MIMO Test Channel:1

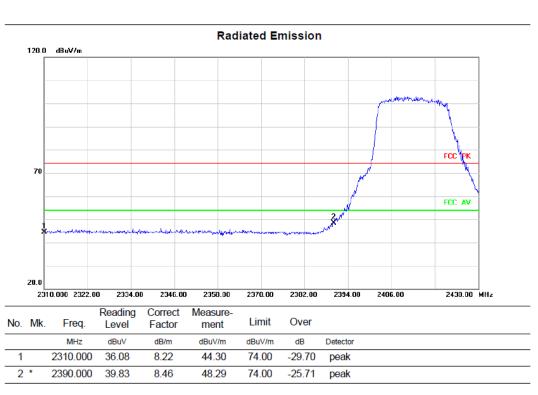
VERTICAL





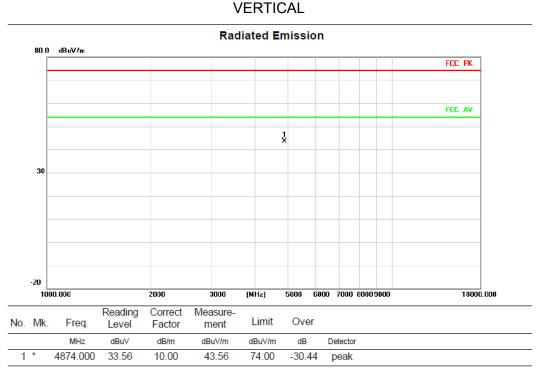




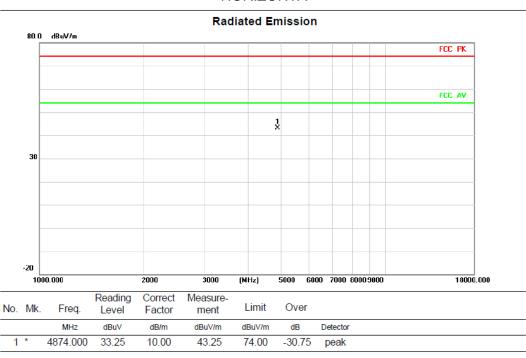




Above 1G (1GHz~18GHz) Test mode: 11AX20MIMO Test Channel:6



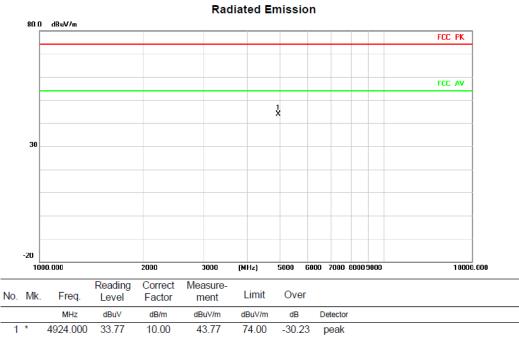
HORIZONTA





Above 1G (1GHz~18GHz) Test mode: 11AX20MIMO Test Channel:11 **VERTICAL**

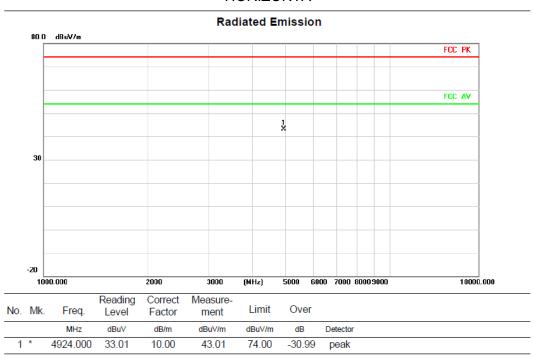
Radiated Emission

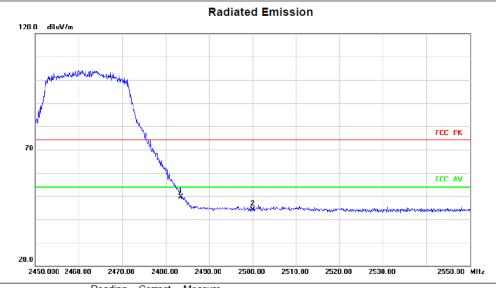


Radiated Emission 120.0 dBuV/m FCC PK 20.0 2470.00 2550.00 MHz 2450.000 2460.00 2480.00 2490.00 2500.00 2510.00 2520.00 2530.00

No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2483.500	39.51	9.10	48.61	74.00	-25.39	peak
2		2500.000	34.27	9.26	43.53	74.00	-30.47	peak



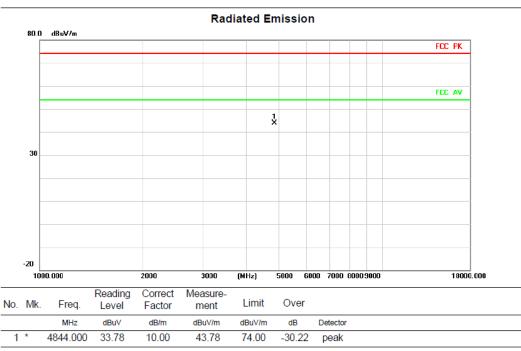


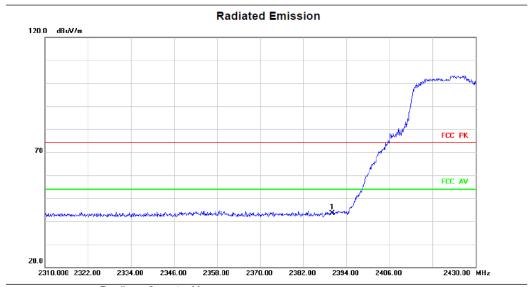


No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1	*	2483.500	40.46	9.10	49.56	74.00	-24.44	peak	
2		2500.000	34.93	9.26	44.19	74.00	-29.81	peak	



Above 1G (1GHz~18GHz) Test mode: 11AX40MIMO Test Channel:3 **VERTICAL**

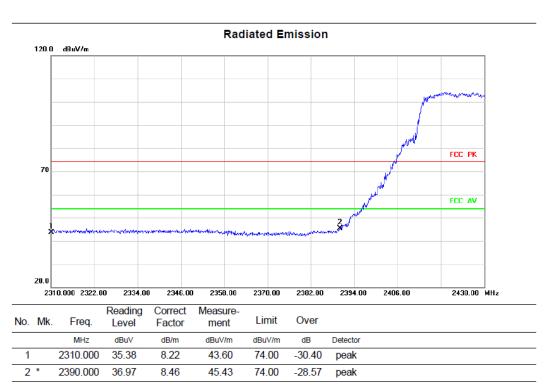




No. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1 *	2390.000	34.92	8.46	43.38	74.00	-30.62	peak	

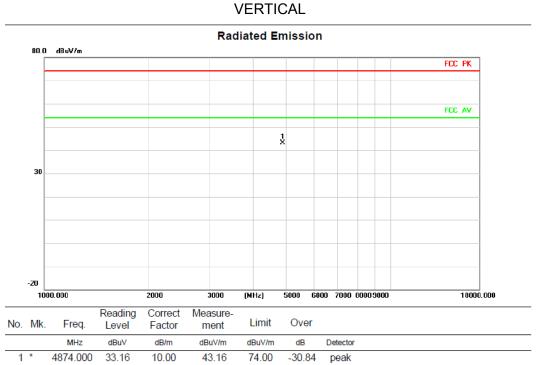








Above 1G (1GHz~18GHz) Test mode: 11N40MIMO Test Channel:6



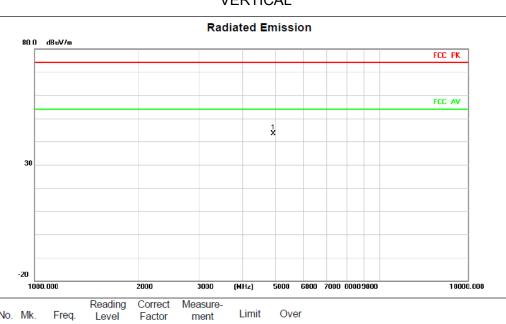
HORIZONTA



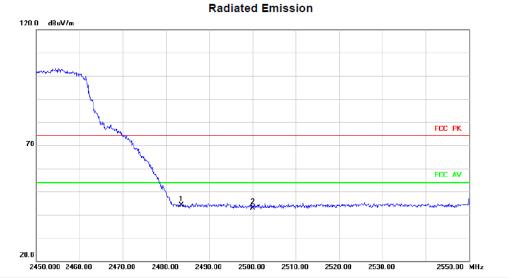


Above 1G (1GHz~18GHz) Test mode: 11N40MIMO Test Channel:9

VERTICAL

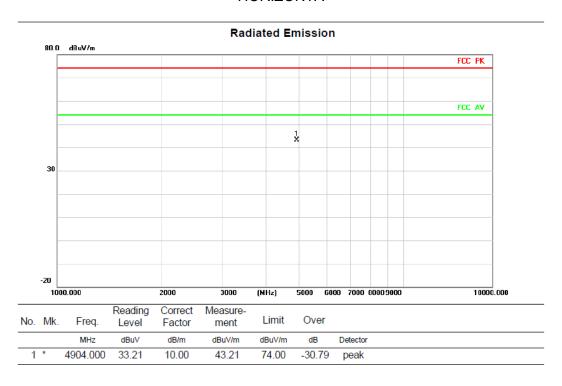


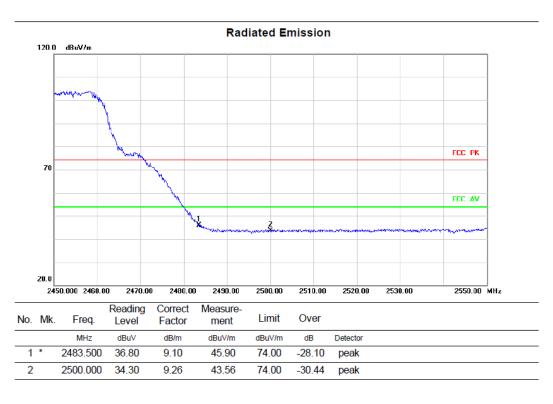




No. M	∕lk.		Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1 *	24	483.500	34.95	9.10	44.05	74.00	-29.95	peak
2	2	500.000	33.74	9.26	43.00	74.00	-31.00	peak







The high frequency, which started from 18GHz to 25GHz, was pre-scanned and the result which was 20dB lower than the limit line was not recorded in this report.



3.3 Spurious Emission at Antenna Port

3.3.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

3.3.2 Test Procedure

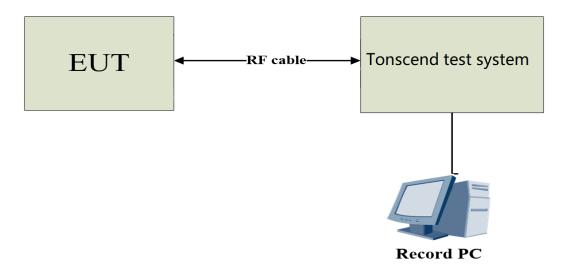
Test Method						
● Conducted Measurement	○Radiated Measurement					
Test Channels						
Lowest, Middle and Highest Channel	O Lowest and Highest Channel					
Environme	ntal conditions					
●Normal	ONormal and Extreme					
Note: ● : Test						

- a) The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
- b) Spectrum Setting as below:

Centre Frequency	The centre frequency of the channel under test
Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto



3.3.3 Test Setup



3.3.4 The Result

3.3.4.1 Conducted Spurious Emission

Test result: PASS

Note: For test data, please refer to the report RFBARR-WTW-P21030485A.

3.3.4.2 Band edge

Test result: PASS

Note: For test data, please refer to the report RFBARR-WTW-P21030485A.



3.4 6dB Bandwidth

3.4.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

3.4.2 Test Procedure

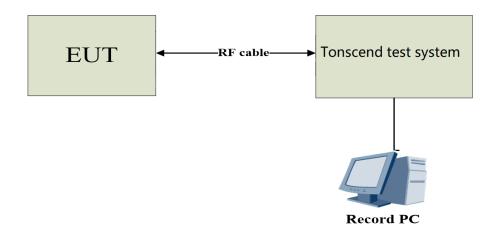
Test Method					
■ Conducted Measurement	○Radiated Measurement				
Tes	t Channels				
●Lowest, Middle and Highest Channel	O Lowest and Highest Channel				
Environm	ental conditions				
● Normal	ONormal and Extreme				
Note: ● : Test					

a) The EUT was connected to the tonscend test system, and the spectrum analyser is set as follow:

Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

- b) Wait for the trace to stabilize then find the peak value of the trace and place the analyser marker on this peak.
- c) Use the -6dB bandwidth function of the spectrum analyser to measure the 6dB Bandwidth of the EUT. This value shall be recorded.
- d) Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

3.4.3 Test Setup





3.4.4 Test Result

3.4.4.1 DTS Bandwidth

Test result: PASS

Note: For test data, please refer to the report RFBARR-WTW-P21030485A.

3.4.4.2 Occupied Channel Bandwidth

Test result: PASS

Note: For test data, please refer to the report RFBARR-WTW-P21030485A.



3.5 Maximum conducted output power

3.5.1 Limit

For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

3.5.2 Test Procedure

Test	Test Method					
● Conducted Measurement	○Radiated Measurement					
Test Channels						
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel					
Environme	ntal conditions					
● Normal	○Normal and Extreme					
Note: ●: Test O: No Test						

- a) The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- b) The maximum conducted output power was performed in accordance with method 11.9.2.3 (for average power) of ANSI C63.10-2013 and FCC KDB 662911 D01 v02r01 Multiple Transmitter Output.

3.5.3 Test Setup

EUT	Power Meter
	1 OWEI WICKEI



3.5.4 The Result

Test result: PASS

Test Mode	Antenna	Frequency[MHz]	Maximum conducted output Power [dBm]	Limit [dBm]	Verdict
	Ant1	2412	18.06	≤30.00	PASS
	Ant2	2412	17.45	≤30.00	PASS
	total	2412	20.78	≤30.00	PASS
	Ant1	2437	19.02	≤30.00	PASS
11B-CDD	Ant2	2437	18.54	≤30.00	PASS
	total	2437	21.80	≤30.00	PASS
	Ant1	2462	18.05	≤30.00	PASS
	Ant2	2462	17.54	≤30.00	PASS
	total	2462	20.81	≤30.00	PASS
	Ant1	2412	18.00	≤30.00	PASS
	Ant2	2412	17.43	≤30.00	PASS
	total	2412	20.73	≤30.00	PASS
	Ant1	2437	17.95	≤30.00	PASS
11G-CDD	Ant2	2437	17.68	≤30.00	PASS
	total	2437	20.83	≤30.00	PASS
	Ant1	2462	17.95	≤30.00	PASS
	Ant2	2462	17.61	≤30.00	PASS
	total	2462	20.80	≤30.00	PASS
	Ant1	2412	16.92	≤30.00	PASS
	Ant2	2412	16.55	≤30.00	PASS
	total	2412	19.75	≤30.00	PASS
	Ant1	2437	17.86	≤30.00	PASS
11N20MIMO	Ant2	2437	17.52	≤30.00	PASS
	total	2437	20.70	≤30.00	PASS
	Ant1	2462	16.98	≤30.00	PASS
	Ant2	2462	16.64	≤30.00	PASS
	total	2462	19.82	≤30.00	PASS
	Ant1	2422	15.17	≤30.00	PASS
	Ant2	2422	14.56	≤30.00	PASS
	total	2422	17.89	≤30.00	PASS
	Ant1	2437	17.77	≤30.00	PASS
11N40MIMO	Ant2	2437	17.44	≤30.00	PASS
	total	2437	20.62	≤30.00	PASS
	Ant1	2452	14.91	≤30.00	PASS
	Ant2	2452	14.42	≤30.00	PASS
	total	2452	17.68	≤30.00	PASS



11AX20MIMO	Ant1	2412	15.04	≤30.00	PASS
	Ant2	2412	14.62	≤30.00	PASS
	total	2412	17.85	≤30.00	PASS
	Ant1	2437	18.10	≤30.00	PASS
	Ant2	2437	17.49	≤30.00	PASS
	total	2437	20.81	≤30.00	PASS
	Ant1	2462	15.45	≤30.00	PASS
	Ant2	2462	14.88	≤30.00	PASS
	total	2462	18.18	≤30.00	PASS
	Ant1	2422	15.35	≤30.00	PASS
	Ant2	2422	14.84	≤30.00	PASS
	total	2422	18.11	≤30.00	PASS
	Ant1	2437	17.45	≤30.00	PASS
11AX40MIMO	Ant2	2437	16.94	≤30.00	PASS
	total	2437	20.21	≤30.00	PASS
	Ant1	2452	15.23	≤30.00	PASS
	Ant2	2452	14.61	≤30.00	PASS
	total	2452	17.94	≤30.00	PASS

Note: The Duty Cycle Factor is compensated in the test system

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1 , G_2 , ..., G_N dBi If transmit signals are correlated, then Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N_{ANT}]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Directional gain = $10\log[(10^{2.41/20} + 10^{2.29/20})^2/N_{ANT}]$ dBi=5.36



3.6 Power Spectral Density

3.6.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmitting.

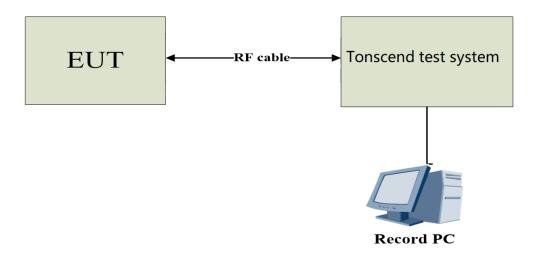
3.6.2 Test Procedure

Test Method						
ORadiated Measurement						
Test Channels						
O Lowest and Highest Channel						
Environmental conditions						
○Normal and Extreme						

- a) The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
- b) Spectrum analyser settings as following:

Spectrum Parameters	Setting
Span Frequency	1.5 times the DTS bandwidth
RBW	3 kHz
VBW	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.6.3 Test Setup



HY-FCC part 15C Ver.1.1 Page 59 / 61 Report No.: RF231116004-01-001



3.6.4 The Result

Test result: PASS

Note: For test data, please refer to the report RFBARR-WTW-P21030485A.



Statement

- 1. The report is invalid without the official seal or special seal of Shenzhen Haiyun Standard Technology Co., Ltd. (hereinafter referred to as the unit).
- 2. The report is invalid without the signature of the approver.
- 3. The report is invalid if altered arbitrarily.
- 4. The report shall not be partially copied without the written approval of the unit.
- 5. The reported test results are only valid for the tested samples.
- 6. If there is any objection to the test report, it shall be submitted to the test unit within 15 days from the date of receiving the report, and the overdue shall not be accepted.

Shenzhen Haiyun Standard Technology Co., Ltd.

Address: Room 110, 111, 112, 113, 115, 116, Block B, Jinyuan Business Building, No. 302, Xixiang Avenue, Labor Community, Xixiang Street, Baoan District, Shenzhen, China

Tel: 0755-26024411

Email: service@hy-lab.cn

End of Test Report