



FCC Test Report

Report No.: ULC-ESH-P20120723B-5

FCC ID: 2AQOB-LWFPRO

Product: WI-FI PRO CEILING SPEAKERS

Model: LWFPRO, LWFPRO/IP

Received Date: Dec.09, 2020

Test Date: Dec.10, 2020 to May.07, 2021

Issued Date: May.07, 2021

Applicant: Lithe Audio Ltd.

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Manufacturer: Lithe Audio Ltd.

Address: Unit 4 IO Centre, Salbrook Road Industrial Estate, Salbrook Road,
Salfords, Redhill, Surrey, RH1 5GJ. UK

Issued By: BUREAU VERITAS ADT (Shanghai) Corporation

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Test Lab
Cert 2343.01

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Release Control Record

Issue No.	Description	Date Issued
ULC-ESH-P20120723B-5	Original release	May.07, 2021



1 Certificate of Conformity

Product: WI-FI PRO CEILING SPEAKERS

Brand: --

Model: LWFPRO, LWFPRO/IP

Applicant: Lithe Audio Ltd.

Test Date: Dec.10, 2020 to May.07, 2021

Standards: 47 CFR Part 15, Subpart E 15.407

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, 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 EMC characteristics under the conditions specified in this report.

Prepared by :

, **Date:**

May.07, 2021

Scott XU

Project Engineer

Approved by :



, **Date:**

May.07, 2021

Daniel SUN

EMC Lab Manager

2 Summary of Test Results

The EUT has been tested according to the following specifications:

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.203	Antenna Requirement	PASS	No antenna connector is used.
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.407(a)	26dB Emission bandwidth	PASS	Meet the requirement of limit.
15.407(e)	Minimum 6 dB bandwidth (5.725-5.85 GHz band)	PASS	Meet the requirement of limit.
15.407(a)	Maximum Conducted output power	PASS	Meet the requirement of limit.
15.407(a)	Peak Power spectrum density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.205 / 15.209 / 15.407(b)	Emissions in restricted frequency bands	PASS	Meet the requirement of limit.
15.209 / 15.247(d)	Radiated Emissions Measurement	PASS	Meet the requirement of limit.

Note: We verified that the power of the module is slightly less than that of the original case, so we quoted the data of the conducted part of original case.



2.1 Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Hybrid Antenna(25MHz-1.5GHz)	Schwarzbeck	VULB9168	E1A1012	Jul.29, 20	Jul.28, 22
Horn Antenna(1GHz -18GHz)	Schwarzbeck	BBHA9120D	E1A1017	Aug.25, 20	Aug.24, 22
Double Ridge Horn Antenna(18G-40G)	COM-POWER	AH-840	E1A1040	Jul.15, 20	Jul.14, 22
Pre-Amplifier(100kHz-1.3GHz)	Agilent	8447D	E1A2001	Apr.20, 20	Apr.18, 22
Pre-Amplifier(0.5GHz-18GHz)	EMCI	EMC184045SE	E1A2009	Jul.06, 20	Jul.05, 21
Pre-Amplifier(18GHz-40GHz)	EMCI	EMC051845SE	E1A2008	Jul.06, 20	Jul.05, 21
EMI test receiver	R&S	ESR7	E1R1005	Apr.20, 20	Apr.18, 22
Spectrum Analyzer	Keysight	N9030B	E1S1003	Jul.23, 20	Jul.22, 21
Spectrum Analyzer	Keysight	N9020A	E1S1004	Mar.03, 20	Mar.01, 22
EMI test receiver	R&S	ESCS30	E1R1001	May.12, 20	May.10, 22
LISN	R&S	ENV216	E1L1011	May.12, 20	May.10, 22
Humidity&Temp Tester	Baolima	WS508	E1H1011	Apr. 03, 20	Apr.01, 22
RF Control Unit	Toscend	JS0806-2	E1C5003	N/A	N/A
Test Software	ADT	ADT_COND_V7.3.1	N/A	N/A	N/A
Test Software	Toscend	JS32-RE	N/A	N/A	N/A
Test Software	Toscend	JS1120	N/A	N/A	N/A
Test Software	Toscend	JS1120-3	N/A	N/A	N/A

2.2 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 $k=2$.

Measurement	Frequency	Expanded Uncertainty ($k=2$) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

2.3 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	WI-FI PRO CEILING SPEAKERS
Test Model	LWFPRO
Power Rating	100-240V~, 50/60Hz, 2.0A for adapter; 24.0Vdc for WI-FI CEILING SPEAKERS
Modulation Type	OFDM
Modulation Technology	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK), 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM), 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) for Wireless Module(LS9AD-AC11DBT-GV) 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) for Wireless Module(444-2250)
Operating Frequency	5150 ~ 5250MHz, 5250 ~ 5350MHz, 5470 ~ 5725MHz for Wireless Module LS9AD-AC11DBT-GV 5150 ~ 5250MHz, 5250 ~ 5350MHz, 5470 ~ 5725MHz, 5745 ~ 5850MHz for Wireless Module 444-2250
Number of Channel	See clause 3.2
Output Power	13.11dBm for Wireless Module(LS9AD-AC11DBT-GV) 14.34dBm for Wireless Module(444-2250)
Antenna Type	PCB Antenna for Wireless Module(LS9AD-AC11DBT-GV, 444-2250)
Antenna Connector	--
Antenna Gain	Ant1:5.9dBi, Ant2:5.9dBi for Wireless Module(LS9AD-AC11DBT-GV), Ant1:1dBi, Ant2:1dBi, Ant3:1dBi, Ant4:1dBi for Wireless Module(444-2250)
Product SW/HW version	21.0.200/A
Radio SW/HW version	NA
Test SW version	NA
RF power setting in Test SW	NA

Note: 1. For more details, please refer to the User's manual of the EUT.

2. The EUT contains two wireless modules.

The wireless module of model LS9AD-AC11DBT-GV (FCC ID: 2ADBM-LS9ADAC11DBT) supports BT/WIFI function.

The wireless module of model 444-2250 (FCC ID: UA9601) supports WIFI 5G function.

The working state of the two 5G modules is controlled by the internal hardware SWITCH module, 2:1 multiplexing, and the default Libre wireless module works. By operating on APP, sending "Select" command, controlling internal hardware switch to select corresponding working wireless

module, will not work at the same time.

Modulation Mode	TX /RX Function
802.11a	2TX / 2RX
802.11n/ac (20MHz)	2TX / 2RX
802.11n/ac (40MHz)	2TX / 2RX
802.11ac (80MHz)	2TX / 2RX

3.2 Description of Test Modes

FOR 5150 ~ 5250MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
42	5210 MHz		

FOR 5250 ~ 5350MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
58	5290 MHz		

FOR 5470 ~ 5725MHz

11 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
106	5530 MHz	122	5610 MHz

FOR 5725 ~ 5850MHz

5 channels are provided for 802.11a

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

3.2.1 Test Mode Applicability:

EUT Configure Mode	Applicable to				Description
	RE ≥ 1G	RE < 1G	PLC	APCM	
-	√	√	√	√	-

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

RE≤1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

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).
- ☒ 802.11n mode EIRP power is greater than 802.11ac, so test 11a mode and 11an mode.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
-	802.11a	5150-5250	36 to 48	36, 40, 48	OFDM	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	MCS0
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	MCS0
-	802.11ac (80MHz)		42	42	OFDM	MCS0
-	802.11a	5250-5350	52 to 64	52, 60, 64	OFDM	6.0
-	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	MCS0
-	802.11n (40MHz)		54 to 62	54, 62	OFDM	MCS0
-	802.11ac (80MHz)		58	58	OFDM	MCS0
-	802.11a	5470-5725	100 to 144	100, 116, 140	OFDM	6.0
-	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	MCS0
-	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	MCS0
-	802.11ac (80MHz)		106	106	OFDM	MCS0
-	802.11a	5725-5850	149 to 161	149, 157, 161	OFDM	6.0

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	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	36	OFDM	DBPSK	6.0

Power Line Conducted Emission Test:

- ☒ 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	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	36 to 48	36	OFDM	DBPSK	6.0

Antenna Port Conducted Measurement

- ☒ 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	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
-	802.11a	5150-5250	36 to 48	36, 40, 48	OFDM	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	MCS0
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	MCS0
-	802.11ac (80MHz)		42	42	OFDM	MCS0
-	802.11a	5250-5350	52 to 64	52, 60, 64	OFDM	6.0
-	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	MCS0
-	802.11n (40MHz)		54 to 62	54, 62	OFDM	MCS0
-	802.11ac (80MHz)		58	58	OFDM	MCS0
-	802.11a	5470-5725	100 to 144	100, 116, 140	OFDM	6.0
-	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	MCS0
-	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	MCS0
-	802.11ac (80MHz)		106	106	OFDM	MCS0
-	802.11a	5725-5850	149 to 161	149, 157, 161	OFDM	6.0

3.2.2 Test Condition:

Applicable to	Normal Environmental Conditions	Normal Input Power
RE ≥ 1G	25deg. C, 60%RH	120Vac, 60Hz
RE < 1G	25deg. C, 60%RH	120Vac, 60Hz
PLC	25deg. C, 60%RH	120Vac, 60Hz
APCM	25deg. C, 60%RH	120Vac, 60Hz

3.3 Duty Cycle of Test Signal

Wireless Module (LS9AD-AC11DBT-GV)

The test results refer to module FCC ID: 2ADBM-LS9ADAC11DBT

Wireless Module (444-2250)

The test results refer to module FCC ID: UA9601



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

NO.	PRODUCT	BRAND/ Manufacturer	MODEL NO.
1	PC	ThinkPad	L470
2	Network Cable	--	--

3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

789033 D02 General U-NII Test Procedures New Rules v01r03

KDB 662911 D01 v02r01

ANSI C63.10:2013

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

4 Test Procedure and Results

4.1 AC Power Conducted Emission

4.1.1 Limits

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.1.2 Test Procedures

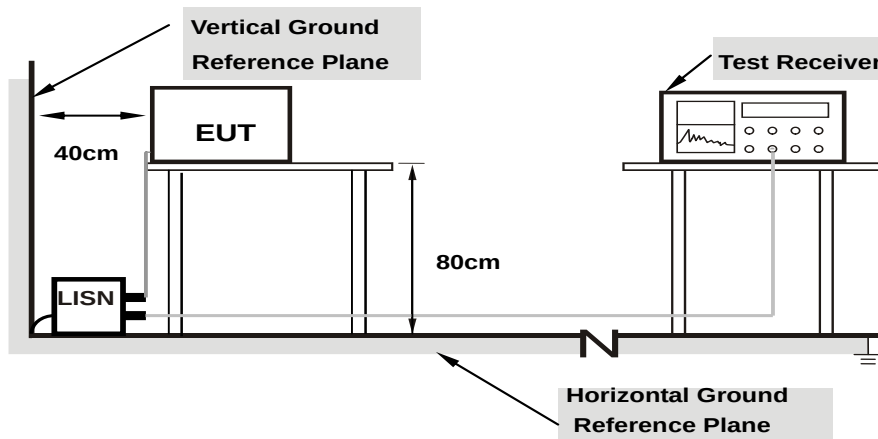
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.1.3 Deviation from Test Standard

No deviation.

4.1.4 Test Setup



Note: 1.Support units were connected to second LISN.

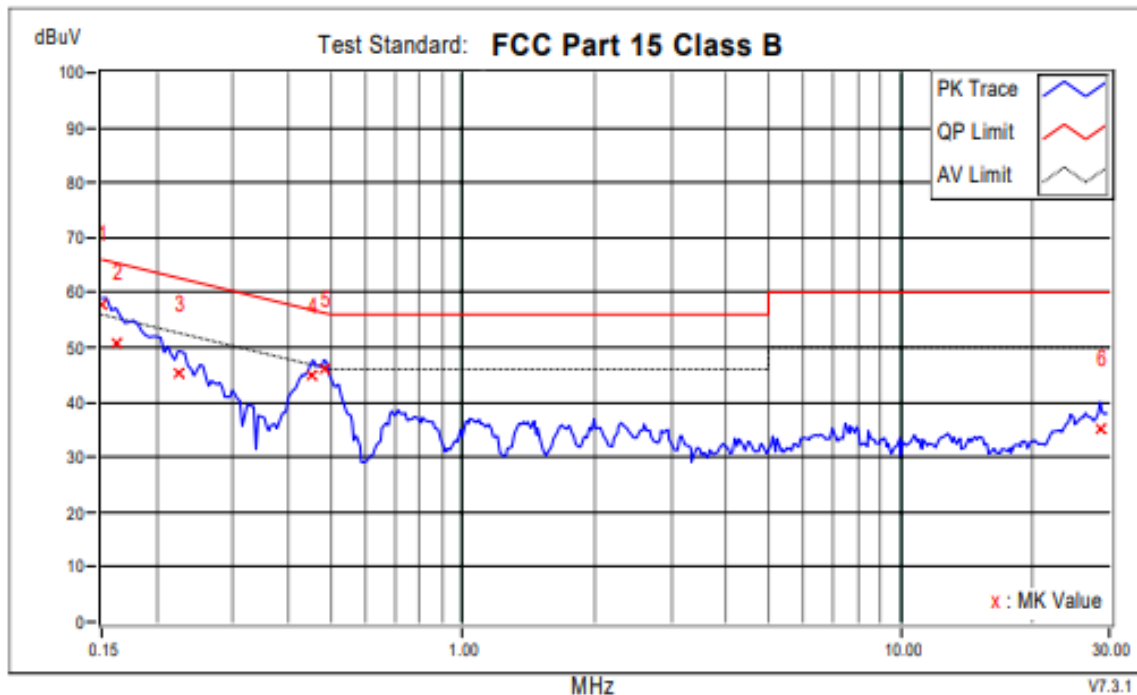
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 EUT Operating Conditions

Same as 4.1.6.

4.1.6 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		

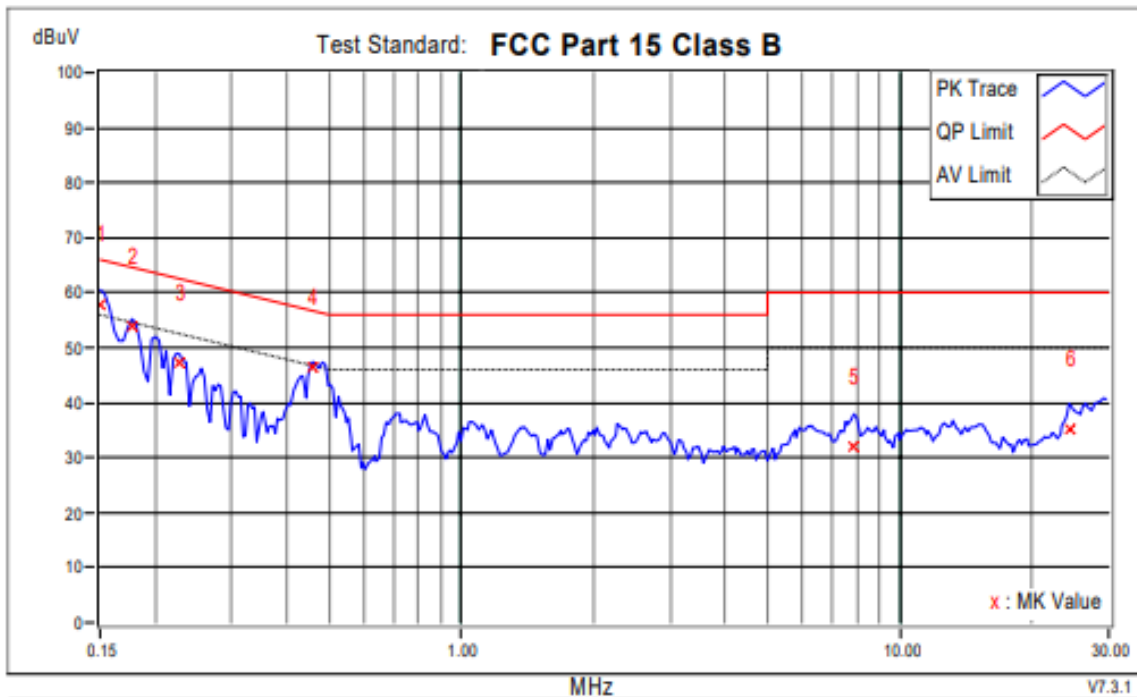


No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15000	9.87	47.89	33.56	57.76	43.43	66.00	56.00	-8.24	-12.57	
2	0.16173	9.87	40.72	16.18	50.59	26.05	65.37	55.37	-14.78	-29.32	
3	0.22429	9.85	35.52	25.27	45.37	35.12	62.66	52.66	-17.29	-17.54	
4	0.45498	9.75	35.12	28.92	44.87	38.67	56.78	46.78	-11.91	-8.11	
+5	0.48235	9.75	36.50	32.50	46.25	42.25	56.30	46.30	-10.05	-4.05	
6	28.56468	10.44	24.79	18.19	35.23	28.63	60.00	50.00	-24.77	-21.37	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		

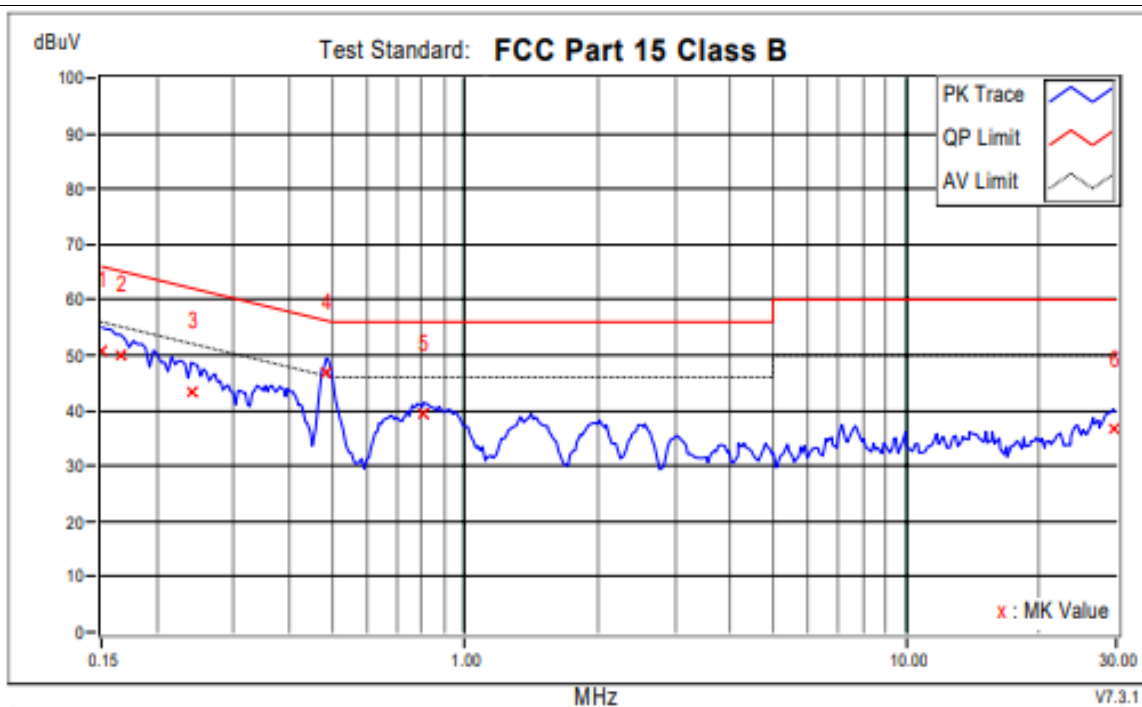


No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15000	9.88	48.01	32.69	57.89	42.57	66.00	56.00	-8.11	-13.43	
2	0.17737	9.85	44.15	30.48	54.00	40.33	64.61	54.61	-10.61	-14.28	
3	0.22820	9.85	37.61	28.24	47.46	38.09	62.51	52.51	-15.06	-14.43	
+4	0.45889	9.88	36.44	32.16	46.32	42.04	56.71	46.71	-10.39	-4.67	
5	7.88160	10.21	21.84	15.87	32.05	26.08	60.00	50.00	-27.95	-23.92	
6	24.38098	10.28	24.78	17.53	35.06	27.81	60.00	50.00	-24.94	-22.19	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 240V, 50Hz		

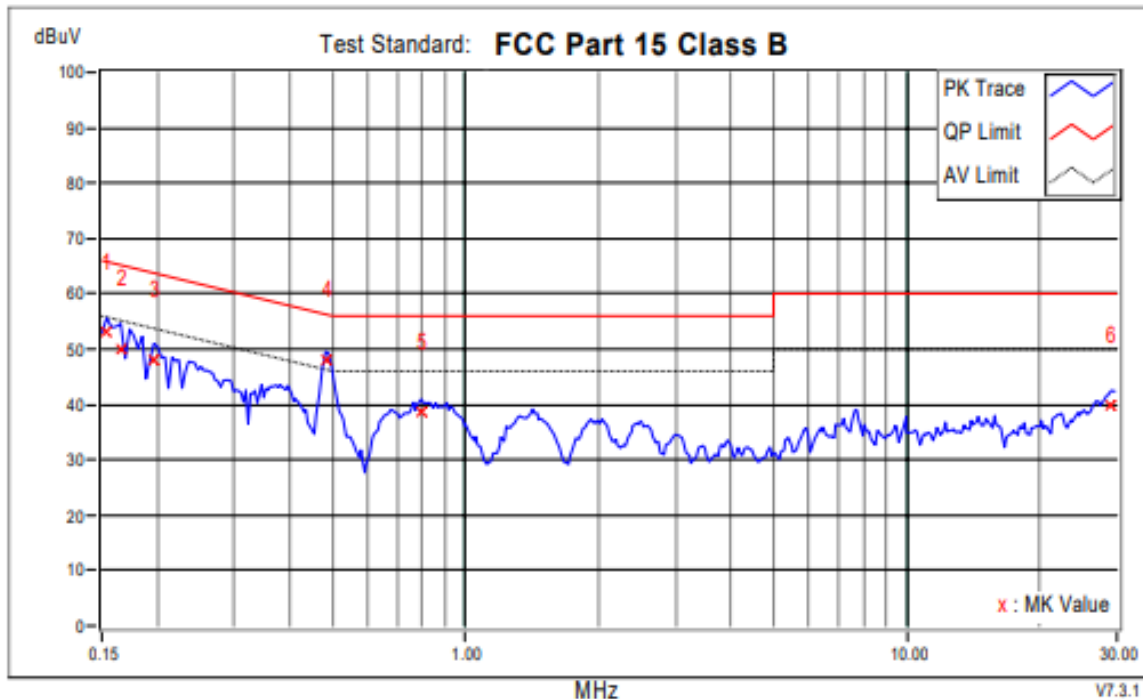


No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15000	9.87	40.75	24.85	50.62	34.72	66.00	56.00	-15.38	-21.28	
2	0.16564	9.88	40.14	20.49	50.02	30.37	65.18	55.18	-15.16	-24.81	
3	0.23993	9.83	33.56	25.43	43.39	35.26	62.10	52.10	-18.71	-16.84	
+4	0.48626	9.75	37.23	32.13	46.98	41.88	56.23	46.23	-9.25	-4.35	
5	0.80688	9.61	29.66	22.75	39.27	32.36	56.00	46.00	-16.73	-13.64	
6	29.58519	10.55	26.30	21.42	36.85	31.97	60.00	50.00	-23.15	-18.03	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 240V, 50Hz		



No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15391	9.88	43.20	27.03	53.08	36.91	65.79	55.79	-12.71	-18.88	
2	0.16564	9.86	40.08	20.40	49.94	30.26	65.18	55.18	-15.23	-24.91	
3	0.19692	9.83	38.17	26.74	48.00	36.57	63.74	53.74	-15.74	-17.17	
+4	0.48235	9.87	38.12	33.09	47.99	42.96	56.30	46.30	-8.30	-3.33	
5	0.79515	9.90	28.83	23.27	38.73	33.17	56.00	46.00	-17.27	-12.83	
6	29.09253	10.62	29.03	24.00	39.65	34.62	60.00	50.00	-20.35	-15.38	

REMARKS:

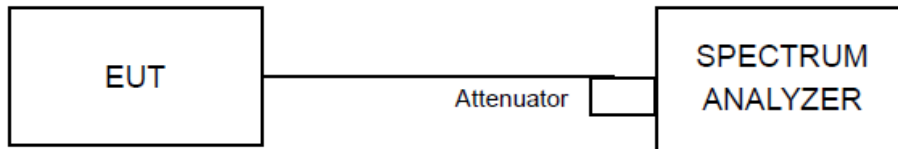
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

4.2 26dB Emission Bandwidth

4.2.1 Limit

No limit requirement.

4.2.2 Test Setup



4.2.3 Test Procedures

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.2.4 Deviation of Test Standard

No deviation.



4.2.5 Test Results

Wireless Module (LS9AD-AC11DBT-GV)

The test results refer to module FCC ID: 2ADBM-LS9ADAC11DBT

Wireless Module (444-2250)

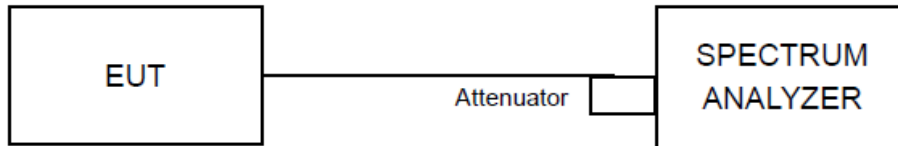
The test results refer to module FCC ID: UA9601

4.3 Minimum 6dB Bandwidth (5.725-5.85 GHz band)

4.3.1 Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

4.3.2 Test Setup



4.3.3 Test Procedures

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 · RBW, peak detector with maximum hold) is implemented by the instrumentation function.

4.3.4 Deviation of Test Standard

No deviation.

4.3.5 Test Results

Wireless Module (LS9AD-AC11DBT-GV)

The test results refer to module FCC ID: 2ADBM-LS9ADAC11DBT

Wireless Module (444-2250)

The test results refer to module FCC ID: UA9601

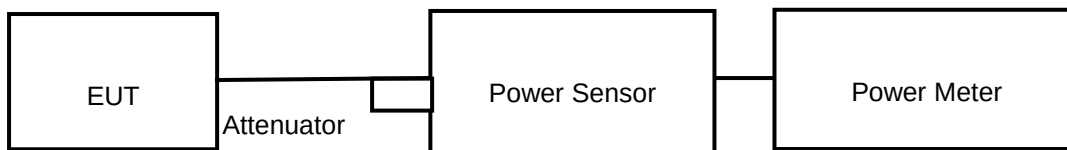
4.4 Conducted Output Power

4.4.1 Limit

Frequency band (MHz)	EUT Category		Limit
5150-5250		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Client devices	250mW (24 dBm)
5250-5350	√		250mW (24 dBm) or 11 dBm+10 log B*
5470-5725	√		250mW (24 dBm) or 11 dBm+10 log B*
5725-5850	√		1 Watt (30 dBm)

Note: Where B is the 26dB emission bandwidth in MHz.

4.4.2 Test Setup



4.4.3 Test Procedures

Method PM is 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.

4.4.4 Deviation of Test Standard

No deviation.

4.4.5 Test Results

Wireless Module (LS9AD-AC11DBT-GV)

TestMode	Antenna	Channel	Result	Limit	Verdict
11A	Ant1	5180	12.31	<=24	PASS
	Ant2	5180	12.14	<=24	PASS
	Ant1	5200	12.21	<=24	PASS
	Ant2	5200	13.11	<=24	PASS
	Ant1	5240	11.96	<=24	PASS
	Ant2	5240	12.25	<=24	PASS
	Ant1	5260	12.29	<=24	PASS
	Ant2	5260	11.39	<=24	PASS
	Ant1	5280	12.18	<=24	PASS
	Ant2	5280	11.62	<=24	PASS
	Ant1	5320	11.94	<=24	PASS
	Ant2	5320	11.98	<=24	PASS
	Ant1	5500	11.48	<=24	PASS
	Ant2	5500	11.47	<=24	PASS
	Ant1	5580	10.93	<=24	PASS
	Ant2	5580	12.60	<=24	PASS
	Ant1	5700	12.01	<=24	PASS
	Ant2	5700	11.90	<=24	PASS
11N20SISO	Ant1	5180	11.12	<=24	PASS
	Ant2	5180	11.61	<=24	PASS
	Ant1	5200	10.74	<=24	PASS
	Ant2	5200	12.22	<=24	PASS
	Ant1	5240	11.74	<=24	PASS
	Ant2	5240	11.17	<=24	PASS
	Ant1	5260	12.04	<=24	PASS
	Ant2	5260	11.37	<=24	PASS
	Ant1	5280	11.42	<=24	PASS
	Ant2	5280	11.61	<=24	PASS
	Ant1	5320	11.88	<=24	PASS
	Ant2	5320	10.08	<=24	PASS
	Ant1	5500	10.41	<=24	PASS
	Ant2	5500	9.58	<=24	PASS
	Ant1	5580	10.14	<=24	PASS
	Ant2	5580	10.67	<=24	PASS
	Ant1	5700	10.75	<=24	PASS
	Ant2	5700	9.15	<=24	PASS

11N40SISO	Ant1	5190	11.07	<=24	PASS
	Ant2	5190	11.03	<=24	PASS
	Ant1	5230	11.20	<=24	PASS
	Ant2	5230	11.72	<=24	PASS
	Ant1	5270	11.67	<=24	PASS
	Ant2	5270	11.01	<=24	PASS
	Ant1	5310	11.39	<=24	PASS
	Ant2	5310	10.20	<=24	PASS
	Ant1	5510	9.95	<=24	PASS
	Ant2	5510	9.49	<=24	PASS
	Ant1	5550	10.40	<=24	PASS
	Ant2	5550	10.68	<=24	PASS
	Ant1	5670	10.84	<=24	PASS
	Ant2	5670	10.65	<=24	PASS
11AC20SISO	Ant1	5180	11.06	<=24	PASS
	Ant2	5180	10.69	<=24	PASS
	Ant1	5200	10.82	<=24	PASS
	Ant2	5200	10.76	<=24	PASS
	Ant1	5240	10.90	<=24	PASS
	Ant2	5240	11.30	<=24	PASS
	Ant1	5260	11.32	<=24	PASS
	Ant2	5260	11.66	<=24	PASS
	Ant1	5280	11.45	<=24	PASS
	Ant2	5280	10.71	<=24	PASS
	Ant1	5320	12.10	<=24	PASS
	Ant2	5320	10.00	<=24	PASS
	Ant1	5500	10.63	<=24	PASS
	Ant2	5500	9.59	<=24	PASS
	Ant1	5580	10.22	<=24	PASS
	Ant2	5580	10.75	<=24	PASS
	Ant1	5700	10.98	<=24	PASS
	Ant2	5700	11.17	<=24	PASS
11AC40SISO	Ant1	5190	11.31	<=24	PASS
	Ant2	5190	11.30	<=24	PASS
	Ant1	5230	11.49	<=24	PASS
	Ant2	5230	10.85	<=24	PASS
	Ant1	5270	11.21	<=24	PASS
	Ant2	5270	10.90	<=24	PASS
	Ant1	5310	11.74	<=24	PASS

	Ant2	5310	10.15	<=24	PASS
	Ant1	5510	10.07	<=24	PASS
	Ant2	5510	10.01	<=24	PASS
	Ant1	5550	10.00	<=24	PASS
	Ant2	5550	10.87	<=24	PASS
	Ant1	5670	10.11	<=24	PASS
	Ant2	5670	10.74	<=24	PASS
11AC80SISO	Ant1	5210	8.91	<=24	PASS
	Ant2	5210	9.02	<=24	PASS
	Ant1	5290	9.56	<=24	PASS
	Ant2	5290	8.70	<=24	PASS
	Ant1	5530	8.46	<=24	PASS
	Ant2	5530	8.10	<=24	PASS
	Ant1	5610	8.34	<=24	PASS
	Ant2	5610	8.61	<=24	PASS

Wireless Module (444-2250)

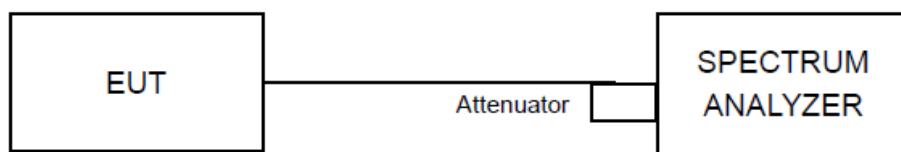
TestMode	Antenna	Channel	Result	Limit	Verdict
11A	Ant1	5180	13.97	<=17	PASS
	Ant2	5180	13.15	<=17	PASS
	Ant3	5180	13.84	<=17	PASS
	Ant4	5180	13.62	<=17	PASS
	Ant1	5240	13.83	<=17	PASS
	Ant2	5240	12.76	<=17	PASS
	Ant3	5240	13.14	<=17	PASS
	Ant4	5240	11.88	<=17	PASS
	Ant1	5280	13.25	<=24	PASS
	Ant2	5280	12.74	<=24	PASS
	Ant3	5280	12.56	<=24	PASS
	Ant4	5280	12.18	<=24	PASS
	Ant1	5320	12.77	<=24	PASS
	Ant2	5320	12.61	<=24	PASS
	Ant3	5320	12.36	<=24	PASS
	Ant4	5320	11.72	<=24	PASS
	Ant1	5500	13.73	<=24	PASS
	Ant2	5500	13.36	<=24	PASS
	Ant3	5500	13.28	<=24	PASS
	Ant4	5500	11.90	<=24	PASS
	Ant1	5580	14.34	<=24	PASS
	Ant2	5580	14.23	<=24	PASS
	Ant3	5580	13.92	<=24	PASS
	Ant4	5580	13.40	<=24	PASS
	Ant1	5700	14.09	<=24	PASS
	Ant2	5700	13.89	<=24	PASS
	Ant3	5700	13.65	<=24	PASS
	Ant4	5700	11.69	<=24	PASS
	Ant1	5745	11.65	<=24	PASS
	Ant1	5785	11.47	<=24	PASS
	Ant1	5825	11.36	<=24	PASS

4.5 Peak Power spectrum density

4.5.1 Limit

Frequency band (MHz)	EUT Category		Limit
5150-5250		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client devices	11dBm/ MHz
5250-5350	√		11dBm/ MHz
5470-5725	√		11dBm/ MHz
5725-5850	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Procedures

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission).
- 7) Record the max value.

4.5.4 Deviation of Test Standard

No deviation.

4.5.5 Test Results

Wireless Module (LS9AD-AC11DBT-GV)

The test results refer to module FCC ID: 2ADBM-LS9ADAC11DBT

Wireless Module (444-2250)

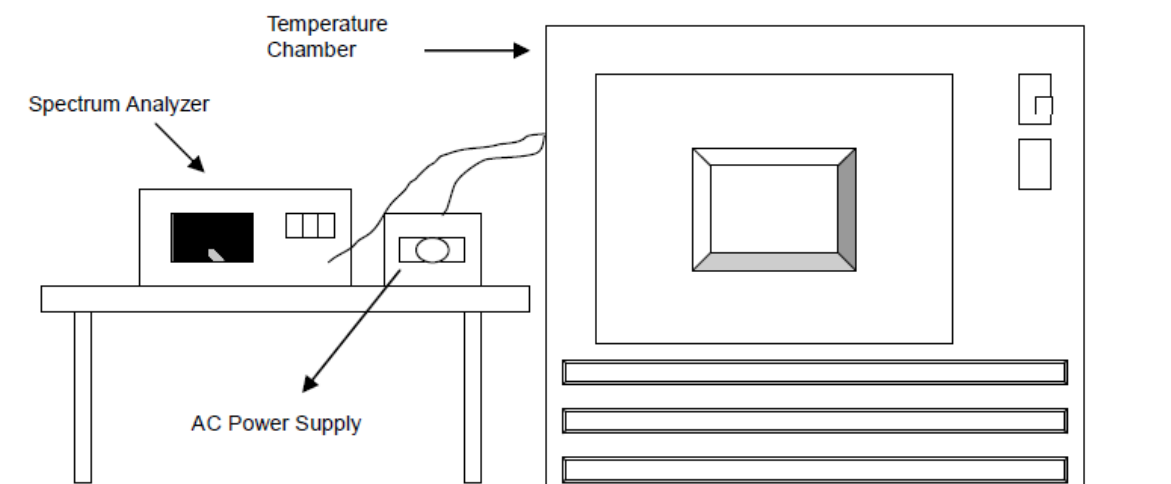
The test results refer to module FCC ID: UA9601

4.6 Frequency Stability

4.6.1 Test Limit

The frequency of the carrier signal shall be maintained within band of operation.

4.6.2 Test Setup



4.6.3 Test Procedures

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time for the temperature the chamber to stabilize, turn the EUT on and measure the operating frequency.
- Repeat step b and c with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at 20 degree C for a minimum of 30min. The supply voltage was the adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 Deviation of Test Standard

No deviation.



4.6.5 Test Results

Wireless Module (LS9AD-AC11DBT-GV)

The test results refer to module FCC ID: 2ADBM-LS9ADAC11DBT

Wireless Module (444-2250)

The test results refer to module FCC ID: UA9601