FCC COMPLIANCE TEST REPORT

Report No.: HA190005-RA

Technical Statement of Conformity in accordance with 47 CFR Part 15 Subpart C

The product

Equipment Under Test : Bluetooth Speaker Microphone

: BTH-600 **Model Number**

: N/A **Product Series**

: HA190005-RA **Report Number Issue Date** : 11-JAN-2019 **Test Result** : Compliance

is produced by

Mobility Sound Technology LTD.

5F, No.100, Jian 1st Road, ZhongHe Dist., New Taipei City #23585, Taiwan



HongAn TECHNOLOGY CO., LTD.

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BSMI Registration No.: SL2-IN-E-0023, SL2-A1-E-0023, FCC Designation No.: TW1071, TW1163

> SL2-IS-E-0023, SL2-R1-E-0023, **TAF Accreditation No.: 1163**

SL2-R2-E-0023, SL2-L1-E-0023 VCCI Registration No.: R-2156, C-2329, T-219

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Test Result Certification

Report No.: HA190005-RA

Applicant	: Mobility Sound Technology LTD.			
Address of Applicant	5F, No.100, Jian 1 st Road, ZhongHe Dist., New Taipei City			
/ tual coo of / tpp://ouni	#23585, Taiwan			
Manufacturer	: Mobility Sound Technology LTD.			
Address of Manufacturer	5F, No.100, Jian 1 st Road, ZhongHe Dist., New Taipei City			
Address of Mandracturer	#23585, Taiwan			
Trade Name	: MobilitySound			
Equipment Under Test	: Bluetooth Speaker Microphone			
Model Number	: BTH-600			
Product Series	: N/A			
FCC ID	: XTS-BTH-600			
Filing Type	: Certification			
Sample Received Date	: 12-Oct-2018			
Test Standard :				
☐ FCC Part 15 Subpart C §15.249				
2 1 00 1 art 10 0aspart 0 3.10.2.10				

Deviations from standard test methods & any other specifications : NONE

Remark:

1. This report details the results of the test carried out on one sample.

- 2. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in both ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.203, 15.207, 15.209, 15.247.
- 3. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd.
- 1. Test Location: HongAn Technology Co., Ltd., No.15-1 Cweishuh Keng, Cweipin Village, Linkou Dist., New Taipei City, Taiwan, R.O.C. FCC Designation No.: TW1071, TW1163.

Documented by:	Kaghang		2019-01-11
	Kay Wang/ ADM. Dept Staff		
Tested by:	Bason. Hsieh		2018-12-25
	Eason Hsieh / ENG. Dept. Staff		
Approved by:	Peter Chin	Date:	2019-01-12
	Peter Chin / Section Manager		

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Summary of Test Result

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	Test Item	Applicable Standard	Test Result	
1	Antenna Requirement	FCC part 15 subpart C §203	Compliance	
2	Conducted Emission	FCC part 15 subpart C §207	Compliance	
3	Restricted Band of	FCC part 15 subpart C §205	Compliance	
3	Operation	PCC part 13 subpart C 9203	Compliance	
4	Radiated Emission	FCC part 15 subpart C §209	Compliance	
5	Field Strength	FCC part 15 subpart C §249(a)	Compliance	
6	Out of Band Emission	FCC part 15 subpart C §249(d)	Compliance	
7	20dB Bandwidth	FCC part 15 subpart C §215(c)	Compliance	

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1 General Description

1.1 Description of EUT

Equipment Under Test	:	Bluetoot	Bluetooth Speaker Microphone						
Model Number of EUT	:	BTH-600	3TH-600						
Product Series	:	N/A							
Power Supply	:	· .	nput: Charging from USB DC 5 V Output: Li-ion Battery DC 3.7 V; 1000mAh; 3.7W						
Frequency Range	:	2402~24	180 MHz						
Number of Channels	:	79 Chan	nels						
Carrier Frequency of Each Channel Antenna Specification	:		2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 tenna/ Gath	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 ain: 1.3 o	2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441	40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59	2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461	60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78	2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480
Modulation Technique	:	FHSS Bluetoot	Bluetooth 4.1 FHSS Bluetooth : GFSK Bluetooth EDR : π/4-DQPSK, 8-DPSK						
Transmit Data Rate	:	Bluetoot	h : 1Mbp	s, 2Mbp	s, 3Mbps				

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		Dimensions : 8.8 cm (L) X 6.8 cm (W) X 3.2 cm (H)
Specification		Weight: 135 g
		Intended Function: The EUT is a Bluetooth Speaker Microphone.
		Product Variance : N/A.

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1.2 Test Instruments

Instrument	Manufacturer	Model	Serial	Last Cal.	Next Cal.
Name	Mode	Number	Number	Date	Date
RF Amplifier	Schaffner	CPA9231A	0405	24-Aug-2018	23-Aug-2019
EMI Receiver	R&S	ESCI	100931	09-Aug-2018	08-Aug-2019
Spectrum Analyzer	R&S	FSV	101629	16-Jan-2018	15-Jan-2019
Preamplifier	HD	HD17187	004	21-May-2018	20-May-2019
Bilog Antenna	TESEQ	CBL6111D	38521	03-Oct-2018	02-Oct-2019
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	23-May-2018	22-May-2019
Horn Antenna (18-40GHz)	Com -Power	AH-840	101042	22-May-2018	21-May-2019
Microwave Preamplifier	Com -Power	PAM-840	461269	21-May-2018	20-May-2019
LISN	Rolf Heine Hochfrequenzt echnik	NNB-4/32T	00001	01-Mar-2018	28-Feb-2019
Active Loop Antenna	EMCO	6502	9202-2717	27-Aug-2018	26-Aug-2019
Coaxial Cable	n/a	8D-FB	HA2-10MSI TE-01	24-Aug-2018	23-Aug-2019
Microflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3368/2	21-May-2018	20-May-2019
Microflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3367/2	22-May-2018	21-May-2019
Coaxial Cable	n/a	RG 223/U	HA2-CE-01	24-Aug-2018	23-Aug-2019

 $[\]mbox{\%}$ The test equipments used are calibrated and can be traced to National ITRI and International Standards.

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1.3 Auxiliary Equipments

1.3.1. Provided by HongAn Technology Co., Ltd. for Test.

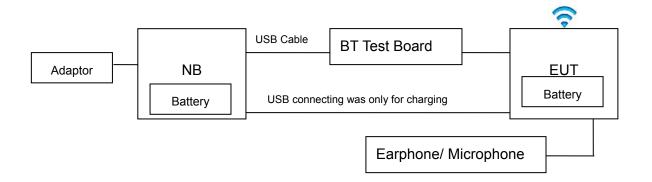
No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Power Cord
				CE,FCC,		
				C-TICK		
01	NoteBook	N61J	N61JV-021A520M	N13219,	ASUS	N/A
				BSMI		
				R31018		

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1.3.2. Provided by the Manufacturer

No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Specification
01	BT Test Board	N/A	N/A	N/A	N/A	N/A
02	USB Cable	N/A	N/A	N/A	N/A	Non-Shielded; Detachable, 1.8m w/o core
03	USB Cable	N/A	N/A	N/A	N/A	Non-Shielded; Detachable, 1.8m w/o core

1.4 EUT SETUP



Note: Main Test Sample: MTX-BTH-600

1.5 Identifying the Final Test Mode

- 1. Mode 1: TX BT mode (1Mbps) CH 00.
- 2. Mode 2: TX BT mode (1Mbps) CH 39.
- 3. Mode 3: TX BT mode (1Mbps) CH 78.
- 4. Mode 4: TX BT mode (2Mbps) CH 00.
- 5. Mode 5: TX BT mode (2Mbps) CH 39.
- 6. Mode 6: TX BT mode (2Mbps) CH 78.
- 7. Mode 7: TX BT mode (3Mbps) CH 00.
- 8. Mode 8: TX BT mode (3Mbps) CH 39.
- 9. Mode 9: TX BT mode (3Mbps) CH 78.

Note:

1. After pre-test, we identified that the TX mode was most likely to cause maximum disturbance and

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most likely to be susceptible to disturbance. Therefore, the Final Assessment was performed for the worst case.

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- 2. The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements. During the tests, there was no Test Software has been used.
- 3. Channel Low (2402 MHz), Mid (2442 MHz) and High (2480 MHz) were chosen for full testing.
- 4. According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.
- 5. Test Software: BlueTest3 V2.5.8; RF parameter setting: Channel: 00, 39, 78/ Data Rate: 1Mbps, 2Mbps, 3Mbps/ Packet: DH1, DH3, DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5/ TX POWER: 50.

1.6 Final Test Mode

Conducted Emission: Mode 3.

Radiated Emission (30~1000 MHz): Mode 3. Radiated Emission (1~26.5GHz): All Mode.

1.7 Condition of Power Supply

DC 5V through USB port

1.8 EUT Configuration

- 1. Setup the EUT as shown in Sec.1.4 Block Diagram.
- 2. Turn on the power of all equipments.
- 3. Activate the selected Final Test Mode.

1.9 Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.10 (2013) and FCC CFR 47 15.203, 15.207, 15.209 and 15.249.

1.10 General Test Procedures

Conducted Emissions

The EUT is set according to the requirements in Section 6.2 of ANSI C63.10 (2013).

Radiated Emissions

The EUT is set according to the requirements in Section 6.3 of ANSI C63.10 (2013).

1.11 Modification

N/A

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1.12 FCC Part 15.205 restricted bands of operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423 399.9-410		4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37635-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

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² Above 38.6

⁽b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

1.13 Qualification of Test Facility

Name of Test Facility : HongAn Technology

Address of Test Facility

No. 15-1, Cweishuh Keng, Cweipin Village, Linkou, New Taipei City,

Report No.: HA190005-RA

Taiwan, R.O.C

FCC Designation No. : TW1071, TW1163

TAF Accreditation No. : 1163

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2 Power line Conducted Emission Measurement

2.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

2.2 Test Arrangement and Procedure

- 1. The EUT was placed on a table, which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

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3. Repeat above procedures until all frequency measured were complete.

2.3 Limit (§ 15.207)

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Fraguency (MHz)	Limits (dBuV)			
Frequency (MHz)	Q.P. (Quasi-Peak)	A.V. (Average)		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5.0	56	46		
5.0 to 30	60	50		

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

2.4 Test Result

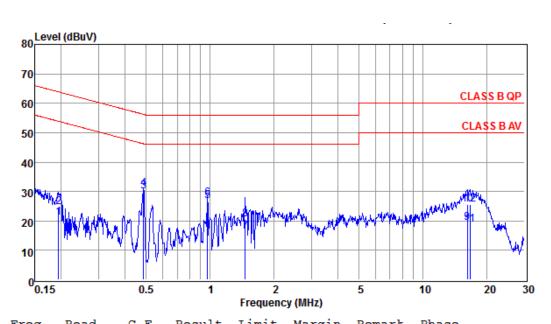
Compliance

The final test data are shown on the following page(s).

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Conducted Emission Test Data

Test Date : 2018-12-25 Power Line: Line **24.2**℃ 52% Temperature Humidity



Freq	Read	C.F	Result	Limit	Margin	Remark	Phase	
MHz	dBuV	dB	dBuV	dBuV	dB			
0.194	21.07	0.12	21.19	53.84	-32.65	Average	LINE	
0.194	24.60	0.12	24.72	63.84	-39.12	QP	LINE	
0.486	29.82	0.16	29.98	46.23	-16.25	Average	LINE	
0.486	30.75	0.16	30.91	56.23	-25.32	QP	LINE	
0.974	26.53	0.21	26.74	46.00	-19.26	Average	LINE	
0.974	27.31	0.21	27.52	56.00	-28.48	QP	LINE	
1.464	16.00	0.24	16.24	46.00	-29.76	Average	LINE	
1.464	20.22	0.24	20.46	56.00	-35.54	QP	LINE	
16.140	18.30	1.07	19.37	50.00	-30.63	Average	LINE	
16.140	24.63	1.07	25.70	60.00	-34.30	QP	LINE	
16.661	17.76	1.10	18.86	50.00	-31.14	Average	LINE	
16.661	24.47	1.10	25.57	60.00	-34.43	QP	LINE	

Note1: C.F (Correction Factor) = Insertion loss + Cable loss

Note2: Margin = Result - Limit

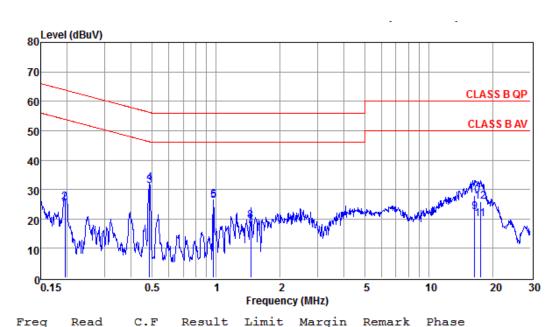
Remark: All readings are Quasi-Peak and Average values.

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Conducted Emission Test Data

Test Date : 2018-12-25 Power Line : Neutral

Temperature : 24.2° C Humidity : 52%



	1104	noud	0.1	KOBULO	DIMIT 0	Margrii	Komark	rnabo
	MHz	dBu∀	dB	dBu∀	dBu∀	dB		
-								
	0.195	23.03	0.12	23.15	53.80	-30.65	Average	NEUTRAL
	0.195	25.58	0.12	25.70	63.80	-38.10	QP	NEUTRAL
	0.486	31.01	0.15	31.16	46.23	-15.07	Average	NEUTRAL
	0.486	31.86	0.15	32.01	56.23	-24.22	QP	NEUTRAL
	0.974	25.91	0.19	26.10	46.00	-19.90	Average	NEUTRAL
	0.974	26.33	0.19	26.52	56.00	-29.48	QP	NEUTRAL
	1.456	17.29	0.22	17.51	46.00	-28.49	Average	NEUTRAL
	1.456	18.98	0.22	19.20	56.00	-36.80	QP	NEUTRAL
	16.398	21.19	0.99	22.18	50.00	-27.82	Average	NEUTRAL
	16.398	27.00	0.99	27.99	60.00	-32.01	QP	NEUTRAL
	17.475	18.85	1.03	19.88	50.00	-30.12	Average	NEUTRAL
	17.475	24.91	1.03	25.94	60.00	-34.06	QP	NEUTRAL

Notel: C.F (Correction Factor) = Insertion loss + Cable loss

Note2: Margin = Result - Limit

Remark: All readings are Quasi-Peak and Average values.

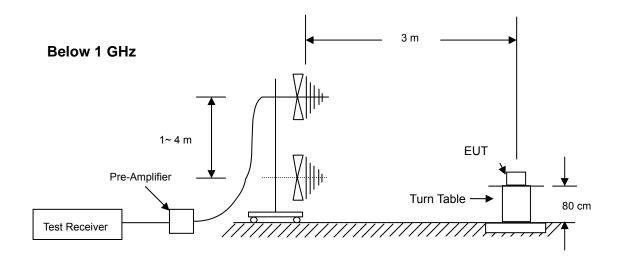
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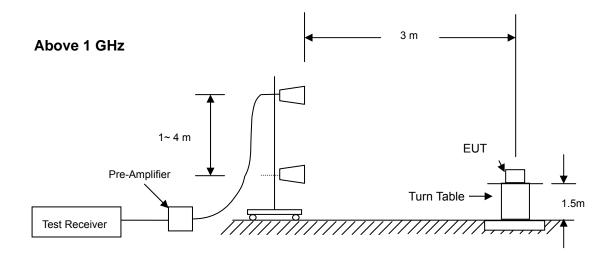
3 Radiated Emission Test

3.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

3.2 Test Arrangement and Procedure





- 1. The EUT is placed on a turntable, which is 0.8 m (below 1GHz) and 1.5m (above 1GHz) above ground plane.
- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
- 4. Maxium procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Set the spectrum analyzer. Refer to each test results for detail setting up.
- 7. Repeat above procedures until the meausreemnts for all frequencies are complete.

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3.3 Limit of Field Strength of Fundamental (§ 15.249)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

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Fundamental Frequency	Field strength of fundamental	Field strength of harmonics		
(MHz)	(microvolts/ meter)	(meters)		
902-928	50	500		
2400-2483.5	50	500		
5725-5875	50	500		
24000-24250	250	2500		

Note:

- 1. Field strength limits are specified at a distance of 3 meters.
- 2. For frequencies above 1000 MHz, the field strength limits in above table are based on average limits. 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.

3.4 Limit of Spurious Emission (§ 15.209)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is lesser attenuation.

Frequency	Field strength	Measurement distance
(MHz)	(microvolts/ meter)	(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

^{**} Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g.§§ 15.231 and 15.241.

3.5 Test Result

Compliance

The final test data are shown on the following page(s).

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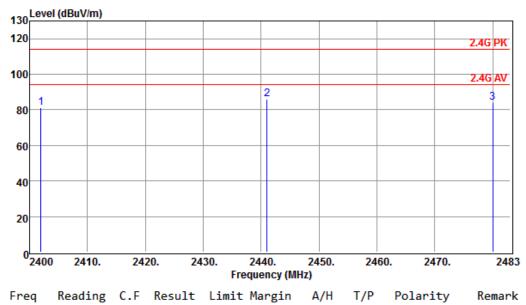
Report No.: HA190005-RA

Temperature : 24.2° Humidity : 52%

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Vertical : CH00, 39, 78 (1Mbps)

EUT Position : X axis



MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2402.000	87.32	-6.02	81.30	94.00	-12.70-			VERTICAL	Peak
2441.000	92.07	-5.89	86.18	94.00	-7.82-			VERTICAL	Peak
2480.000	89.87	-5.79	84.08	94.00	-9.92-			VERTICAL	Peak

Notel: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO. Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

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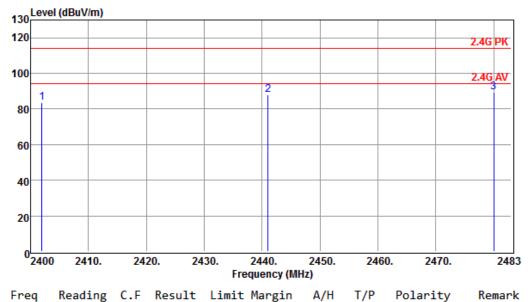
Report No.: HA190005-RA

Temperature : 24.2° Humidity : 52%

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Horizontal : CH00, 39, 78 (1Mbps)

EUT Position : X axis



		_			_			_	
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2402.000	89.79	-6.02	83.77	94.00	-10.23-			HORIZONTAL	Peak
2441.000	93.66	-5.89	87.77	94.00	-6.23-			HORIZONTAL	Peak
2480.000	95.05	-5.79	89.26	94.00	-4.74-			HORIZONTAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO. Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

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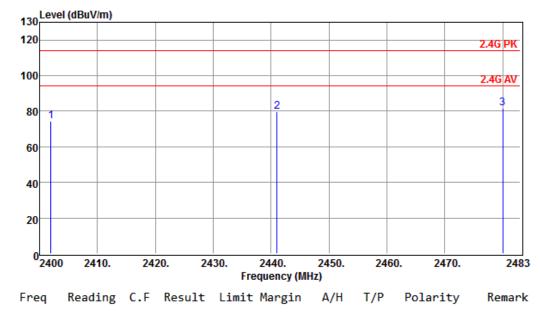
Report No.: HA190005-RA

Temperature : 24.2°C Humidity : 52%

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Vertical : CH00, 39, 78 (2Mbps)

EUT Position : X axis



MHz dBuV dB dBuV/m dBuV/m deg dB cm94.00 -19.74-----2402.000 80.28 -6.0274.26 VERTICAL Peak 2441.000 85.70 -5.89 79.81 94.00 -14.19-----VERTICAL Peak 2480.000 87.61 -5.79 81.82 94.00 -12.18-----Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO. Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

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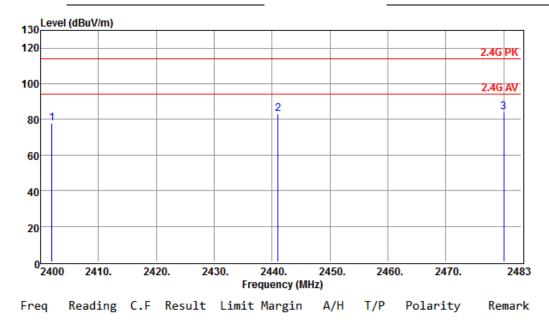
Report No.: HA190005-RA

Temperature : 24.2° Humidity : 52%

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Horizontal : CH00, 39, 78 (2Mbps)

EUT Position : X axis



MHz dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2402.000 83.74 2441.000 88.99 2480.000 89.88	-5.89	83.10	94.00	-10.90-			HORIZONTAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO. Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

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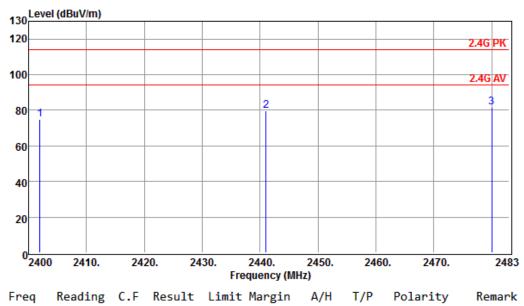
Report No.: HA190005-RA

Temperature : 24.2° Humidity : 52%

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Vertical : CH00, 39, 78 (3Mbps)

EUT Position : X axis



MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2402.000	80.82	-6.02	74.80	94.00	-19.20-			VERTICAL	Peak
2441.000	85.80	-5.89	79.91	94.00	-14.09-			VERTICAL	Peak
2480.000	87.48	-5.79	81.69	94.00	-12.31-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO. Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

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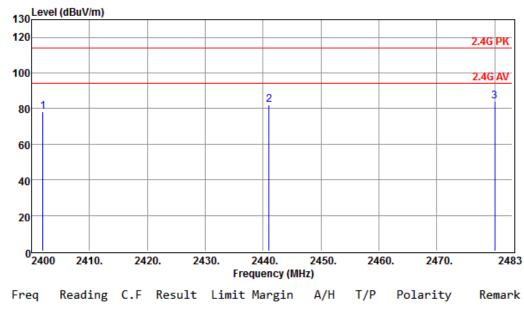
Report No.: HA190005-RA

Temperature : 24.2°C Humidity : 52%

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Horizontal : CH00, 39, 78 (3Mbps)

EUT Position : X axis



MHz dBuV/m dBuV/m dBuV dB dB deg cm2402.000 84.11 -6.0278.09 94.00 -15.91-----HORIZONTAL Peak 2441.000 88.20 -5.89 82.31 94.00 -11.69-----HORIZONTAL Peak 2480.000 -5.79 83.96 94.00 -10.04----Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO. Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

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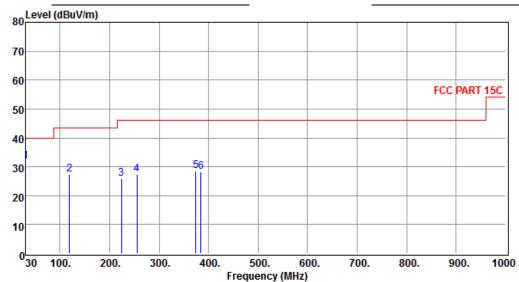
Radiated Emission Test Data (Below 1 GHz)

Temperature : 24.2° Humidity : 52°

Test Date : 25-DEC-2018 Tested by : Eason Hsieh

Polarization : Vertical Channel : CH78

EUT Position : X axis



	rreq	Keauı	ing C.F	Kesuit	LIMIT	nangin	A/II	1/F	rolarity	Kelliark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
-										
	30.000	35.87	-4.17	31.70	40.00	-8.30-			VERTICAL	Peak
	119.240	38.86	-11.36	27.50	43.50	-16.00-			VERTICAL	Peak
	224.000	38.85	-13.09	25.76	46.00	-20.24-			VERTICAL	Peak
	255.040	36.71	-9.31	27.40	46.00	-18.60-			VERTICAL	Peak
	374.350	35.85	-7.34	28.51	46.00	-17.49-			VERTICAL	Peak
	384.050	35.25	-7.02	28.23	46.00	-17.77-			VERTICAL	Peak

Polanity

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

Recult

Remark:

- 1. Measuring frequencies from 30 MHz to 1 GHz.
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.
- 3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
- 4. All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.
- 5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

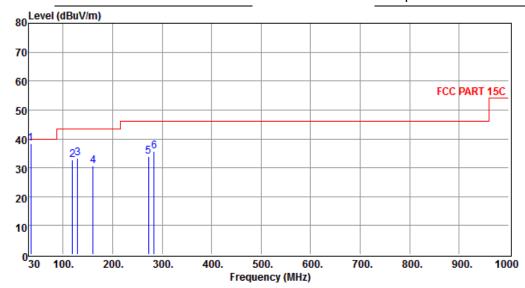
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Radiated Emission Test Data (Below 1 GHz)

Report No.: HA190005-RA

Temperature : 24.2° Humidity : 52%Test Date : 25-DEC-2018 Tested by : Eason Hsieh
Polarization : Horizontal Channel : CH78

EUT Position : X axis Data rate : 1Mbps



MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
34.850	44.96	-6.61	38.35	40.00	-1.65-			HORIZONTAL	Peak
119.240	44.16	-11.36	32.80	43.50	-10.70-			HORIZONTAL	Peak
128.940	44.69	-11.37	33.32	43.50	-10.18-			HORIZONTAL	Peak
160.950	43.32	-12.55	30.77	43.50	-12.73-			HORIZONTAL	Peak
272.500	43.66	-9.80	33.86	46.00	-12.14-			HORIZONTAL	Peak
284.140	45.20	-9.61	35.59	46.00	-10.41-			HORIZONTAL	Peak

T/P

Polarity

Remark

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

Reading C.F Result Limit Margin

Remark:

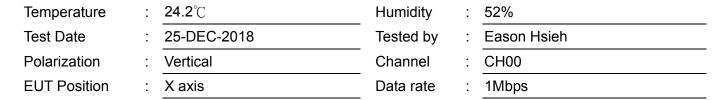
1. Measuring frequencies from 30 MHz to 1 GHz.

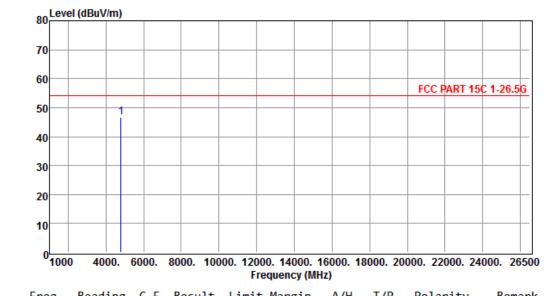
Freq

- 2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.
- 3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
- 4. All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.
- 5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

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Report No.: HA190005-RA





Freq	readin	ig C.F	Kesuit	Limit	margin	Α/П	1/1	Polarity	Kemark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
4804.000	43.74	3.09	46.83	54.00	-7.17-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

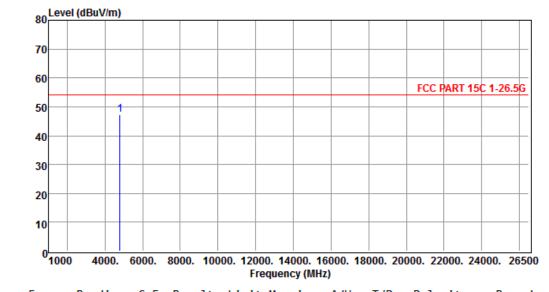
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are
 recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

Temperature **24.2**°C 52% Humidity **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH00** Horizontal Channel **EUT Position** X axis Data rate 1Mbps



	Freq	Keadi	ng C.F	Result	Limit	Margin	A/H	I/P	Polarity	Kemark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
-				47.45						
- 4	804.000	44.06	3.09	4/.15	54.00	-6.85-			HORIZONTAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

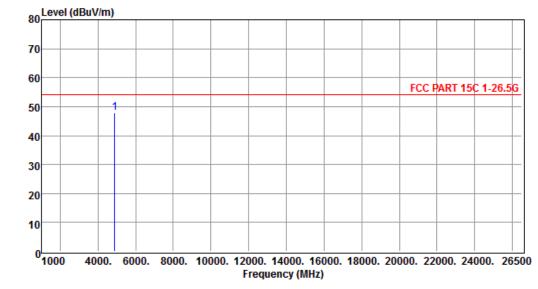
Remark:

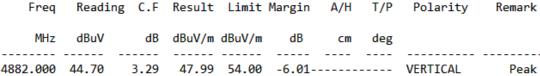
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH39** Vertical Channel **EUT Position** X axis Data rate 1Mbps





Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

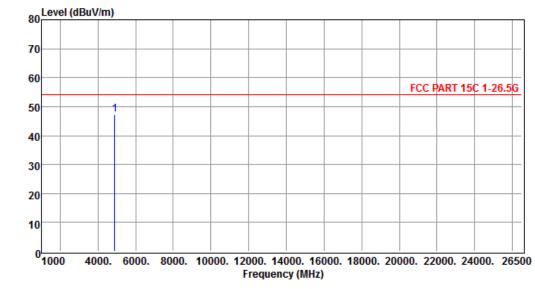
Remark:

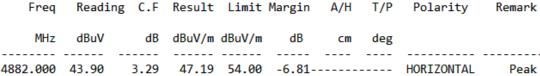
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

FCC Test Report Page 28 of 77

Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH39** Horizontal Channel **EUT Position** X axis Data rate 1Mbps





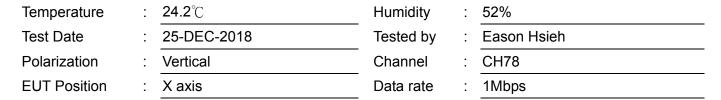
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

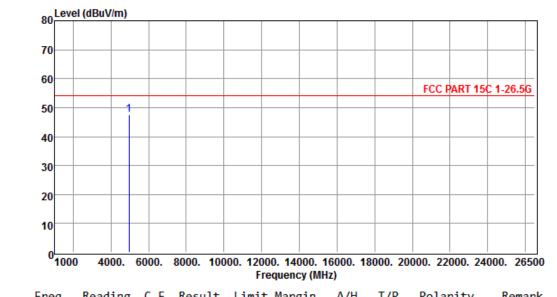
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA





rreq	iveauti	ig C.F	Kesuit	LIMIT	nar g in	A/II	1/1	rolarity	Kelliark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
4960.000	44.00	3.50	47.50	54.00	-6.50-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

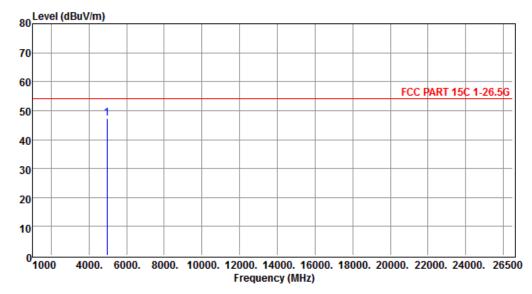
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are
 recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

Temperature **24.2**°C Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Horizontal Polarization Channel **CH78 EUT Position** X axis Data rate 1Mbps



Reading C.F Result Limit Margin Freq T/P Polarity Remark MHz dBuV dB dBuV/m dBuV/m dΒ cmdeg 4960.000 43.91 3.50 47.41 54.00 -6.59-----HORIZONTAL

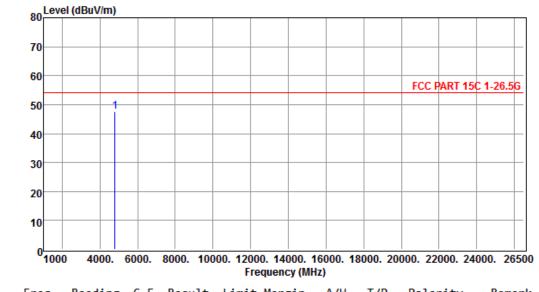
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Temperature **24.2**℃ Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization Channel CH00 Vertical **EUT Position** X axis 2Mbps Data rate



Freq	Reading	C.F	Result	Limit	Margin	A/H	T/P	Polarity	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
4804.000	44.60	3.09	47.69	54.00	-6.31-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

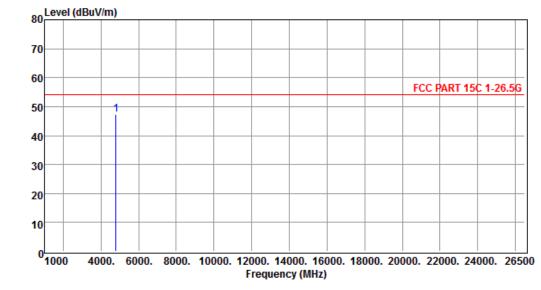
Remark:

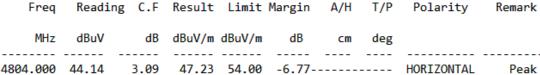
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH00** Horizontal Channel **EUT Position** X axis 2Mbps Data rate





Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

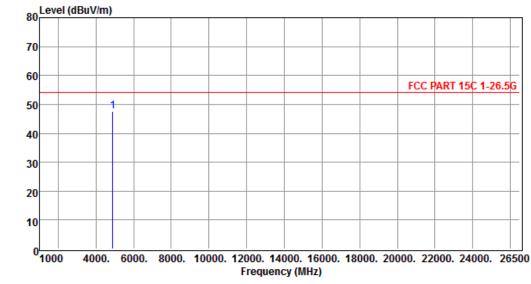
Remark:

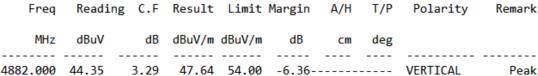
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

: 24.2°C Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH39** Vertical Channel **EUT Position** X axis Data rate 2Mbps





Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

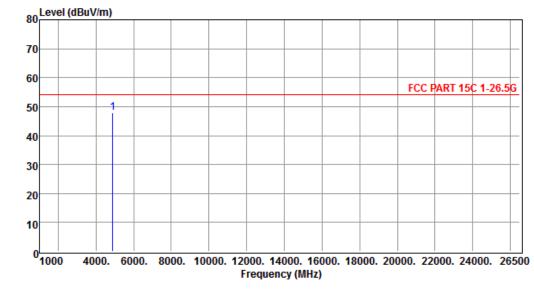
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH39** Horizontal Channel **EUT Position** X axis 2Mbps Data rate



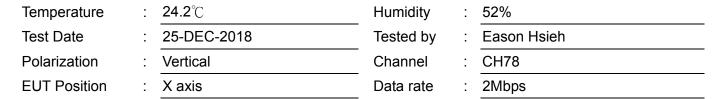
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

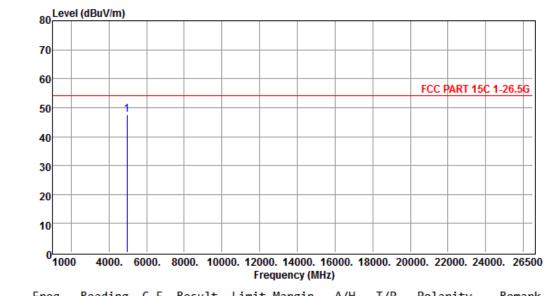
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA





Freq	Keadin	ig C.F	Kesuit	Limit	margin	А/П	1/1	Polarity	Kemark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
4960.000	44.16	3.50	47.66	54.00	-6.34-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

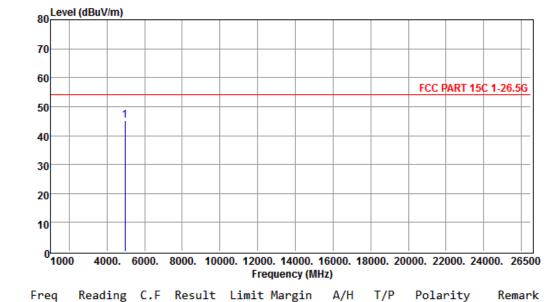
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are
 recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

Temperature **24.2**°C Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Horizontal Polarization Channel **CH78 EUT Position** X axis Data rate 2Mbps

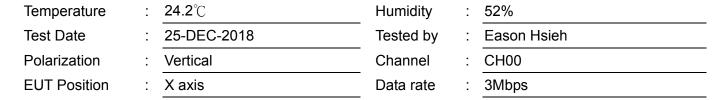


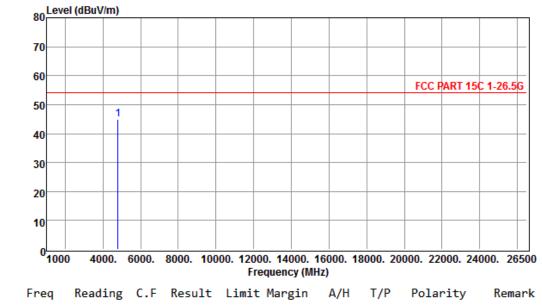
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

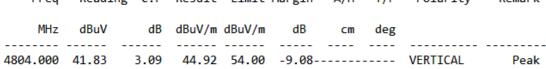
Remark :

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

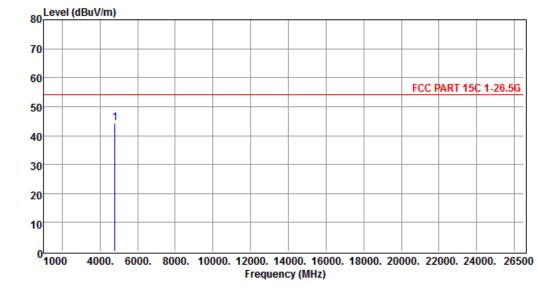
Remark:

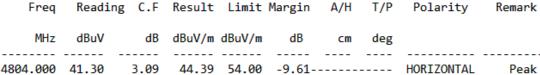
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH00** Horizontal Channel **EUT Position** X axis 3Mbps Data rate





Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

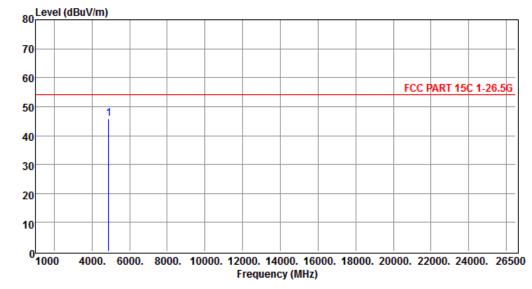
Remark:

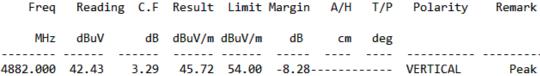
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH39** Vertical Channel **EUT Position** X axis Data rate 3Mbps





Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

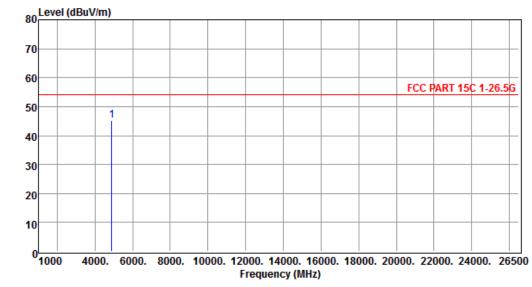
Remark:

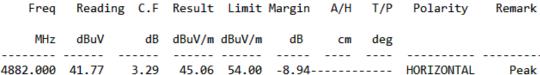
- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.2℃ Temperature Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization **CH39** Horizontal Channel **EUT Position** X axis 3Mbps Data rate





Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

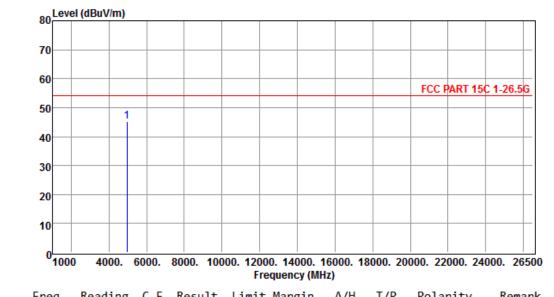
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

52% Temperature **24.2**℃ Humidity **Test Date** 25-DEC-2018 Tested by Eason Hsieh Polarization Vertical Channel CH78 **EUT Position** X axis Data rate 3Mbps



rreq	iveauti	ig C.F	Kesuit	LIMIT	nar gin	A/II	1/1	rolarity	Kelliark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
4960.000	41.80	3.50	45.30	54.00	-8.70-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

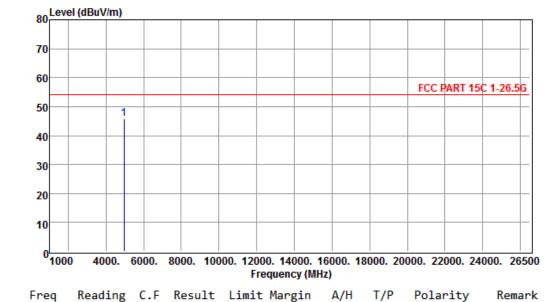
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are
 recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

Temperature **24.2**°C Humidity 52% **Test Date** 25-DEC-2018 Tested by Eason Hsieh Horizontal Polarization Channel **CH78 EUT Position** X axis Data rate 3Mbps



Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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4 Out of Band Emission Test

4.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

4.2 Test Arrangement and Procedure

Refer to Sec. 3.2.

4.3 Limit of Field Strength of Fundamental (§ 15.249(d))

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Report No.: HA190005-RA

4.4 Test Result

Compliance

The final test data are shown on the following page(s).

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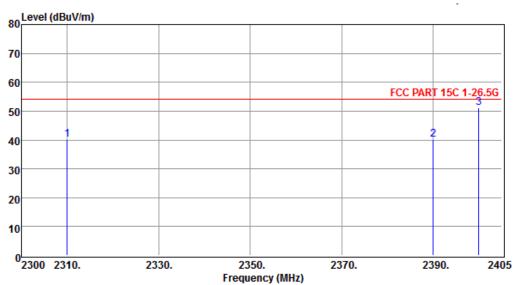
Report No.: HA190005-RA

Temperature : 24.3° C Humidity : 43°

Test Date : 28-Nov-2017 Tested by : Eason Hsieh

Polarization : Vertical Channel : CH00

EUT Position : X axis Data Rate : 1Mbps



Freq	Readi	ng C.F	Result	Limit	Margin	A/H	T/P	Polarity	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2310.000	46.35	-6.29	40.06	54.00	-13.94-			VERTICAL	Peak
2390.000	46.15	-6.06	40.09	54.00	-13.91			VERTICAL	Peak
2400.000	57.14	-6.03	51.11	54.00	-2.89-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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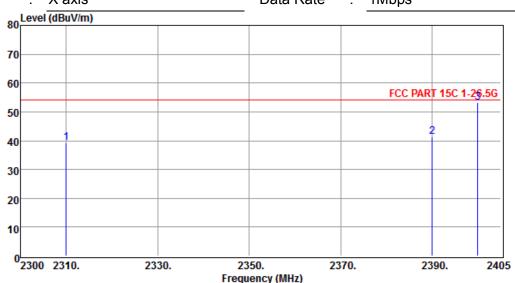
Report No.: HA190005-RA

Temperature : 24.3° C Humidity : 43%

Test Date : 28-Nov-2017 Tested by : Eason Hsieh

Polarization : Horizontal Channel : CH00

EUT Position : X axis Data Rate : 1Mbps



Freq	Readir	ng C.F	Result	Limit	Margin	A/H	T/P	Polarity	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2310.000	45.43	-6.29	39.14	54.00	-14.86-			HORIZONTAL	Peak
2390.000	47.41	-6.06	41.35	54.00	-12.65-			HORIZONTAL	Peak
2400.000	59.21	-6.03	53.18	54.00	-0.82-			HORIZONTAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

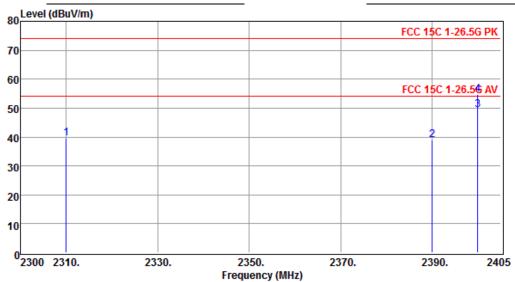
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

EUT Position : X axis Data Rate : 2Mbps



Peak
Peak
Average
Peak
_

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

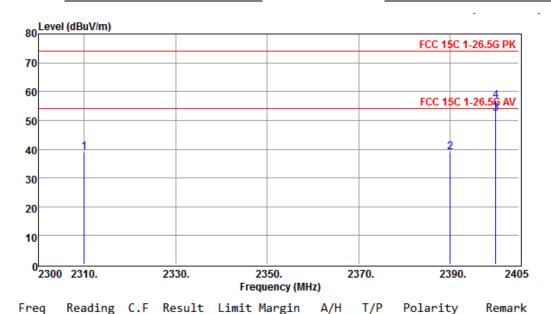
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.3℃ Temperature Humidity 43% **Test Date** 28-Nov-2017 Tested by Eason Hsieh Polarization Horizontal Channel CH₀0 **EUT Position** Data Rate X axis 2Mbps



MHz	dBuV	dB	dBuV/m	dBuV/m	dB	 deg		
2390.000 2400.000	44.97 58.26	-6.06 -6.03	38.91 52.23	74.00 54.00	-35.09 -1.77	 	HORIZONTAL HORIZONTAL HORIZONTAL HORIZONTAL	Peak Peak Average Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

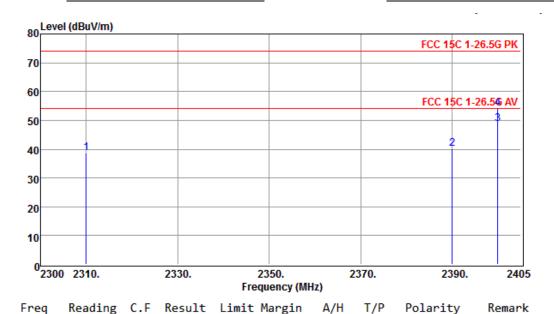
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.3℃ Temperature Humidity 43% **Test Date** 28-Nov-2017 Tested by Eason Hsieh Polarization Vertical Channel CH₀0 **EUT Position** Data Rate X axis 3Mbps



		0						,	
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2310.000	44.85	-6.29	38.56	74.00	-35.44-			VERTICAL	Peak
2390.000	46.26	-6.06	40.20	74.00	-33.80-			VERTICAL	Peak
2400.000	54.94	-6.03	48.91	54.00	-5.09-			VERTICAL	Average
2400.000	60.10	-6.03	54.07	74.00	-19.93-			VERTICAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

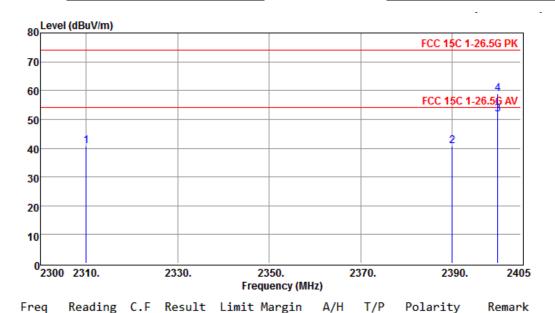
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Report No.: HA190005-RA

24.3℃ Temperature Humidity 43% **Test Date** 28-Nov-2017 Tested by Eason Hsieh Polarization Horizontal Channel CH₀0 **EUT Position** Data Rate X axis 3Mbps



		0			0	•	•	,	
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2309.975	47.06	-6.29	40.77	74.00	-33.23			HORIZONTAL	Peak
2390.000	46.68	-6.06	40.62	74.00	-33.38-			HORIZONTAL	Peak
2400.000	57.76	-6.03	51.73	54.00	-2.27-			HORIZONTAL	Average
2400.000	64.90	-6.03	58.87	74.00	-15.13-			HORIZONTAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (b) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

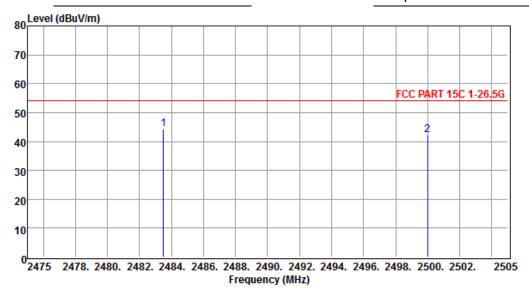
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Temperature : 24.3° C Humidity : 43%

Test Date : 28-Nov-2017 Tested by : Eason Hsieh

Polarization : Vertical : CH78

EUT Position : X axis Data Rate : 1Mbps



Freq	Readir	ng C.F	Result	Limit	Margin	A/H	T/P	Polarity	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2483.500 2500.000								VERTICAL VERTICAL	Peak Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

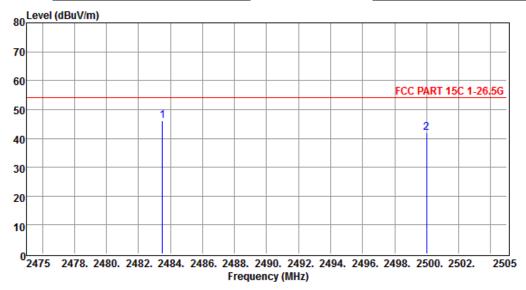
Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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EUT Position : X axis Data Rate : 1Mbps



Freq	Readir	ng C.F	Result	Limit	Margin	A/H	T/P	Polarity	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
								HORIZONTAL HORIZONTAL	Peak Peak

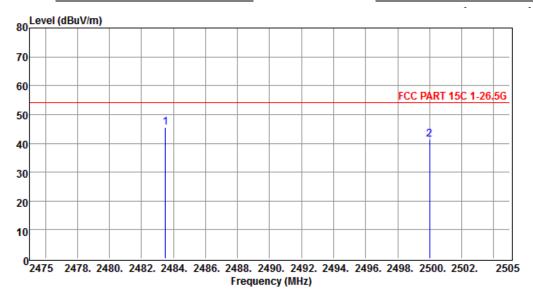
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Temperature **24.3**℃ Humidity : 43% **Test Date** 28-Nov-2017 Tested by Eason Hsieh Polarization Vertical Channel **CH78 EUT Position** X axis Data Rate 2Mbps



Freq	Readir	ng C.F	Result	Limit	Margin	A/H	T/P	Polarity	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2402 500	E4 4E		45 30	F4 00	0.60			VEDITION	DI-
2483.500	51.15	-5.//	45.38	54.00	-8.62-			VERTICAL	Peak
2500.000	46.97	-5.72	41.25	54.00	-12.75-			VERTICAL	Peak

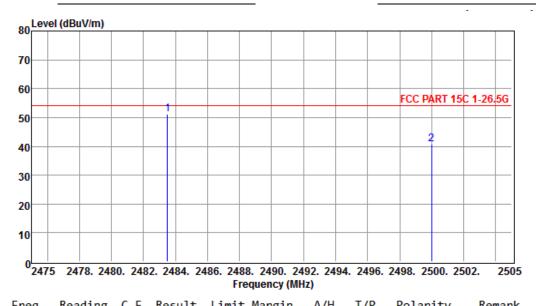
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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Temperature **24.3**℃ Humidity : 43% **Test Date** 28-Nov-2017 Tested by Eason Hsieh Polarization Horizontal Channel **CH78 EUT Position** X axis Data Rate 2Mbps



rreq	NeauII	ig C.F	Kesuit	LIMIT	Hargin	A/II	1/1	rolarity	Kelliark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
								HORIZONTAL HORIZONTAL	

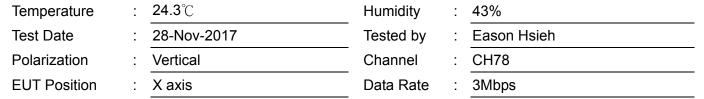
Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

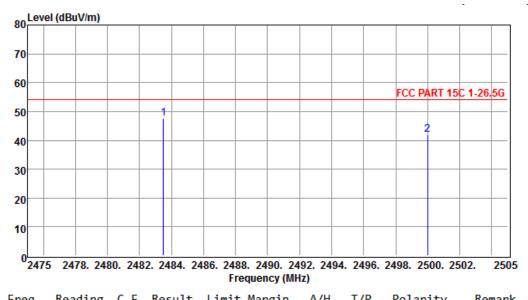
Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:

Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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rreq	Keauti	ig C.F	Kesuic	LIMIT	Hargin	A/II	1/1	rolarity	Kelliark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg		
2483.500 2500.000									Peak Peak

Polanity

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain Note2: Margin = Result - Limit

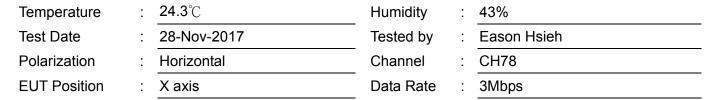
Remark:

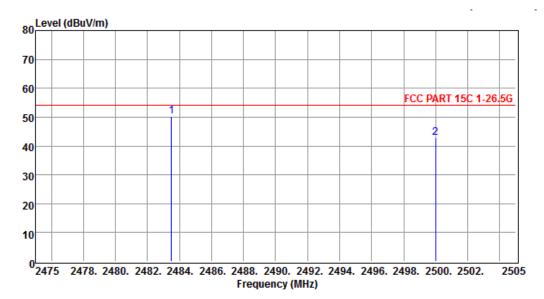
Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Pacul+

- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are 2. recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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FILE	:Ψ	Keaut	ııg	C.F	Kesuit	LIMIT	nar.8111	A/II	1/F	rolarity	Kelliark
MH	lz	dBuV		dB	dBuV/m	dBuV/m	dB	cm	deg		
2483.50	90	56.02	-5	5.77	50.25	54.00	-3.75-			HORIZONTAL	Peak
2500.00	90	48.52	-5	5.72	42.80	54.00	-11.20-			HORIZONTAL	Peak

Note1: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Note2: Margin = Result - Limit

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are
 recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- 5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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5 20 dB Bandwidth

5.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

5.2 Test Arrangement and Procedure



1. The transmitter output was connected to a spectrum analyzer (through an attenuator, if it's necessary).

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2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. Measured the -20 dB bandwidth and plotted the graph.

5.3 Limit

None; For report purpose only.

5.4 Test Result

No non-compliance noted.

The final test data are shown on the following page(s).

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