

Partial FCC Test Report (WLAN 5GHz Band)

Report No.: RFBBGM-WTW-P21120093-7

FCC ID: WIYSLM500QA

Test Model: SLM500

Received Date: Dec. 24, 2021

Test Date: Feb. 25 ~ Mar. 02, 2022

Issued Date: Mar. 17, 2022

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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBBGM-WTW-P21120093-7	Original release	Mar. 17, 2022

1 Certificate of Conformity

Product: Smart module

Brand:  **CASTLES
TECHNOLOGY**

Test Model: SLM500

Sample Status: Identical Prototype

Applicant: CASTLES TECHNOLOGY CO., LTD.

Test Date: Feb. 25 ~ Mar. 02, 2022

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

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

Prepared by : Pettie Chen, **Date:** Mar. 17, 2022
Pettie Chen / Senior Specialist

Approved by : Jeremy Lin, **Date:** Mar. 17, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(8)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -10.11dB at 0.64600MHz.
15.407(b)(1/2/3/4(i/ii)/8)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.70dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	NA	Refer to Note 1
15.407(a)(1/2/3)	Peak Power Spectral Density	NA	Refer to Note 1
15.407(e)	6dB bandwidth	NA	Refer to Note 1
15.407(g)	Frequency Stability	NA	Refer to Note 1
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) connector not a standard connector.

Note:

1. This report is a partial report. Therefore, only AC Power Conducted Emission, radiated emissions and Max Average Transmit Power were verified and recorded in this report. Other testing data please refer to the original SGS report no.: SZCR210300003004.
2. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
3. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
4. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smart module
Brand	
Test Model	SLM500
Status of EUT	Identical Prototype
Power Supply Rating	5.0 Vdc (host equipment) 3.65 or 3.7 Vdc
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20): up to 72.2Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20): 4 5745 ~ 5825MHz: 802.11a, 802.11n (HT20): 5
Output Power	5180 ~ 5240MHz: 24.099mW 5745 ~ 5825MHz: 17.824mW
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Refer to Note as below
Cable Supplied	N/A

Note:

- This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of SGS report no.: SZCR210300003004. The differences from the original report are adding an End-product (POS Terminal (Brand:  , Model: SATURN1000)), using software to reduce power and disabling 802.11n (HT40) and 5260 ~ 5320MHz, 5500 ~ 5700MHz. Only AC Power Conducted Emission, Conducted Power and radiated emissions were verified and recorded in this report. Other testing data please refer to the original SGS report no.: SZCR210300003004.
- The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	1TX

- The EUT was installed in POS Terminal (Brand:  , Model: SATURN1000).

- The antenna information of POS Terminal is listed as below.

Antenna			
Antenna Type	Dipole	Brand	ARISTOTLE
Antenna Connector	ipex(MHF)	Model	RFA-25GPSJP32370B105
Antenna Gain (dBi)	3.92		

*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

5. The battery and adapter information of POS Terminal is listed as below.

Battery 1 (Support unit)	
Brand	 CASTLES TECHNOLOGY
Model	SATURN1000
Rating	3.65Vdc, 5840mAh

Battery 2 (Support unit)	
Brand	 CASTLES TECHNOLOGY
Model	SATURN1000
Rating	3.7Vdc, 5840mAh

*Battery 2 was the worst for the final tests.

Adapter 1 (Support unit)	
Brand	LUCENT TRANS
Model	1A52-UB52A
Input Power	100-240 Vac; 50/60 Hz; 0.3 A
Output Power	5Vdc; 2A

Adapter 2 (Support unit)	
Brand	LUCENT TRANS
Model	1A52-SR52A
Input Power	100-240 Vac; 50/60 Hz; 0.3 A
Output Power	5Vdc; 2A
Power Cord	1.5m

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	Power	
A	√	√	√	√	Power from adapter 1
B	-	√	√	-	Power from adapter 2

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
Power: Transmit Power

Note:

1. "-": Means no effect.
2. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ 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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5

Radiated Emission Test (Below 1GHz):

- ☒ 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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A, B	802.11n (HT20)	5180-5240	36 to 48	36	OFDM	6.5
	802.11n (HT20)	5745-5825	149 to 165		OFDM	6.5

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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A, B	802.11n (HT20)	5180-5240	36 to 48	36	OFDM	6.5
	802.11n (HT20)	5745-5825	149 to 165		OFDM	6.5

Transmit Power Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	21 deg. C, 71 % RH	120 Vac, 60 Hz	Rex Wang
RE<1G	21 deg. C, 71 % RH	120 Vac, 60 Hz	Rex Wang
PLC	25 deg. C, 75 % RH	120 Vac, 60 Hz	Rex Wang
Power	25 deg. C, 60 % RH	120 Vac, 60 Hz	Ivan Tseng

3.3 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Earphone	APPLE	MB77PFEB	NA	NA	-
B.	POS Terminal	 CASTLES TECHNOLOGY	SATURN1000	NA	NA	-
C.	Adapter	LUCENT TRANS	1A52-UB52A	NA	NA	For Test Mode A
			1A52-SR52A	NA	NA	For Test Mode B

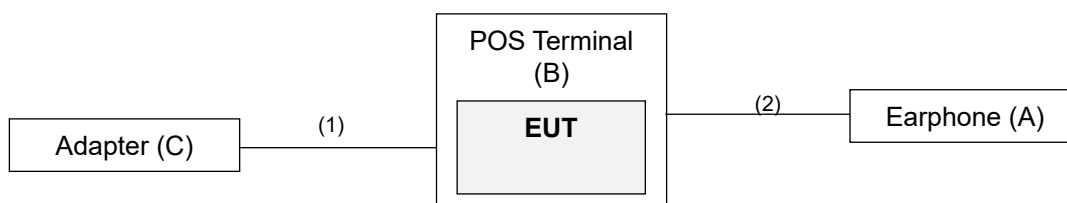
Note:

1. All power cords of the above support units are non-shielded (1.8m).

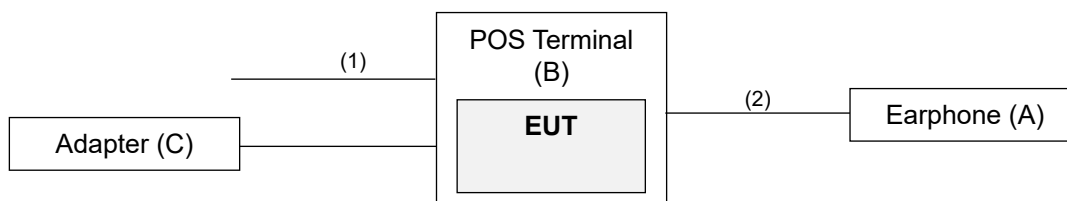
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.95	Y	0	Provided by client
2.	Audio cable	1	1.5	Y	0	-

3.3.1 Configuration of System under Test

Test Mode A



Test Mode B



3.4 General Description of Applied Standards and References

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

Test standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10:2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK: 74 (dBuV/m)	AV: 54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☒ 15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK: 105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK: 122.2 (dBuV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge. ^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A01963	Jul. 24, 2021	Jul. 23, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM80 00	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
			Jan. 15, 2022	Jan. 14, 2023
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 16, 2021	Jan. 15, 2022
			Jan. 15, 2022	Jan. 14, 2023
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5519000 4/MY55190007/MY55210 005	Jul. 12, 2021	Jul. 11, 2022

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

Note:

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

For Radiated emission above 30MHz

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

Note:

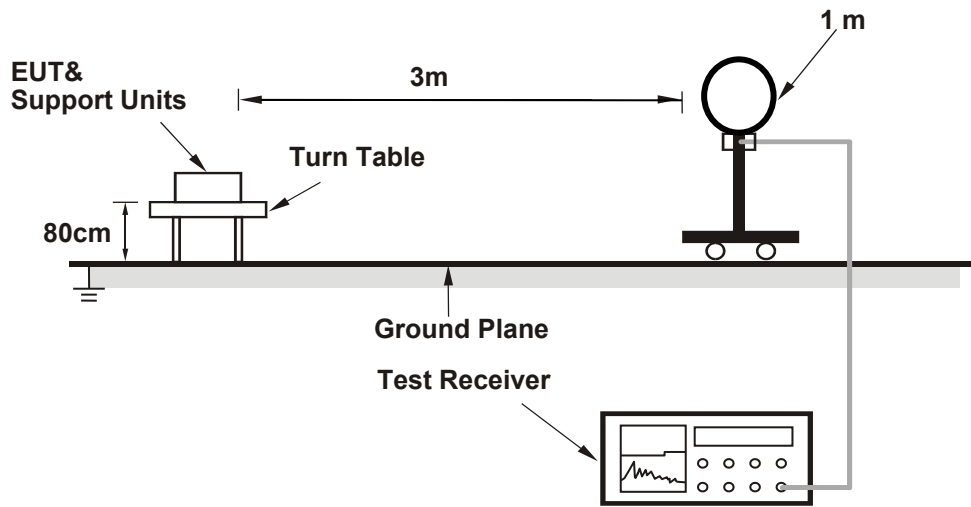
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

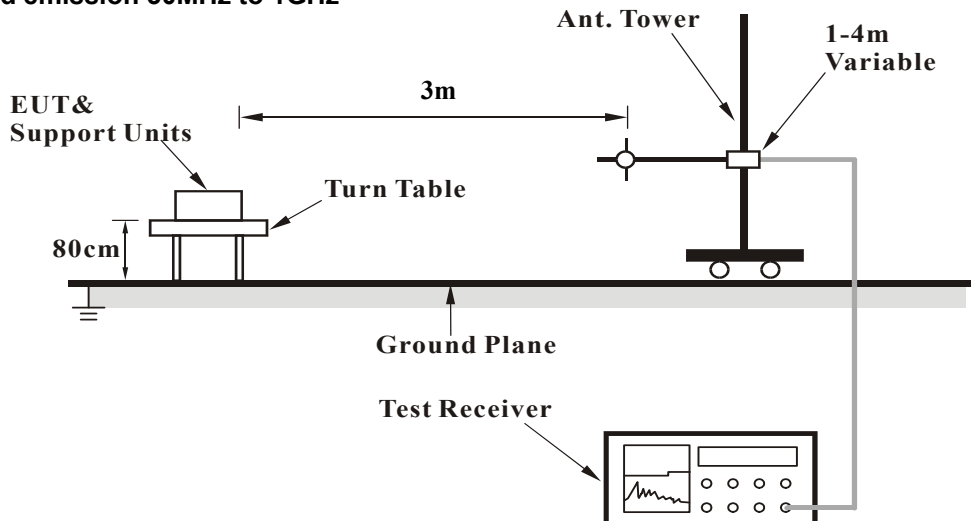
No deviation.

4.1.5 Test Setup

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

RF Mode	TX 802.11a	Channel	CH 36 : 5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	67.05 PK	74.00	-6.95	3.34 H	291	61.47	5.58
2	5150.00	47.54 AV	54.00	-6.46	3.34 H	291	41.96	5.58
3	*5180.00	106.60 PK			3.34 H	291	66.57	40.03
4	*5180.00	96.11 AV			3.34 H	291	56.08	40.03
5	#10360.00	59.24 PK	68.20	-8.96	1.36 H	352	41.67	17.57
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	69.63 PK	74.00	-4.37	1.27 V	321	64.05	5.58
2	5150.00	49.10 AV	54.00	-4.90	1.27 V	321	43.52	5.58
3	*5180.00	108.32 PK			1.27 V	321	68.29	40.03
4	*5180.00	97.57 AV			1.27 V	321	57.54	40.03
5	#10360.00	59.94 PK	68.20	-8.26	2.04 V	316	42.37	17.57

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 40 : 5200 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	108.72 PK			3.32 H	294	68.67	40.05
2	*5200.00	98.29 AV			3.32 H	294	58.24	40.05
3	#10400.00	59.18 PK	68.20	-9.02	1.34 H	352	41.72	17.46
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	110.02 PK			1.67 V	336	69.97	40.05
2	*5200.00	99.81 AV			1.67 V	336	59.76	40.05
3	#10400.00	59.93 PK	68.20	-8.27	2.07 V	312	42.47	17.46

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 48 : 5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	108.35 PK			3.34 H	289	68.37	39.98
2	*5240.00	98.00 AV			3.34 H	289	58.02	39.98
3	5350.00	56.10 PK	74.00	-17.90	3.34 H	289	50.84	5.26
4	5350.00	43.09 AV	54.00	-10.91	3.34 H	289	37.83	5.26
5	#10480.00	59.10 PK	68.20	-9.10	1.36 H	348	41.62	17.48
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	109.85 PK			1.60 V	342	69.87	39.98
2	*5240.00	99.53 AV			1.60 V	342	59.55	39.98
3	5350.00	56.54 PK	74.00	-17.46	1.60 V	342	51.28	5.26
4	5350.00	43.60 AV	54.00	-10.40	1.60 V	342	38.34	5.26
5	#10480.00	59.80 PK	68.20	-8.40	1.97 V	306	42.32	17.48

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5608.00	45.53 PK	68.20	-22.67	3.39 H	305	39.56	5.97
2	*5745.00	104.39 PK			3.39 H	305	63.55	40.84
3	*5745.00	93.17 AV			3.39 H	305	52.33	40.84
4	#5958.80	46.91 PK	68.20	-21.29	3.39 H	305	40.01	6.90
5	11490.00	60.19 PK	74.00	-13.81	1.32 H	343	41.59	18.60
6	11490.00	47.28 AV	54.00	-6.72	1.32 H	343	28.68	18.60
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5638.40	57.26 PK	68.20	-10.94	1.61 V	355	51.24	6.02
2	*5745.00	109.06 PK			1.61 V	355	68.22	40.84
3	*5745.00	97.36 AV			1.61 V	355	56.52	40.84
4	#5985.20	58.50 PK	68.20	-9.70	1.61 V	355	51.57	6.93
5	11490.00	60.27 PK	74.00	-13.73	2.04 V	317	41.67	18.60
6	11490.00	47.34 AV	54.00	-6.66	2.04 V	317	28.74	18.60

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 157 : 5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5608.40	56.63 PK	68.20	-11.57	3.72 H	307	50.66	5.97
2	*5785.00	104.17 PK			3.72 H	307	63.13	41.04
3	*5785.00	92.46 AV			3.72 H	307	51.42	41.04
4	#5964.80	58.53 PK	68.20	-9.67	3.72 H	307	51.63	6.90
5	11490.00	60.15 PK	74.00	-13.85	1.34 H	346	41.55	18.60
6	11490.00	47.34 AV	54.00	-6.66	1.34 H	346	28.74	18.60
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5625.20	57.40 PK	68.20	-10.80	1.39 V	355	51.40	6.00
2	*5785.00	108.91 PK			1.39 V	355	68.07	40.84
3	*5785.00	97.36 AV			1.39 V	355	56.52	40.84
4	#5980.00	58.65 PK	68.20	-9.55	1.39 V	355	51.72	6.93
5	11490.00	60.38 PK	74.00	-13.62	2.06 V	322	41.78	18.60
6	11490.00	47.46 AV	54.00	-6.54	2.06 V	322	28.86	18.60

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 165 : 5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5627.60	56.56 PK	68.20	-11.64	3.57 H	311	50.56	6.00
2	*5825.00	103.75 PK			3.57 H	311	62.57	41.18
3	*5825.00	92.37 AV			3.57 H	311	51.19	41.18
4	#5974.80	59.54 PK	68.20	-8.66	3.57 H	311	52.63	6.91
5	11650.00	60.11 PK	74.00	-13.89	1.28 H	336	41.90	18.21
6	11650.00	47.33 AV	54.00	-6.67	1.28 H	336	29.12	18.21
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5622.00	57.54 PK	68.20	-10.66	1.39 V	356	51.55	5.99
2	*5825.00	109.88 PK			1.39 V	356	68.70	41.18
3	*5825.00	98.18 AV			1.39 V	356	57.00	41.18
4	#5980.40	59.09 PK	68.20	-9.11	1.39 V	356	52.16	6.93
5	11650.00	60.15 PK	74.00	-13.85	2.06 V	315	41.94	18.21
6	11650.00	47.35 AV	54.00	-6.65	2.06 V	315	29.14	18.21

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 36 : 5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	68.45 PK	74.00	-5.55	3.23 H	293	62.87	5.58
2	5150.00	47.92 AV	54.00	-6.08	3.23 H	293	42.34	5.58
3	*5180.00	106.51 PK			3.23 H	293	66.48	40.03
4	*5180.00	96.16 AV			3.23 H	293	56.13	40.03
5	#10360.00	59.16 PK	68.20	-9.04	1.36 H	342	41.59	17.57
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	70.30 PK	74.00	-3.70	1.33 V	317	64.72	5.58
2	5150.00	49.35 AV	54.00	-4.65	1.33 V	317	43.77	5.58
3	*5180.00	107.99 PK			1.33 V	317	67.96	40.03
4	*5180.00	97.67 AV			1.33 V	317	57.64	40.03
5	#10360.00	59.88 PK	68.20	-8.32	1.82 V	346	42.31	17.57

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 40 : 5200 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	108.19 PK			3.33 H	295	68.14	40.05
2	*5200.00	97.92 AV			3.33 H	295	57.87	40.05
3	#10400.00	59.18 PK	68.20	-9.02	1.35 H	349	41.72	17.46
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	109.73 PK			1.42 V	326	69.68	40.05
2	*5200.00	99.39 AV			1.42 V	326	59.34	40.05
3	#10400.00	59.79 PK	68.20	-8.41	2.06 V	314	42.33	17.46

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 48 : 5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	107.76 PK			3.27 H	284	67.78	39.98
2	*5240.00	97.44 AV			3.27 H	284	57.46	39.98
3	5350.00	55.99 PK	74.00	-18.01	3.27 H	284	50.73	5.26
4	5350.00	43.12 AV	54.00	-10.88	3.27 H	284	37.86	5.26
5	#10480.00	59.10 PK	68.20	-9.10	1.36 H	344	41.62	17.48
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	109.45 PK			1.50 V	326	69.47	39.98
2	*5240.00	99.02 AV			1.50 V	326	59.04	39.98
3	5350.00	56.09 PK	74.00	-17.91	1.50 V	326	50.83	5.26
4	5350.00	43.38 AV	54.00	-10.62	1.50 V	326	38.12	5.26
5	#10480.00	59.76 PK	68.20	-8.44	2.06 V	317	42.28	17.48

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 149 : 5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5633.20	57.06 PK	68.20	-11.14	3.40 H	308	51.05	6.01
2	*5745.00	104.74 PK			3.40 H	308	63.90	40.84
3	*5745.00	93.07 AV			3.40 H	308	52.23	40.84
4	#5985.60	58.05 PK	68.20	-10.15	3.40 H	308	51.12	6.93
5	11490.00	60.47 PK	74.00	-13.53	1.29 H	344	41.87	18.60
6	11490.00	47.45 AV	54.00	-6.55	1.29 H	344	28.85	18.60
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5646.00	59.39 PK	68.20	-8.81	1.58 V	356	53.35	6.04
2	*5745.00	108.29 PK			1.58 V	356	67.45	40.84
3	*5745.00	97.07 AV			1.58 V	356	56.23	40.84
4	#5926.80	58.06 PK	68.20	-10.14	1.58 V	356	51.04	7.02
5	11490.00	60.54 PK	74.00	-13.46	2.11 V	320	41.94	18.60
6	11490.00	47.48 AV	54.00	-6.52	2.11 V	320	28.88	18.60

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 157 : 5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5624.80	57.93 PK	68.20	-10.27	3.78 H	307	51.94	5.99
2	*5785.00	104.34 PK			3.78 H	307	63.30	41.04
3	*5785.00	92.33 AV			3.78 H	307	51.29	41.04
4	#5944.40	58.78 PK	68.20	-9.42	3.78 H	307	51.86	6.92
5	11570.00	60.29 PK	74.00	-13.71	1.29 H	338	41.90	18.39
6	11570.00	47.36 AV	54.00	-6.64	1.29 H	338	28.97	18.39
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5644.80	57.38 PK	68.20	-10.82	1.68 V	346	51.36	6.02
2	*5785.00	108.99 PK			1.68 V	346	67.95	41.04
3	*5785.00	97.39 AV			1.68 V	346	56.35	41.04
4	#5958.40	58.84 PK	68.20	-9.36	1.68 V	346	51.94	6.90
5	11570.00	60.34 PK	74.00	-13.66	2.09 V	310	41.95	18.39
6	11570.00	47.61 AV	54.00	-6.39	2.09 V	310	29.22	18.39

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

RF Mode	TX 802.11n (HT20)	Channel	CH 165 : 5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5611.20	56.97 PK	68.20	-11.23	3.55 H	311	51.00	5.97
2	*5825.00	103.54 PK			3.55 H	311	62.36	41.18
3	*5825.00	92.18 AV			3.55 H	311	51.00	41.18
4	#5961.60	57.85 PK	68.20	-10.35	3.55 H	311	50.95	6.90
5	11650.00	59.89 PK	74.00	-14.11	1.33 H	345	41.68	18.21
6	11650.00	47.00 AV	54.00	-7.00	1.33 H	345	28.79	18.21
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5628.40	57.79 PK	68.20	-10.41	1.66 V	347	51.79	6.00
2	*5825.00	108.92 PK			1.66 V	347	67.74	41.18
3	*5825.00	97.51 AV			1.66 V	347	56.33	41.18
4	#5963.20	58.28 PK	68.20	-9.92	1.66 V	347	51.38	6.90
5	11650.00	59.96 PK	74.00	-14.04	2.02 V	318	41.75	18.21
6	11650.00	47.07 AV	54.00	-6.93	2.02 V	318	28.86	18.21

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

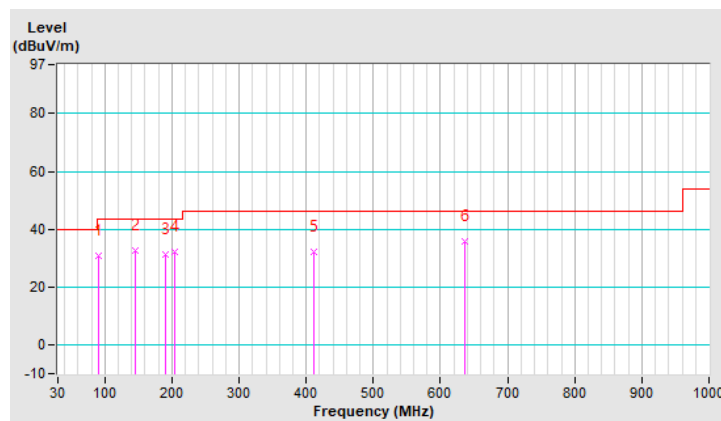
Below 1GHz Worst-Case Data:

RF Mode	TX 802.11n (HT20)	Channel	CH 36 : 5180 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	A		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	91.11	30.64 QP	43.50	-12.86	1.25 H	116	45.33	-14.69
2	145.43	32.40 QP	43.50	-11.10	1.00 H	291	41.40	-9.00
3	190.05	31.48 QP	43.50	-12.02	1.50 H	214	42.82	-11.34
4	204.60	31.98 QP	43.50	-11.52	1.00 H	288	43.52	-11.54
5	412.18	32.13 QP	46.00	-13.87	2.00 H	61	36.86	-4.73
6	636.25	35.89 QP	46.00	-10.11	1.00 H	268	35.67	0.22

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

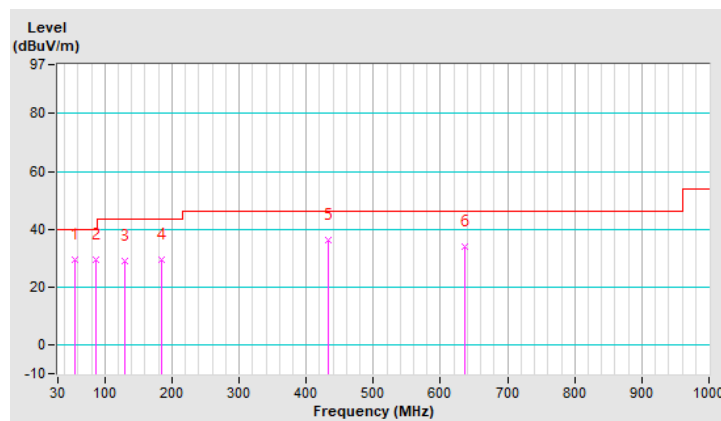


RF Mode	TX 802.11n (HT20)	Channel	CH 36 : 5180 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	A		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.22	29.51 QP	40.00	-10.49	1.00 V	5	38.70	-9.19
2	86.26	29.53 QP	40.00	-10.47	1.00 V	51	44.13	-14.60
3	128.94	28.96 QP	43.50	-14.54	1.50 V	140	39.34	-10.38
4	185.20	29.41 QP	43.50	-14.09	1.50 V	348	40.24	-10.83
5	432.55	36.40 QP	46.00	-9.60	1.25 V	5	40.25	-3.85
6	636.25	33.79 QP	46.00	-12.21	1.00 V	188	33.57	0.22

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

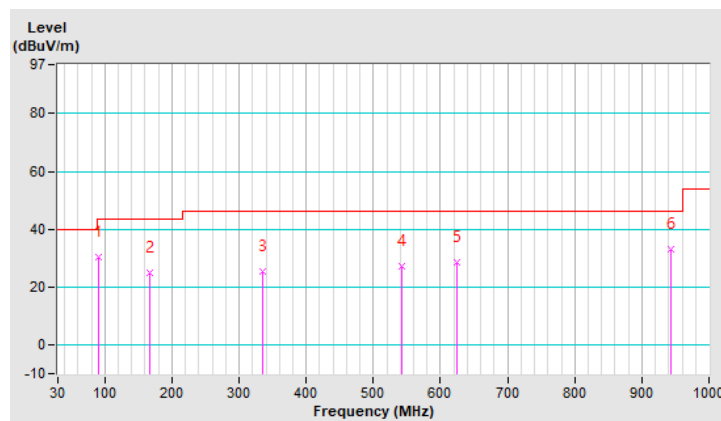


RF Mode	TX 802.11n (HT20)	Channel	CH 36 : 5180 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	B		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	91.11	30.50 QP	43.50	-13.00	1.50 H	104	45.19	-14.69
2	167.74	24.96 QP	43.50	-18.54	1.00 H	133	33.89	-8.93
3	334.58	25.59 QP	46.00	-20.41	1.50 H	245	31.62	-6.03
4	543.13	27.18 QP	46.00	-18.82	1.25 H	270	28.92	-1.74
5	623.64	28.32 QP	46.00	-17.68	1.00 H	54	28.30	0.02
6	943.74	33.01 QP	46.00	-12.99	1.00 H	5	26.87	6.14

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

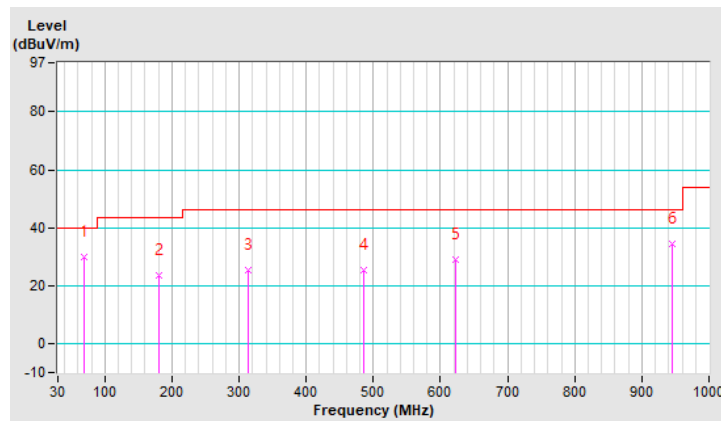


RF Mode	TX 802.11n (HT20)	Channel	CH 36 : 5180 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	B		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	68.80	29.98 QP	40.00	-10.02	1.00 V	167	40.95	-10.97
2	181.32	23.73 QP	43.50	-19.77	1.50 V	56	34.08	-10.35
3	313.24	25.42 QP	46.00	-20.58	1.25 V	146	31.89	-6.47
4	484.93	25.32 QP	46.00	-20.68	1.00 V	16	28.20	-2.88
5	621.70	28.91 QP	46.00	-17.09	2.00 V	173	28.94	-0.03
6	944.71	34.23 QP	46.00	-11.77	1.00 V	160	28.10	6.13

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 03, 2021	Dec. 02, 2022
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 2022
Software ADT	BV ADT_Conc_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).

3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

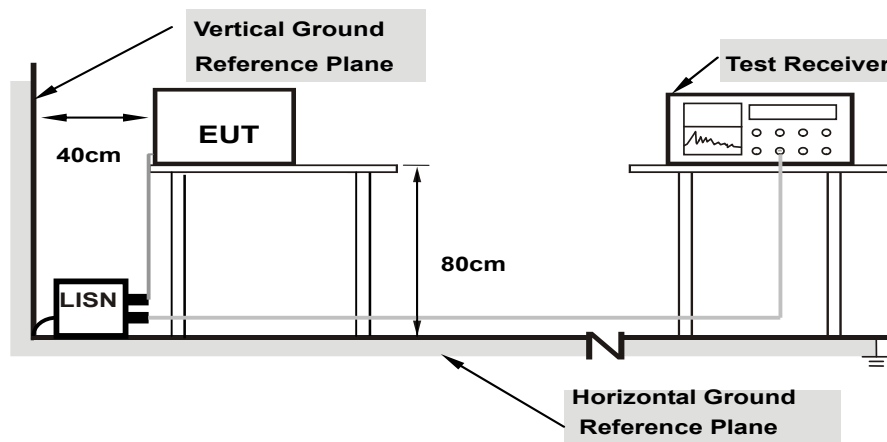
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 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).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

Worst-case data:

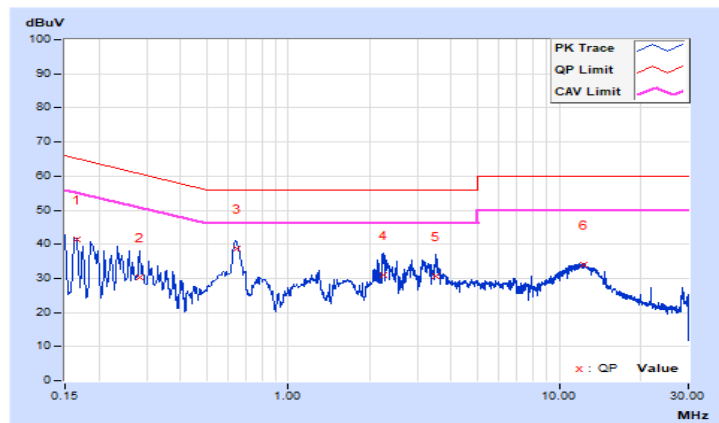
802.11n (HT20)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16535	9.78	31.55	17.63	41.33	27.41	65.19	55.19	-23.86	-27.78
2	0.28200	9.83	20.31	12.27	30.14	22.10	60.76	50.76	-30.62	-28.66
3	0.64600	9.89	28.97	26.00	38.86	35.89	56.00	46.00	-17.14	-10.11
4	2.25800	9.98	21.08	13.10	31.06	23.08	56.00	46.00	-24.94	-22.92
5	3.50200	10.00	20.48	13.35	30.48	23.35	56.00	46.00	-25.52	-22.65
6	12.31800	10.12	23.78	16.88	33.90	27.00	60.00	50.00	-26.10	-23.00

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.

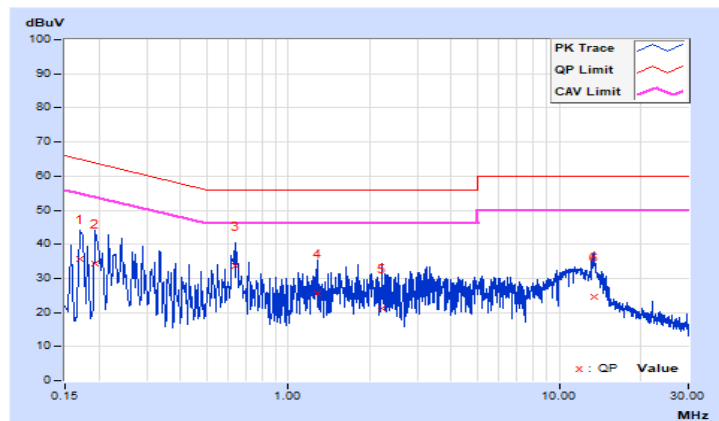


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17000	9.84	25.96	9.86	35.80	19.70	64.96	54.96	-29.16	-35.26
2	0.19400	9.86	24.57	10.88	34.43	20.74	63.86	53.86	-29.43	-33.12
3	0.64200	9.96	23.66	15.20	33.62	25.16	56.00	46.00	-22.38	-20.84
4	1.27800	10.00	15.75	4.96	25.75	14.96	56.00	46.00	-30.25	-31.04
5	2.21400	10.05	11.23	2.13	21.28	12.18	56.00	46.00	-34.72	-33.82
6	13.39000	10.23	14.34	7.02	24.57	17.25	60.00	50.00	-35.43	-32.75

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.

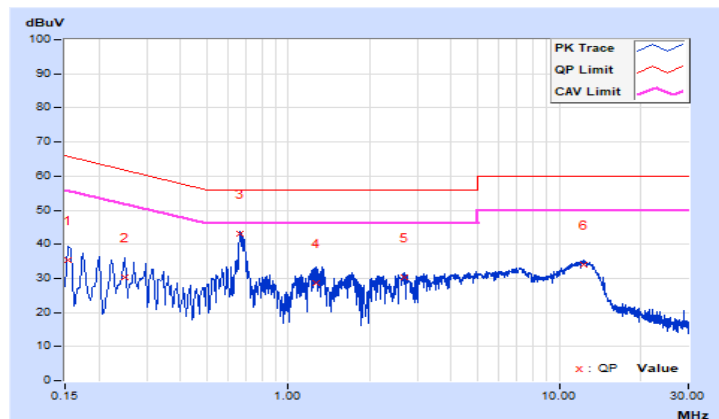


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.77	25.57	13.35	35.34	23.12	65.78	55.78	-30.44	-32.66
2	0.25000	9.82	20.52	12.41	30.34	22.23	61.76	51.76	-31.42	-29.53
3	0.66600	9.89	33.32	24.94	43.21	34.83	56.00	46.00	-12.79	-11.17
4	1.27396	9.93	18.70	10.83	28.63	20.76	56.00	46.00	-27.37	-25.24
5	2.67400	9.98	20.25	11.82	30.23	21.80	56.00	46.00	-25.77	-24.20
6	12.38200	10.12	23.94	15.89	34.06	26.01	60.00	50.00	-25.94	-23.99

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.

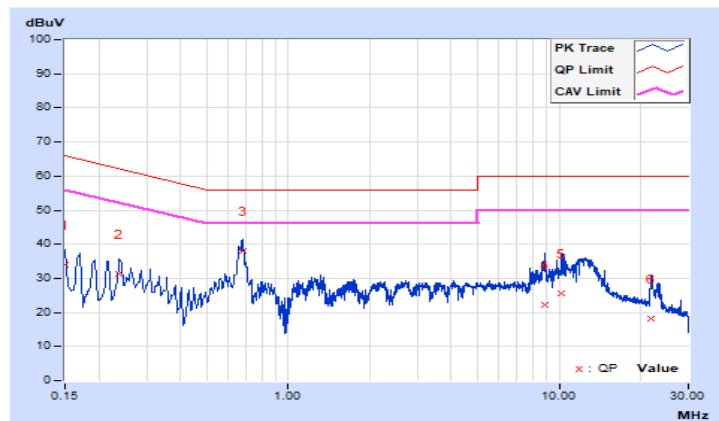


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.82	24.05	12.26	33.87	22.08	66.00	56.00	-32.13	-33.92
2	0.23785	9.88	21.56	14.79	31.44	24.67	62.17	52.17	-30.73	-27.50
3	0.67800	9.96	28.03	24.98	37.99	34.94	56.00	46.00	-18.01	-11.06
4	8.82200	10.17	12.03	4.28	22.20	14.45	60.00	50.00	-37.80	-35.55
5	10.20600	10.19	15.44	4.54	25.63	14.73	60.00	50.00	-34.37	-35.27
6	21.97000	10.31	7.86	3.85	18.17	14.16	60.00	50.00	-41.83	-35.84

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.



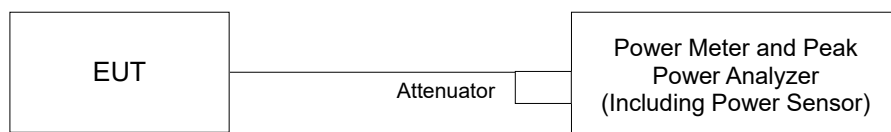
4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		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)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	-		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	-		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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 and set the detector to average. Duty factor is not added to measured value.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Power Output:

802.11a

Chan.	Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	23.823	13.77	24.00	Pass
40	5200	22.491	13.52	24.00	Pass
48	5240	22.131	13.45	24.00	Pass
149	5745	14.962	11.75	30.00	Pass
157	5785	16.181	12.09	30.00	Pass
165	5825	17.458	12.42	30.00	Pass

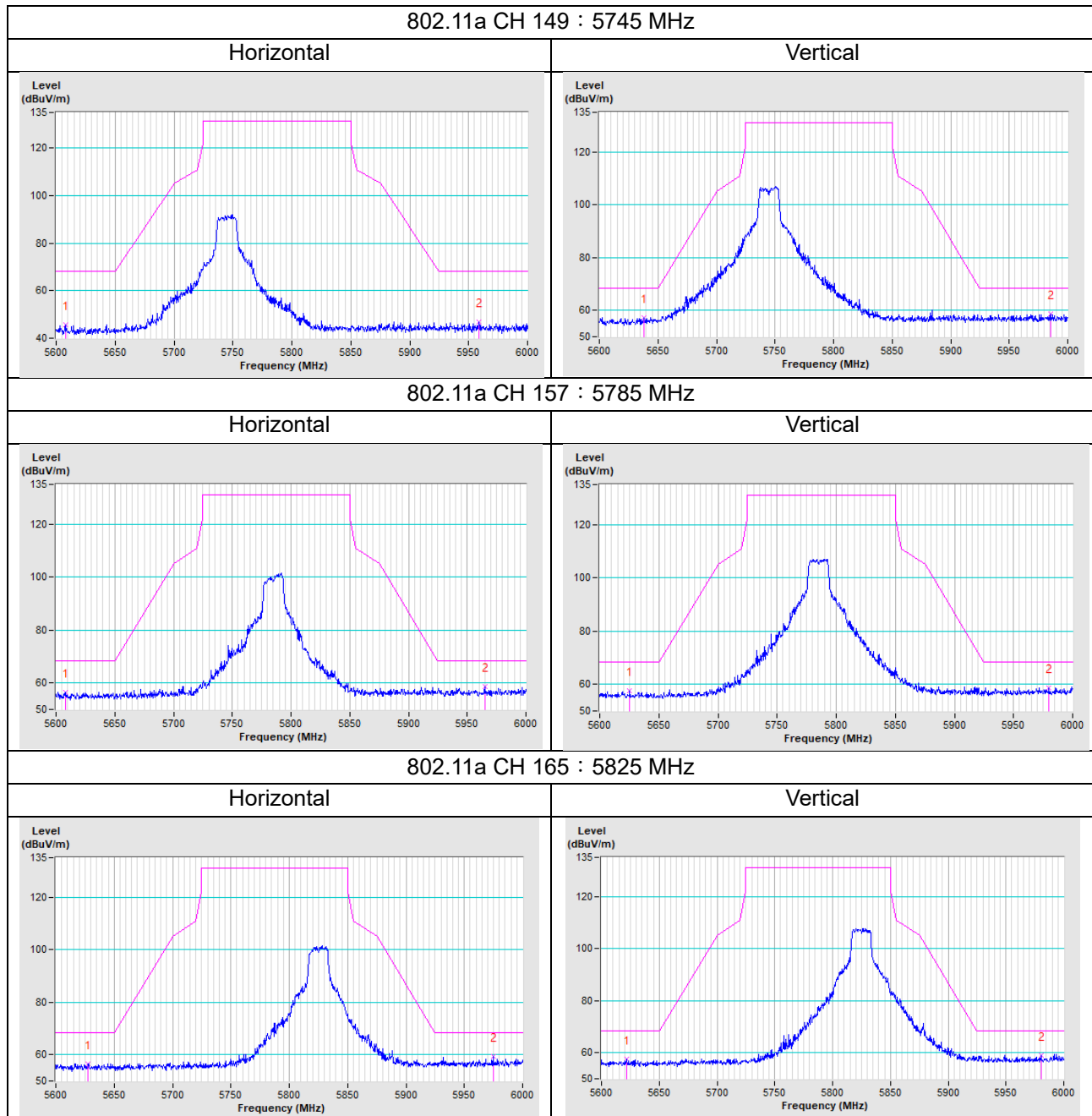
802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	24.099	13.82	24.00	Pass
40	5200	21.086	13.24	24.00	Pass
48	5240	22.491	13.52	24.00	Pass
149	5745	14.928	11.74	30.00	Pass
157	5785	16.106	12.07	30.00	Pass
165	5825	17.824	12.51	30.00	Pass

5 Pictures of Test Arrangements

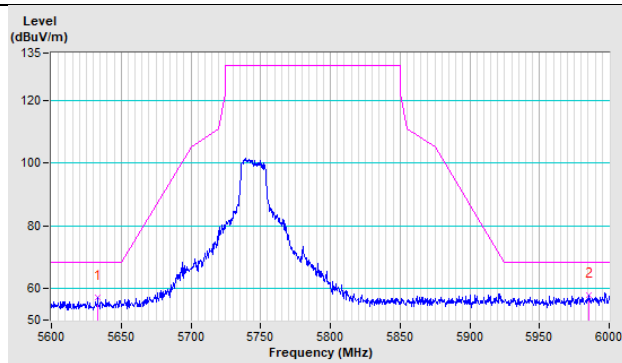
Please refer to the attached file (Test Setup Photo).

Annex A - Radiated out of Band Emission (OOBE) Measurement (For U-NII-3 band)

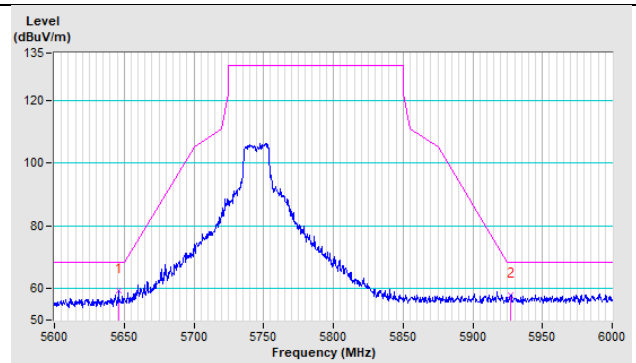


802.11n (HT20) CH 149 : 5745 MHz

Horizontal

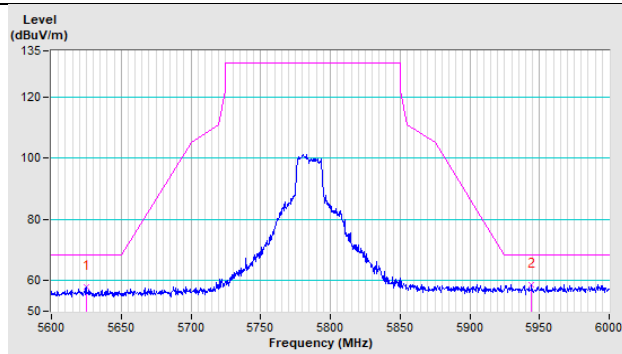


Vertical

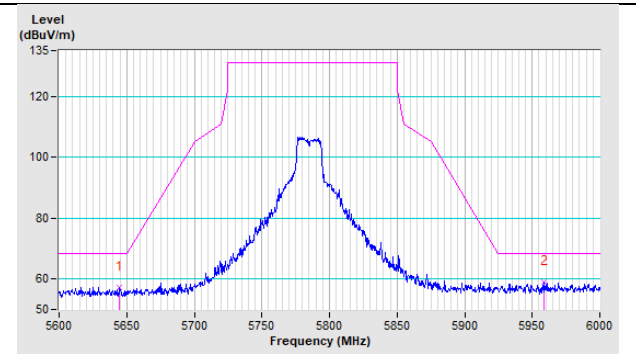


802.11n (HT20) CH 157 : 5785 MHz

Horizontal

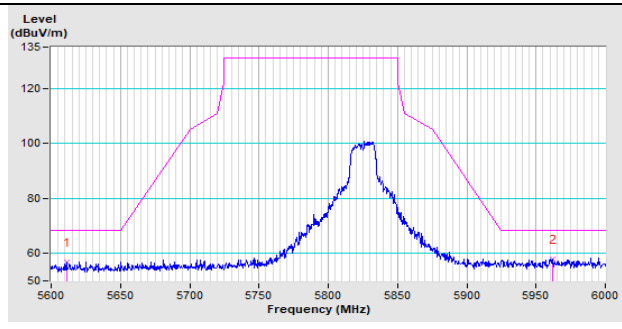


Vertical

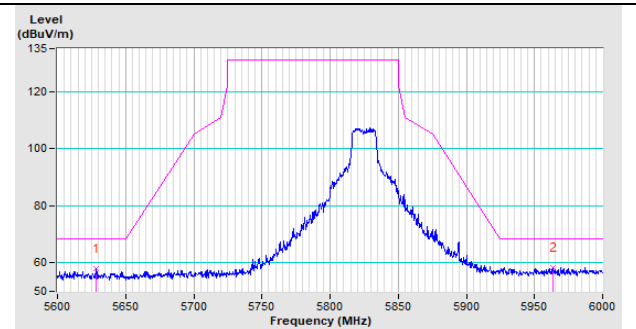


802.11n (HT20) CH 165 : 5825 MHz

Horizontal



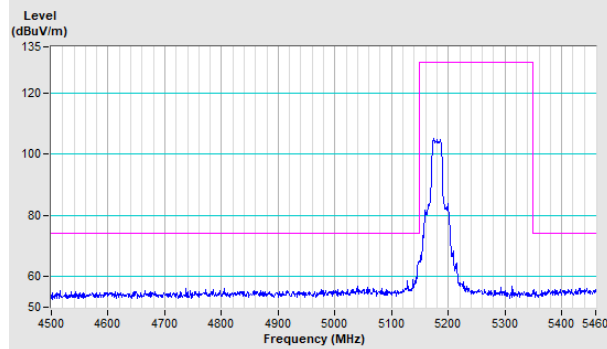
Vertical



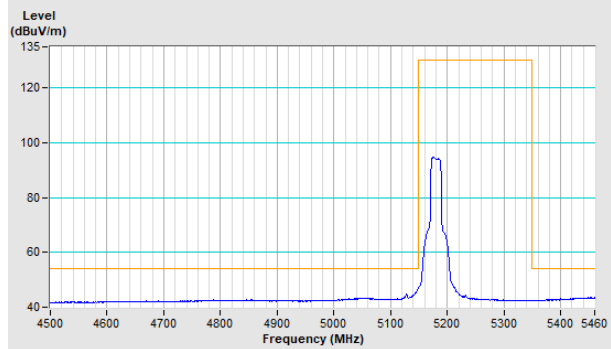
Annex B - Band Edge Measurement

802.11a Channel 36

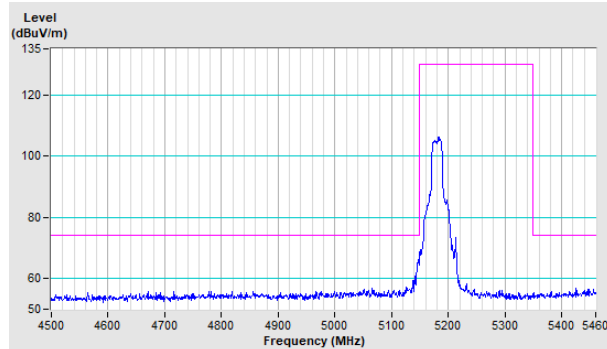
Horizontal (Peak)



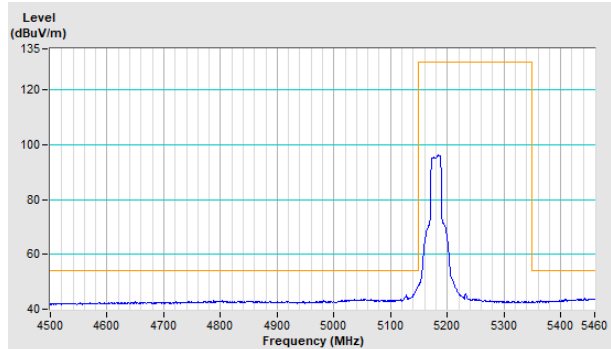
Horizontal (Average)



Vertical (Peak)

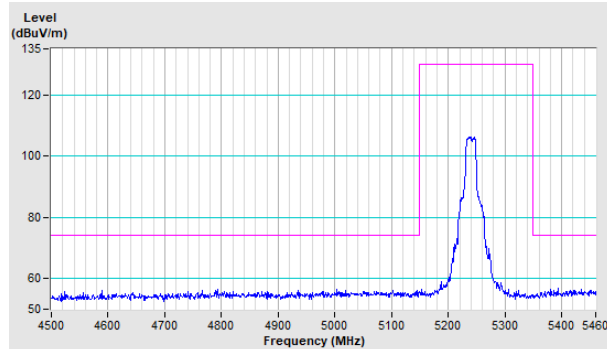


Vertical (Average)

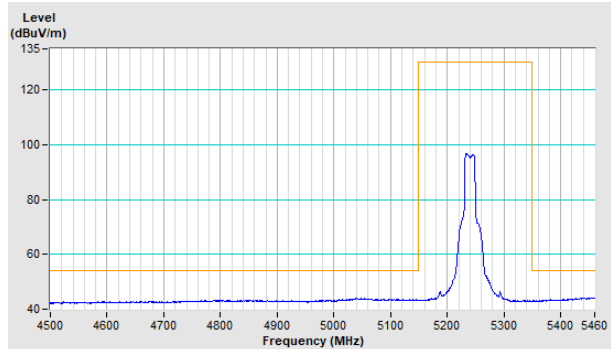


802.11a Channel 48

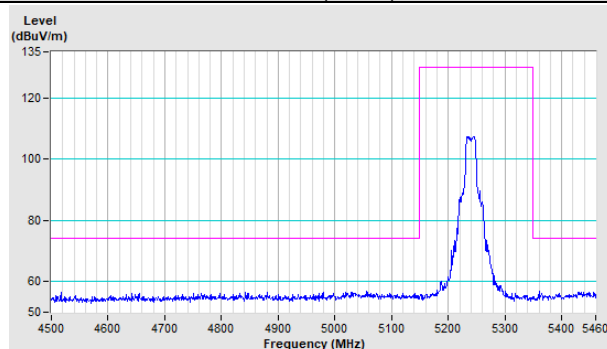
Horizontal (Peak)



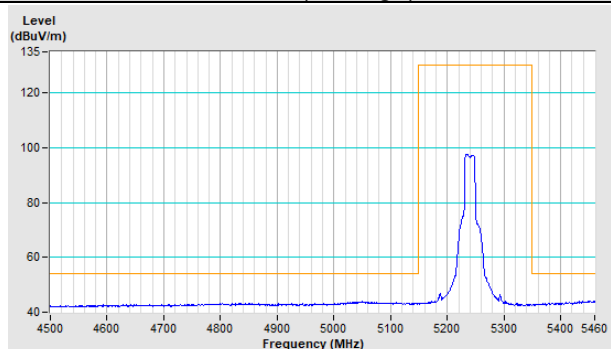
Horizontal (Average)



Vertical (Peak)

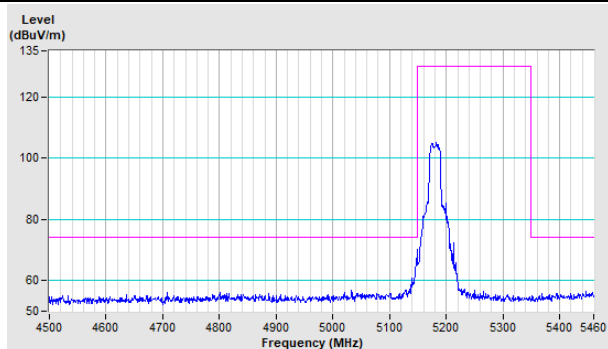


Vertical (Average)

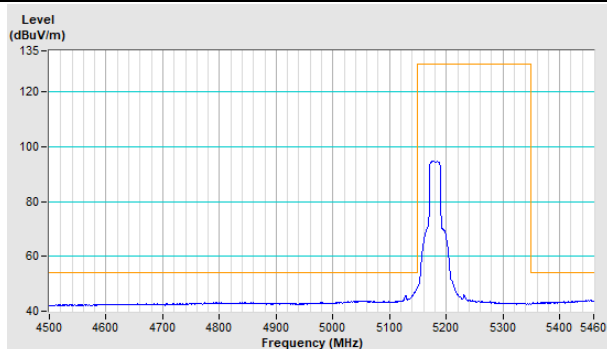


802.11n (HT20) Channel 36

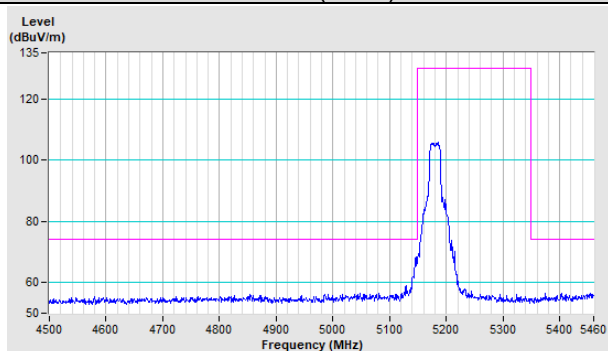
Horizontal (Peak)



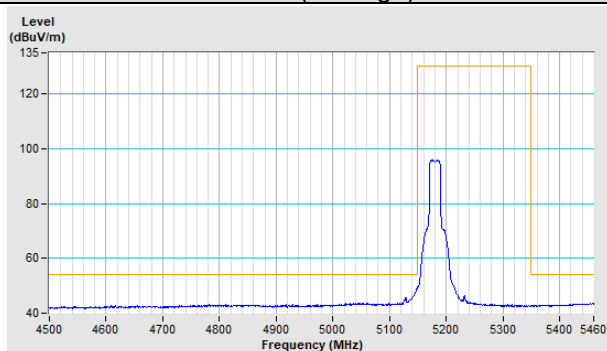
Horizontal (Average)



Vertical (Peak)

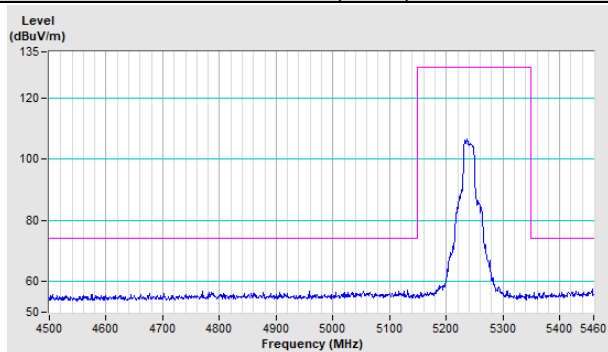


Vertical (Average)

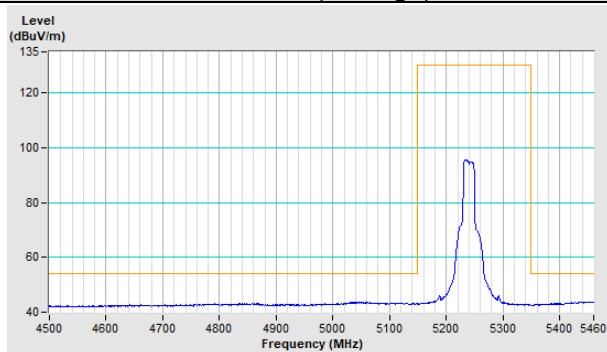


802.11n (HT20) Channel 48

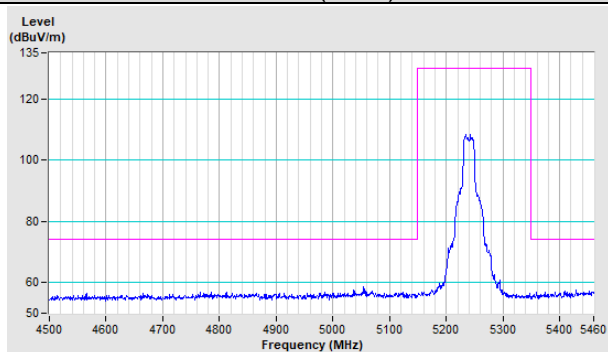
Horizontal (Peak)



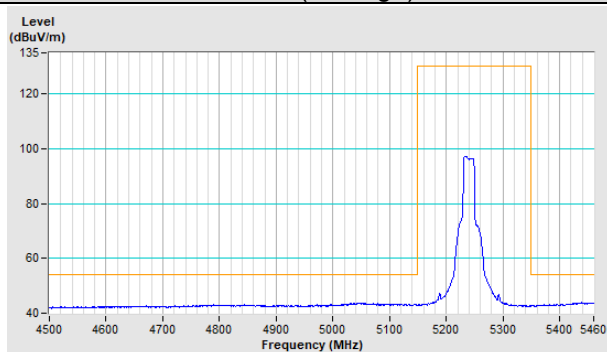
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



Appendix – Information of the Testing Laboratories

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

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

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

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Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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