

Prüfbericht-Nr.: <i>Test report no.:</i>	CN23T4C2 005	Auftrags-Nr.: <i>Order no.:</i>	168421836	Seite 1 von 10 Page 1 of 10
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-03-21	
Auftraggeber: <i>Client:</i>	Lenovo (Beijing) Limited 201-H2-6, Floor 2, Building 2, No.6 Shangdi West Road, Haidian District, 100085 Beijing, P. R. China			
Prüfgegenstand: <i>Test item:</i>	ThinkBook Wireless Dock			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	L01WC014-CS-H			
Auftrags-Inhalt: <i>Order content:</i>	Test Report			
Prüfgrundlage: <i>Test specification:</i>	FCC Part 2: Section 2.1093			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2023-03-21	Please refer to photo documents		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003448177-003, 004			
Prüfzeitraum: <i>Testing period:</i>	2023-03-27 to 2023-07-04			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	X  Hardy Suo		genehmigt von: <i>authorized by:</i>	X  Lin Lin
Datum: <i>Date:</i>	2023-07-18		Ausstellungsdatum: <i>Issue date:</i>	2023-07-18
Stellung / Position:	Sachverständige(r) / Expert		Stellung / Position:	Sachverständige(r) / Expert
Sonstiges / Other:	FCC ID: A5ML01WC014			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
5 = mangelhaft N/T = nicht getestet				
5 = poor N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

Prüfbericht-Nr.: CN23T4C2 005
Test report no.:

Seite 2 von 10
Page 2 of 10

Anmerkungen Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. <i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</i>
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

1. Radio Frequency Exposure

RESULT:

Pass

Test standard : FCC Part 2: Section 2.1091
447498 D04 Interim General RF Exposure Guidance v01

1.1 Product Technical Information

The EUT (Equipment Under Test) is a ThinkBook Wireless Dock. It supports 2.4/5G Wi-Fi and WPT functions.

For details refer to the User Manual, Technical Description and Circuit Diagram.

General Information of EUT	Value
Kind of Equipment:	ThinkBook Wireless Dock
Type Designation:	L01WC014-CS-H
Trademark:	Lenovo
Operating Temperature Range:	0 °C ~ +40 °C
Operating Voltage:	DC 20V@6.75A input via AC Adapter
Testing Voltage:	AC 120V, 60Hz
Radiofrequency operating mode	1) 2.4GHz Wi-Fi: operating within 2400-2483.5MHz, supports 20MHz Bandwidth and IEEE 802.11 b/g/n20/ax20 2) 5GHz Wi-Fi: operating within 5150-5850MHz, supports 20MHz/40MHz/80MHz Bandwidth and IEEE 802.11 a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80 3) WPT: operating within 110~205KHz
Technical Specification of 2.4GHz Wi-Fi of AP6275PR3	
Operating Frequency	2412 - 2462MHz for 802.11b/g/n(HT20)/ax20(HE20)
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM/256QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n HE0 ~ HE9 for 802.11ax
Multi-RU	No, full RU
Channel Number	11 channels for 802.11b/g/n(HT20)/ax20(HE20)
Channel Separation	5 MHz
Antenna Type	Integral Antenna
Antenna Number	1Tx1Rx for SISO mode (ANT2 or ANT4) 2Tx2Rx for MIMO mode (ANT2+ANT4)
Antenna Gain	2.47dBi for ANT2 2.47dBi for ANT4 (provided by client)
The type of wideband data transmission equipment	DTS
Technical Specification of 2.4GHz Wi-Fi of AP6275S	
Operating Frequency	2412 - 2462MHz for 802.11b/g/n(HT20)/ax20(HE20)

Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM) OFDMA(BPSK/QPSK/16QAM/64QAM/256QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n HE0 ~ HE9 for 802.11ax
Multi-RU	Yes
Channel Number	11 channels for 802.11b/g/n(HT20)/ax20(HE20)
Channel Separation	5 MHz
Antenna Type	Integral Antenna
Antenna Number	1Tx1Rx for SISO mode (ANT1 or ANT3) 2Tx2Rx for MIMO mode (ANT1+ANT3)
Antenna Gain	2.9dBi for ANT1 2.74dBi for ANT3 (provided by client)
The type of wideband data transmission equipment	DTS
Technical Specification of 5GHz Wi-Fi of AP6275PR3	
Operating Frequency	5150 – 5250 MHz for 802.11 a/n-HT20/n-HT40/ac HT20/ac HT40/ac HT80/ax HE20/ax HE40/ax HE80 5725 – 5850 MHz for 802.11 a/n-HT20/n-HT40/ac HT20/ac HT40/ac HT80/ax HE20/ax HE40/ax HE80
Type of Modulation	OFDM(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)
Data Rate	1) 6/9/12/18/24/36/48/54 Mbps for 802.11a 2) MCS0 ~ MCS9 for 802.11 20/n40/ac20/ac40/ac80 3) HE0 ~ HE11 for 802.11 ax20/ax40/ax80
Multi-RU	No, full RU
Channel Number	7 channels for 5150 – 5250 MHz 8 channels for 5725 – 5850 MHz
Channel Separation	20MHz, 40MHz, 80MHz
Antenna Type	Integral Antenna
Antenna Number	1Tx1Rx for SISO mode (ANT2 or ANT4) 2Tx2Rx for MIMO mode (ANT2+ANT4)
Antenna Gain	5150 – 5250 MHz: ANT2=2.45dBi, ANT4=2.87dBi 5725 – 5850 MHz: ANT2=2.84dBi, ANT4=0.37dBi (provided by client)
Type of Product	Client Device without Radar Detection
TX Power Control (TPC)	Supported
The type of wideband data transmission equipment	DTS
Technical Specification of 5GHz Wi-Fi of AP6275S	
Operating Frequency	5150 – 5250 MHz for 802.11 a/n-HT20/n-HT40/ac HT20/ac HT40/ac HT80/ax HE20/ax HE40/ax HE80 5250 – 5350 MHz for 802.11 a/n-HT20/n-HT40/ac HT20/ac HT40/ac HT80/ax HE20/ax HE40/ax HE80 5470 – 5725 MHz for 802.11 a/n-HT20/n-HT40/ac HT20/ac HT40/ac HT80/ax HE20/ax HE40/ax HE80 5725 – 5850 MHz for 802.11 a/n-HT20/n-HT40/ac HT20/ac HT40/ac HT80/ax HE20/ax HE40/ax HE80

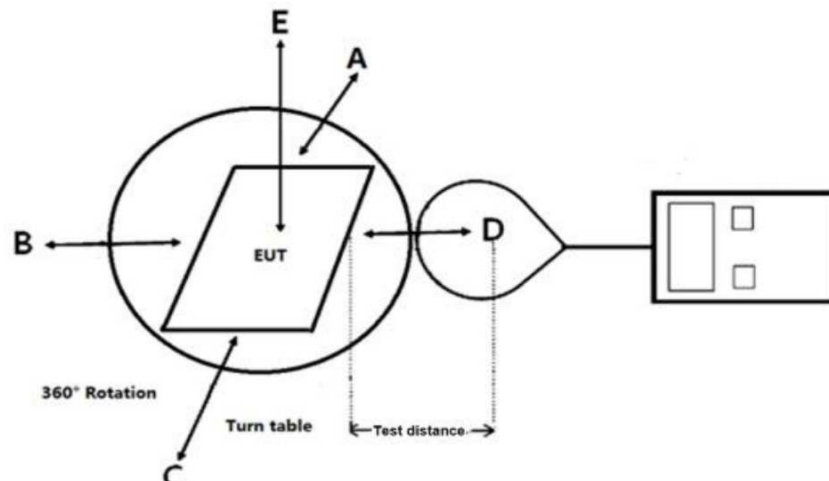
Type of Modulation	OFDM(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM) OFDMA(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)
Data Rate	1) 6/9/12/18/24/36/48/54 Mbps for 802.11a 2) MCS0 ~ MCS9 for 802.11 20/n40/ac20/ac40/ac80 3) HE0 ~ HE11 for 802.11 ax20/ax40/ax80
Multi-RU	Yes
Channel Number	7 channels for 5150 – 5250 MHz 7 channels for 5250 – 5350 MHz 21 channels for 5470 – 5725 MHz 8 channels for 5725 – 5850 MHz
Channel Separation	20MHz, 40MHz, 80MHz
Antenna Type	Integral Antenna
Antenna Number	1Tx1Rx for SISO mode (ANT1 or ANT3) 2Tx2Rx for MIMO mode (ANT1+ANT3)
Antenna Gain	5150 – 5250 MHz: ANT1=2.35dBi, ANT3=1.5dBi 5250 – 5350 MHz: ANT1=2.35dBi, ANT3=1.5dBi 5470 – 5725 MHz: ANT1=2.96dBi, ANT3=2.83dBi 5725 – 5850 MHz: ANT1=2.9dBi, ANT3=2.44dBi (provided by client)
Type of Product	Client Device without Radar Detection
TX Power Control (TPC)	Supported
The type of wideband data transmission equipment	DTS
*Remark: L01WC014-CS-H has two 2.4GHz Wi-Fi modules AP6275PR3 and AP6275S.	

1.2 List of Test and Measurement Instruments

EMF					
Equip. No.	Description	Manufacturer	Model	Serial No.	Calibrated until (DD.MM.YYYY)
9050046	Electric and Magnetic Field Analyzer	Narda	EHP200A	180ZX20517	28.09.2023

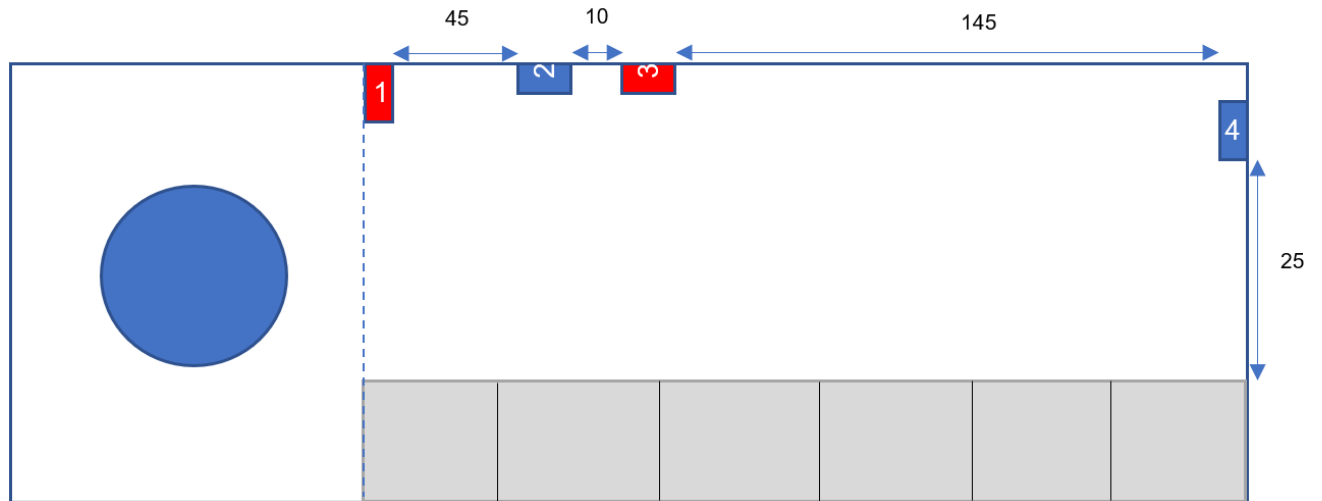
1.3 Test Setup Diagram

Diagram of EMF Measurement Configuration for PWT



1.4 Product Classification and Antenna Location

This device defined as a transmitting device designed to be used with a PC and charge to it via POGO PIN (gary area), the device is powered by AC/DC adapter, the antennas location as below:



(unit: mm)

Remark:

1. ANT1 + ANT3 belong to module AP6275S; ANT2 + ANT4 belong to module AP6275PR3.
2. As the intended using scenario, the minimum distance between ANT4 and PC is 25mm, after considering of PC keyboard's construction, the minimum distance between ANT4 and end-user's hands is 50mm.

1.5 Radio Frequency Exposure Limit for WPT

Limit of Maximum Permissible Exposure

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180 / f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1	30

Note 1: f = frequency in MHz; *Plane-wave equivalent power density

Note 2: For the applicable limit, see FCC 1.1310, 680106 D01 RF Exposure Wireless Charging Apps v03

Note 3: Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.

Note 4: The aggregate H-field strengths at 0 cm surrounding the device and 0 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

1.6 Calculation Result

1.6.1 Stand-alone transmission MPE of AP6275PR3

According to 447498 D04 Interim General RF Exposure Guidance v01 table B.2, the SAR test excusion thresholds of 2450MHz is $219\text{mw} \cdot 2.5 = 547.5\text{mW}$; the min. SAR test excusion thresholds of 5GHz is $169\text{mw} \cdot 2.5 = 422.5\text{mW}$.

The max. output power of 2.4GHz Wi-Fi is $18.63\text{dBm} + 2.47\text{dBi} = 21.1\text{dBm} = 128.83\text{mW}$, is $< 547.5\text{mW}$;
 The max. output power of 5GHz Wi-Fi is $17.42\text{dBm} + 2.84\text{dBi} = 20.16\text{dBm} = 103.75\text{mW}$, is $< 422.5\text{mW}$.

Note:

- *2.4GHz Wi-Fi RF Output Power: Refer to section 1.7
- *5GHz Wi-Fi RF Output Power: Refer to test report CN23T4C2 003

1.6.2 Stand-alone transmission MPE of AP6275S

According to 447498 D04 Interim General RF Exposure Guidance v01 table B.2, the SAR test excusion thresholds of 2450MHz is $219\text{mw} \cdot 2.5 = 547.5\text{mW}$; the min. SAR test excusion thresholds of 5GHz is $169\text{mw} \cdot 2.5 = 422.5\text{mW}$.

The max. output power of 2.4GHz Wi-Fi is $19.15\text{dBm} + 2.9\text{dBi} = 22.05\text{dBm} = 160.32\text{mW}$, is $< 547.5\text{mW}$;
 The max. output power of 5GHz Wi-Fi is $17.79\text{dBm} + 2.9\text{dBi} = 20.69\text{dBm} = 117.22\text{mW}$, is $< 422.5\text{mW}$.

Note:

- *2.4GHz Wi-Fi RF Output Power: Refer to section 1.7
- *5GHz Wi-Fi RF Output Power: Refer to test report CN23T4C2 003

1.6.3 Stand-alone transmission MPE of WPT

Test Mode	Test Position	Test Distance (cm)	Measure Value (A/m)	Limit (A/m)	50%Limit (A/m)	Result
Charging mode	Front	0	0.431	1.63	0.815	PASS
	Rear	0	0.465	1.63	0.815	PASS
	Left	0	0.465	1.63	0.815	PASS

	Right	0	0.438	1.63	0.815	PASS
	Top	0	0.443	1.63	0.815	PASS

Test Mode	Test Position	Test Distance (cm)	Measure Value (V/m)	Limit (V/m)	50%Limit (V/m)	Result
Charging mode	Front	0	2.443	614	307	PASS
	Rear	0	2.418	614	307	PASS
	Left	0	2.544	614	307	PASS
	Right	0	2.498	614	307	PASS
	Top	0	2.332	614	307	PASS

1.6.4 Simultaneous transmission MPE

The product has two 2.4GHz Wi-Fi modules AP6275PR3 and AP6275S, the Simultaneous Transmission possibilities are listing below:

Simultaneous Tx Combination	Configuration
1	2.4GHz Wi-Fi (AP6275PR3) + 2.4GHz Wi-Fi (AP6275S)
2	5GHz Wi-Fi (AP6275PR3) + 5GHz Wi-Fi (AP6275S)
3	2.4GHz Wi-Fi (AP6275PR3) + 5GHz Wi-Fi (AP6275S)
4	5GHz Wi-Fi (AP6275PR3) + 2.4GHz Wi-Fi (AP6275S)

Result:

No.	Test Mode	Calculation (mW)	Limit (mW)	Calculation of Sum (mW)	Min. Limit of Sum (mW)	Result
1	2.4GHz Wi-Fi (AP6275PR3) + 2.4GHz Wi-Fi (AP6275S)	128.83	547.5	289.15	547.5	Pass
		160.32	547.5			
2	5GHz Wi-Fi (AP6275PR3) + 5GHz Wi-Fi (AP6275S)	103.75	422.5	220.97	422.5	Pass
		117.22	422.5			
3	2.4GHz Wi-Fi (AP6275PR3) + 5GHz Wi-Fi (AP6275S)	128.83	547.5	246.05	422.5	Pass
		117.22	422.5			
4	5GHz Wi-Fi (AP6275PR3) + 2.4GHz Wi-Fi (AP6275S)	103.75	422.5	264.07	422.5	Pass
		160.32	547.5			

1.6.5 Conclusion

Therefore the maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.

1.7 Supplement

Table 1: Test Result of Maximum Average Conducted Output Power of AP6275PR3

Worst case

Test Mode	Data Rate	Test Channel	ANT Port	Measured AV Power (dBm)
802.11b	1 Mbps	1	1	15.83
			2	15.87
		6	1	16.21
			2	16.08
		11	1	16.45
			2	16.29
802.11g	6 Mbps	1	1	17.26
			2	16.79
		6	1	17.54
			2	17.11
		11	1	17.68
			2	17.23
802.11n (HT20)	MCS7	1	1+2	17.15
		6	1+2	17.75
		11	1+2	17.77
802.11ax (HE20)	MCS7	1	1+2	17.84
		6	1+2	18.22
		11	1+2	18.63

Table 2: Test Result of Maximum Average Conducted Output Power of AP6275S

Worst case

Test Mode	Data Rate	Test Channel	ANT Port	Measured AV Power (dBm)
802.11b	1 Mbps	1	1	17.02
			2	14.89
		6	1	16.07
			2	15.01
		11	1	15.85
			2	15.07
802.11g	6 Mbps	1	1	17.61
			2	15.91
		6	1	18.00
			2	16.89
		11	1	17.72
			2	16.74
802.11n (HT20)	MCS7	1	1+2	19.15
		6	1+2	18.72
		11	1+2	18.56
802.11ax (HE20)	MCS7	1	1+2	17.48
		6	1+2	17.27
		11	1+2	17.25
802.11ax (HE20)_26 tone_RU1	MCS7	1	1+2	18.62
		6	1+2	18.53
		11	1+2	18.33
802.11ax (HE20)_242 tone_RU1	MCS7	1	1+2	14.17
		6	1+2	13.86
		11	1+2	12.22