



SAR TEST REPORT

Test Report No. : 32KE0041-HO-02-F-R1

Applicant : Sony Corporation

Type of Equipment : Personal Computer

Model No. : SVD112A1WL

FCC ID : AK8SVD112A1WL

Test regulation : FCC47CFR 2.1093
FCC OET Bulletin 65, Supplement C (Edition 01-01)

Test Result : **Complied**

FCC15.247(2.4G)	Body	: 0.422W/kg
FCC15.407(5.2G/5.3G)	Body	: 1.16W/kg
FCC15.407(5.6G)	Body	: 0.894W/kg
FCC15.247(5.8G)	Body	: 0.384W/kg

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 32KE0041-HO-02-F. 32KE0041-HO-02-F is replaced with this report.

Date of test: August 8 to 20, 2012

Representative
test engineer:

Hisayoshi Sato

Engineer of WiSE Japan,
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Leader of WiSE Japan
UL Verification Service

NVLAP LAB CODE: 200572-0

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13-EM-F0429

CONTENTS	PAGE
SECTION 1: Customer information	3
SECTION 2: Equipment under test (E.U.T.)	3
2.1 Identification of E.U.T.	3
2.2 Product description.....	3
SECTION 3: Test standard information	5
3.1 Test Specification.....	5
3.2 Procedure	5
3.3 Exposure limit	6
3.4 Test Location.....	6
SECTION 4: Test result	7
4.1 Stand-alone SAR result	7
4.2 Simultaneous transmission SAR result.....	7
SECTION 5: Description of the operating mode.....	8
5.1 Output power operating modes	8
5.2 SAR testing operating modes	13
5.3 Confirmation before SAR testing.....	32
5.4 Confirmation after SAR testing.....	40
SECTION 6: Description of the Body setup.....	41
6.1 Description of the Body setup	41
6.2 Laptop	41
6.3 Tablet	42
SECTION 7: Test surrounding.....	43
7.1 Measurement uncertainty	43
SECTION 8: Measurement results	45
8.1 WLAN Body SAR (2.4G).....	45
8.2 WLAN Body SAR (5G).....	47
SECTION 9 Test instruments.....	51
APPENDIX 1: SAR Measurement data.....	52
1. Evaluation procedure.....	52
2. Measurement data	53
APPENDIX 2: System Validation	107
1. System validation result Body 2450.....	107
2. System validation result Body 5GHz	110
3. System Validation Dipole (D2450V2,S/N:713).....	115
4. System Validation Dipole (D5GHzV2,S/N:1020).....	126
5. Validation uncertainty	139
APPENDIX 3: System specifications.....	140
1. Configuration and peripherals	140
2. Specifications	141
3. Dosimetric E-Field Probe Calibration (EX3DV4, S/N: 3825)	146
APPENDIX 4: Photographs of test setup	157
1. Photographs of EUT	157
2. Position of antenna	159
3. Photographs of setup	160

SECTION 1: Customer information

Company Name : Sony Corporation
 Address : 1-7-1 Konan, Minato-ku, Tokyo, 399-8282 Japan
 Telephone Number : +81-263-71-8272
 Facsimile Number : +81-263-71-8984
 Contact Person : Yuichi Kosaka

SECTION 2: Equipment under test (E.U.T.)**2.1 Identification of E.U.T.**

Type of Equipment : Personal Computer
 Model No. : SVD112A1WL
 Serial No. : DVT16430 1200012
 Rating : Li-ion Battery (Model No.: VGP-BPS31)
 DC7.4V/ 4960mAh 37Wh
 Option Battery : N/A
 Accessory : N/A
 Receipt Date of Sample : July 7, 2012
 Country of Mass-production : Japan
 Condition of EUT : Production prototype
 (Not for Sale: This sample is equivalent to mass-produced items.)
 Modification of EUT : No Modification by the test lab
 Device category : Portable
 Antenna to antenna separation distance : The shortest distance is 11mm from WLAN antenna to Bluetooth antenna.
 Simultaneous transmission : WLAN can transmit simultaneously with Bluetooth

2.2 Product description**General Specification**

Feature of EUT : This model is co-located with Wireless LAN(IEEE802.11a/b/g/n)/
 Bluetooth module, NFC Module and stylus.
 Each antenna is included in the Personal computer.
 This model can co-operate Wireless LAN(IEEE802.11a) + Bluetooth + NFC
 + stylus.
 Clock frequency(ies) in the system : 12MHz, 25MHz

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Radio Specification**Specification of Wireless LAN (IEEE802.11a/b/g) and Bluetooth**

Type of radio	Wireless LAN (IEEE802.11a)	Wireless LAN (IEEE802.11b/g)	Bluetooth (EDR/BDR/LE)
Equipment Type	Transceiver		
Frequency of Operation	Low Band Lower frequency=5180MHz Upper frequency=5320MHz High Band Lower frequency=5500MHz Upper frequency=5700MHz Upper Band Lower frequency=5745MHz Upper frequency=5825MHz	Lower frequency=2412MHz Upper frequency=2462MHz	Lower frequency=2402MHz Upper frequency=2480MHz
Bandwidth & Channel spacing	Bandwidth: 20MHz Ch spacing: 20MHz	Bandwidth: 20MHz Ch spacing: 5MHz	Bandwidth: 1MHz Ch spacing: 1MHz (EDR/BDR), 2MHz (LE)
Type of Modulation	OFDM	11b: DSSS 11g: OFDM	EDR/BDR: GFSK, $\pi/4$ DQPSK, 8DPSK LE: GFSK
Antenna Type	PIFA (Internal)		
Antenna Connector Type	U.FL compatible connector		
Antenna Gain	Antenna 1: +1.95dBi (2.4GHz) +1.83dBi (5GHz) Antenna 2: +1.20dBi (2.4GHz) +2.33dBi (5GHz) (Including Cableloss)		+1.20dBi
Power Supply	DC 3.3V		
Operating temperature range	+5 to +35 deg. C.		

Specification of Wireless LAN (IEEE802.11n)

Type of radio	Wireless LAN (IEEE802.11n)			
	2.4G Band MISO / MIMO (20M Band)	2.4G Band MISO / MIMO (40M Band)	5G Band MISO / MIMO (20M Band)	5G Band MISO / MIMO (40M Band)
Equipment Type	Transceiver			
Frequency of Operation	Lower frequency =2412MHz Upper frequency =2462MHz	Lower frequency =2422MHz Upper frequency =2452MHz	Low Band Lower frequency=5180MHz Upper frequency=5320MHz High Band Lower frequency=5500MHz Upper frequency=5700MHz Upper Band Lower frequency=5745MHz Upper frequency=5825MHz	Low Band Lower frequency=5190MHz Upper frequency=5310MHz High Band Lower frequency=5510MHz Upper frequency=5670MHz Upper Band Lower frequency=5755MHz Upper frequency=5795MHz
Bandwidth & Channel spacing	Bandwidth: 20MHz Ch spacing: 5MHz	Bandwidth: 40MHz Ch spacing: 5MHz	Bandwidth: 20MHz Ch spacing: 20MHz	Bandwidth: 40MHz Ch spacing: 40MHz
Type of Modulation	OFDM			
Antenna Type	PIFA (Internal)			
Antenna Connector Type	U.FL compatible connector			
Antenna Gain	Antenna 1: +1.95dBi (2.4GHz) +1.83dBi (5GHz) Antenna 2: +1.20dBi (2.4GHz) +2.33dBi (5GHz) (Including Cableloss)			
Power Supply	DC 3.3V			
Operating temperature range	+5 to +35 deg. C.			

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SECTION 3 : Test standard information

3.1 Test Specification

Title : **Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01):**

Supplement C (Edition 01-01) - Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions
OET Bulletin 65 (Edition 97-01) - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

: **IEEE Std 1528-2003:**

IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques Supplement C

In additions;

- KDB450824 D01** SAR Prob Cal and Ver Meas v01r01
- KDB450824 D01** Dipole SAR Validation Verification v01
- KDB447498D01(v04)** Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
- KDB447498D02(v02)** SAR Measurement Procedures for USB Dongle Transmitters
- KDB648474D01** SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas
- KDB941225D01(v02)** SAR Measurement Procedures for 3G Devices
- KDB941225D02(v02v01)** 3GPP R6 HSPA and R7 HSPA+ SAR Guidance
- KDB941225D03(v01)** Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE
- KDB941225D04(v01)** Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode
- KDB941225D05(v01)** SAR for LTE Devices
- KDB941225D06(v01)** SAR test procedures for devices incorporating SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities (Hot Spot SAR)
- KDB941225D07(v01)** SAR Evaluation Procedures for UMPC Mini-Tablet Devices
- KDB 616217 D01(v01r01)** SAR Evaluation Considerations for Laptop Computer with antennas Built-in on Display Screen
- KDB 616217 D03(v01)** SAR Evaluation Considerations for Laptop/Notebook/Netbook and Tablet
- KDB865664** SAR Measurement Requirements for 3 to 6 GHz
- KDB248227(rev.1.2)** SAR Measurement Procedures for 802.11a//b/g Transmitters

Reference

[1]ANSI, ANSI/IEEE C95.1-1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY 10017, 1992.

[2]SPEAG uncertainty document (AN 15-7/AN19-17) for DASY 5 System from SPEAG (Shimid & Partner Engineering AG).

3.2 Procedure

Transmitter	WLAN	Bluetooth
Test Procedure	FCC OET BULLETIN 65, SUPPLEMENT C SAR	Exemption (Power < 12mW)
Category	FCC47CFR 2.1093	FCC47CFR 2.1093
Note: UL Japan, Inc. 's SAR Work Procedures 13-EM-W0429 and 13-EM-W0430		

Bluetooth mode is excluded from SAR test since power was $1/2 * 60/f_{[GHz]}[mW]$.

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3.3 Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

<p>NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE SPATIAL PEAK(averaged over any 1g of tissue) LIMIT 1.6 W/kg</p>

3.4 Test Location

*Shielded room for SAR testings

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SECTION 4 : Test result**4.1 Stand-alone SAR result**

Mode	1g BodySAR [W/kg]
WLAN 11b/g/n(2.4G)	0.422
WLAN 11a/n(5G) 15.407	1.16
WLAN 11a/n(5G) 15.247	0.384
Bluetooth	Exemption

4.2 Simultaneous transmission SAR result**<Simultaneous Procedure>**

This EUT has the unlicensed transmitter such as WLAN (802.11a/b/g/n) & Bluetooth devices, and the following simultaneous transmission is possible.

No.	Capable Tx configurations	Body SAR	Note
1	WLAN+Bluetooth	Exemption	-

< WLAN + Bluetooth >

Simultaneous transmitter evaluation based on the KDB648474.

Step1	Bluetooth antenna is < 2.5cm from WLAN antenna
Step2	Bluetooth power < Pref (=1/2*60/f _[GHz]). Refer to section 5 of this test report.
Step3	WLAN 1g SAR < 1.2W/kg
Step4	No stand-alone SAR for Bluetooth
Step5	No simultaneous transmission.

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SECTION 5 : Description of the operating mode**5.1 Output power operating modes**

Mode	Duty cycle	Frequency Band	Test Frequency	Modulation
IEEE802.11b	100%	2412-2462MHz	2412MHz (1ch) 2437MHz(6ch) 2462MHz(11ch)	DSSS (DBPSK.DQPSK.CCK)
IEEE802.11g	100%	2412-2462MHz	2412MHz (1ch) 2437MHz(6ch) 2462MHz(11ch)	OFDM (BPSK.QPSK.16QAM,64QAM)
IEEE802.11n20 (2.4G)	100%	2412-2462MHz	2412MHz (1ch) 2437MHz(6ch) 2462MHz(11ch)	
IEEE802.11n40 (2.4G)	100%	2412-2462MHz	2422MHz (3ch) 2437MHz(6ch) 2462MHz(11ch)	
IEEE802.11a	100%	5180-5240MHz	All channel	
	100%	5260-5320MHz	All channel	
	100%	5500-5700MHz	All channel	
	100%	5745-5825MHz	All channel	
IEEE802.11n20 (5G)	100%	5180-5240MHz	All channel	
	100%	5260-5320MHz	All channel	
	100%	5500-5700MHz	All channel	
	100%	5745-5825MHz	All channel	
IEEE802.11n40 (5G)	100%	5190-5230MHz	All channel	
	100%	5270-5310MHz	All channel	
	100%	5510-5670MHz	All channel	
	100%	5755-5795MHz	All channel	
Bluetooth	94%(DH5, 3DH5) 67%(LE)	2402-2480MHz	2402MHz(1ch) 2441MHz(39ch) 2480MHz(78ch)	BDR(DH5) EDR(3DH5) LE

Setting**WLAN**

*Power of the EUT was set by the software as follows;

Software: DRTU Ver.1.5.3-0335

Power settings: Refer to the following table.

*This setting of software is the worst case.

Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

Bluetooth

* Power of the EUT was set by the software as follows;

Software: Intel DRTU, Version 1.5.3-0335

Power settings: BDR/EDR: 8dBm

LE: None (The power setting by the software was not possible)

*This setting of software is the worst case.

Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

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WLAN power settings

11b, 1Mbps

Ch	Freq.	Power set	
		Ant 1	Ant 2
1	2412	14	14.5
6	2437	14.5	14
11	2462	14.5	14

11g, 6Mbps

Ch	Freq.	Power set	
		Ant 1	Ant 2
1	2412	12.5	12
6	2437	15	15
11	2462	12.5	11.5

11n20(SISO), MCS0 (LongGI)

Ch	Freq.	Power set	
		Ant 1	Ant 2
1	2412	11.5	11.5
6	2437	15.5	15.5
11	2462	11	11

11n40(SISO), MCS0 (ShortGI)

Ch	Freq.	Power set	
		Ant 1	Ant 2
3	2422	8.5	8.5
6	2437	13	12
9	2452	9	8

11n20(MIMO), MCS8 (LongGI)

Ch	Freq.	Power set
		Ant 1 & 2
1	2412	11
6	2437	12.5
11	2462	10

11n40(MIMO), MCS8 (ShortGI)

Ch	Freq.	Power set
		Ant 1 & 2
3	2422	7
6	2437	11.5
9	2452	7.5

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11a 6Mbps

	Ch	Freq.	Power set	
			Ant 1	Ant 2
W52/53	36	5180	13	13.5
	40	5200	14.5	14.5
	44	5220	14.5	14.5
	48	5240	14.5	14.5
	52	5260	14	14.5
	56	5280	14.5	14.5
	60	5300	14.5	14.5
	64	5320	14.5	14.5
W56	100	5500	14.5	13.5
	104	5520	14.5	14
	108	5540	15	14
	112	5560	15	14
	116	5580	15	14
	120	5600	15	14
	124	5620	15	14
	128	5640	15	14
	132	5660	15	14
	136	5680	15	14.5
140	5700	15	14.5	
W58	149	5745	15	15
	153	5765	14.5	15
	157	5785	15	15
	161	5805	15	15.5
	165	5825	15.5	15.5

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11n20(SISO), MCS0 (LongGI)

	Ch	Freq.	Power set	
			Ant 1	Ant 2
W52/53	36	5180	12.5	13
	40	5200	14.5	14
	44	5220	14.5	14.5
	48	5240	14.5	14.5
	52	5260	14.5	14.5
	56	5280	14.5	14.5
	60	5300	14.5	14.5
	64	5320	14	14
W56	100	5500	14.5	14
	104	5520	14.5	14
	108	5540	14.5	14
	112	5560	14.5	14
	116	5580	15	14
	120	5600	15	14
	124	5620	15	14
	128	5640	15	14
	132	5660	15	14
	136	5680	15	14.5
140	5700	15	14.5	
W58	149	5745	14.5	14.5
	153	5765	14.5	14.5
	157	5785	15	15
	161	5805	15	15.5
	165	5825	15	15.5

11n40(SISO), MCS0 (ShortGI)

	Ch	Freq.	Power set	
			Ant 1	Ant 2
W52/53	38	5190	10.5	10.5
	46	5230	14.5	14.5
	54	5270	14	14.5
	62	5310	10.5	11.5
W56	102	5510	13.5	13
	110	5550	15.5	14.5
	118	5590	15.5	14.5
	126	5630	15.5	14.5
	134	5670	15.5	14.5
W58	151	5755	15.5	15.5
	159	5795	15.5	15.5

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11n20(MIMO), MCS8 (LongGI)

	Ch	Freq.	Power set
			Ant 1 & 2
W52/53	36	5180	11.5
	40	5200	12
	44	5220	12.5
	48	5240	12.5
	52	5260	12
	56	5280	12.5
	60	5300	13
	64	5320	12.5
W56	100	5500	12.5
	104	5520	12
	108	5540	12
	112	5560	12
	116	5580	12
	120	5600	12.5
	124	5620	12
	128	5640	12
	132	5660	12.5
	136	5680	12.5
140	5700	13	
W58	149	5745	12
	153	5765	12.5
	157	5785	12.5
	161	5805	13
	165	5825	13

11n40(MIMO), MCS8 (ShortGI)

	Ch	Freq.	Power set
			Ant 1 & 2
W52/53	38	5190	9
	46	5230	13.5
	54	5270	13.5
	62	5310	10
W56	102	5510	11.5
	110	5550	12.5
	118	5590	12.5
	126	5630	13
	134	5670	13
W58	151	5755	13
	159	5795	13

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5.2 SAR testing operating modes

Decision of SAR test channel

The operating mode for SAR testing was decided by the output power

The average output power for 802.11a was measured on all channels in each frequency band.

Mode	GHz	Channel	"Default Test Channel"		UNII		
			FCC 15.247				
			802.11b	802.11g			
802.11 b/g/n20	2.412	1	√	Δ			
	2.437	6	√	Δ			
	2.462	11	√	Δ			
802.11a/n20	UNII	5.18	36			√	
		5.20	40				*
		5.22	44				*
		5.24	48			√	
		5.26	52			√	
		5.28	56				*
		5.30	60				*
		5.32	64			√	
		5.50	100				*
		5.52	104			√	
		5.54	108				*
		5.56	112				*
		5.58	116			√	
		5.60	120				*
		5.62	124			√	
		5.64	128				*
		5.66	132				*
	5.68	136			√		
	5.70	140				*	
	UNII or FCC 15.247	5.745	149	√		√	
		5.765	153		*		*
5.785		157	√			*	
5.805		161		*	√		
FCC 15.247	5.825	165	√				
802.11n40	UNII	5.19	38			√	
		5.23	46			√	
		5.27	54			√	
		5.31	62			√	
		5.51	102			√	
		5.55	110			√	
		5.59	118				*
		5.63	126			√	
	5.67	134			√		
	UNII or FCC 15.247	5.755	151	√		√	
		FCC 15.247	5.795	159	√		√

√ = "default test channels"

* = Possible 802.11a channels with maximum average output > the "default test channels"

Δ = Possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"

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1) WLAN (11b/g/n(2.4G))

1. The data rate SAR for highest power is not required because the average output power for higher data rate is less than 1/4dB higher than that measured the lowest data rate mode.
2. The other channels are measured if the SAR result at max. AVG power channel will be above 0.8W/kg

[IEEE802.11b Ant. 1] Rate Check

Rate [Mbps]	Freq. [MHz]	Reading [dBm] AVG
1.0	2437	3.36
2.0	2437	3.20
5.5	2437	3.24
11.0	2437	3.13

[IEEE802.11b Ant. 1] 1Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
1	2412	2.81	1.20	10.00	14.01	25.17
6	2437	3.48	1.22	10.00	14.70	29.52
11	2462	3.25	1.33	10.00	14.58	28.70

[IEEE802.11b Ant. 2] 1Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
1	2412	2.98	1.32	10.00	14.30	26.92
6	2437	2.83	1.35	10.00	14.18	26.16
11	2462	2.62	1.45	10.00	14.07	25.54

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 : Worst data rate

 : SAR test channel

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[IEEE802.11g Ant. 1] Rate Check

Rate [Mbps]	Freq. [MHz]	Reading [dBm] AVG
6.0	2437	3.91
9.0	2437	3.89
12.0	2437	3.87
18.0	2437	3.78
24.0	2437	3.66
36.0	2437	3.64
48.0	2437	3.55
54.0	2437	3.50

[IEEE802.11g Ant. 1] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
1	2412	1.67	1.20	10.00	12.87	19.36
6	2437	3.94	1.22	10.00	15.16	32.81
11	2462	1.39	1.33	10.00	12.72	18.70

[IEEE802.11g Ant. 2] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
1	2412	0.83	1.32	10.00	12.15	16.41
6	2437	3.61	1.35	10.00	14.96	31.31
11	2462	0.64	1.45	10.00	12.09	16.19

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Worst data rate

SAR test channel

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[IEEE802.11n 20M(2.4GHz) Ant. 1 LongGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	2437	3.86
1	2437	3.74
2	2437	3.84
3	2437	3.79
4	2437	3.69
5	2437	3.62
6	2437	3.63
7	2437	3.65

[IEEE802.11n 20M(2.4GHz) Ant. 1 ShortGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	2437	3.85

[IEEE802.11n 20M(2.4GHz) Ant. 1 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
1	2412	0.53	1.20	10.00	11.73	14.89
6	2437	3.95	1.22	10.00	15.17	32.89
11	2462	-0.19	1.33	10.00	11.14	13.00

[IEEE802.11n 20M(2.4GHz) Ant. 2 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
1	2412	-0.15	1.32	10.00	11.17	13.09
6	2437	3.88	1.35	10.00	15.23	33.32
11	2462	-0.08	1.45	10.00	11.37	13.72

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Attenuator}$$

Worst data rate

SAR test channel

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[IEEE802.11n 40M(2.4GHz) Ant. 1 LongGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	2437	1.01
1	2437	0.98
2	2437	0.86
3	2437	0.63
4	2437	0.61
5	2437	0.56
6	2437	0.53
7	2437	0.46

[IEEE802.11n 40M(2.4GHz) Ant. 1 ShortGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	2437	1.08

[IEEE802.11n 40M(2.4GHz) Ant. 1 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
3	2422	-3.02	1.19	10.00	8.17	6.56
6	2437	1.13	1.22	10.00	12.35	17.18
9	2452	-2.81	1.29	10.00	8.48	7.04

[IEEE802.11n 40M(2.4GHz) Ant. 2 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
3	2422	-3.54	1.31	10.00	7.77	5.99
6	2437	-0.26	1.35	10.00	11.09	12.84
9	2452	-3.86	1.42	10.00	7.56	5.70

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 :Worst data rate

 :SAR test channel

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[IEEE802.11n 20M(2.4GHz) Ant. 1+2 LongGI] Rate Check

MCS	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	2437	1	0.70	3.80
		2	0.87	
MCS9	2437	1	0.66	3.72
		2	0.75	
MCS10	2437	1	0.68	3.73
		2	0.75	
MCS11	2437	1	0.71	3.66
		2	0.59	
MCS 12	2437	1	0.37	3.44
		2	0.48	
MCS 13	2437	1	0.39	3.50
		2	0.58	
MCS 14	2437	1	0.44	3.53
		2	0.59	
MCS15	2437	1	0.33	3.42
		2	0.48	

[IEEE802.11n 20M(2.4GHz) Ant. 1+2 ShortGI] Rate Check

MCS	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	2437	1	0.75	3.78
		2	0.79	

[IEEE802.11n 20M(2.4GHz) Ant. 1+2 LongGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
1	2412	1	0.10	1.20	10.07	11.37	14.21	26.38
		2	-0.29	1.32	10.00	11.03		
6	2437	1	0.56	1.22	10.07	11.85	15.08	32.20
		2	0.93	1.35	10.00	12.28		
11	2462	1	-1.56	1.33	10.07	9.84	13.38	21.78
		2	-0.61	1.45	10.00	10.84		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 :Worst data rate

 :SAR test channel

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[IEEE802.11n 40M(2.4GHz) Ant. 1+2 LongGI] Rate Check

MCS	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	2437	1	-0.22	2.49
		2	-0.85	
MCS9	2437	1	-0.29	2.41
		2	-0.93	
MCS10	2437	1	-0.36	2.35
		2	-0.99	
MCS11	2437	1	-0.58	2.12
		2	-1.22	
MCS 12	2437	1	-0.66	2.01
		2	-1.37	
MCS 13	2437	1	-0.79	1.94
		2	-1.38	
MCS 14	2437	1	-0.82	1.93
		2	-1.35	
MCS15	2437	1	-0.84	1.89
		2	-1.41	

[IEEE802.11n 40M(2.4GHz) Ant. 1+2 ShortGI] Rate Check

MCS	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	2437	1	-0.17	2.53
		2	-0.81	

[IEEE802.11n 40M(2.4GHz) Ant. 1+2 ShortGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
3	2422	1	-4.98	1.19	10.07	6.28	8.99	7.93
		2	-5.65	1.31	10.00	5.66		
6	2437	1	-0.35	1.22	10.07	10.94	14.03	25.32
		2	-0.24	1.35	10.00	11.11		
9	2452	1	-4.79	1.29	10.07	6.57	9.64	9.21
		2	-4.72	1.42	10.00	6.70		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

:Worst data rate

:SAR test channel

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2) WLAN (11a/n(5180-5320MHz):

1. The data rate SAR for highest power and the lowest data rate are required.
2. The other channels are measured if the SAR result at max. AVG power channel will be above 0.4W/kg.

[IEEE802.11a Ant. 1] Rate Check

Rate [Mbps]	Freq. [MHz]	Reading [dBm] AVG
6.0	5240	2.99
9.0	5240	2.80
12.0	5240	2.76
18.0	5240	2.71
24.0	5240	2.76
36.0	5240	2.81
48.0	5240	2.89
54.0	5240	2.72

[IEEE802.11a Ant. 1] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
36	5180	1.41	1.67	10.14	13.22	21.00
40	5200	2.94	1.61	10.14	14.69	29.44
44	5220	2.95	1.57	10.14	14.66	29.24
48	5240	3.01	1.60	10.15	14.76	29.92
52	5260	2.80	1.64	10.15	14.59	28.75
56	5280	2.92	1.62	10.15	14.69	29.46
60	5300	3.09	1.57	10.15	14.81	30.27
64	5320	3.20	1.59	10.15	14.94	31.22

[IEEE802.11a Ant. 2] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
36	5180	2.44	1.72	10.00	14.16	26.05
40	5200	3.27	1.67	10.00	14.94	31.16
44	5220	2.86	1.64	10.00	14.50	28.20
48	5240	2.98	1.63	10.00	14.61	28.90
52	5260	2.94	1.68	9.99	14.61	28.90
56	5280	2.80	1.69	9.99	14.48	28.08
60	5300	3.03	1.64	9.99	14.66	29.24
64	5320	3.26	1.63	9.99	14.88	30.76

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Worst data rate

SAR test channel

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[IEEE802.11n 20M(5GHz) Ant. 1 LongGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	5240	3.10
1	5240	2.88
2	5240	2.78
3	5240	2.72
4	5240	2.78
5	5240	2.68
6	5240	2.70
7	5240	2.67

[IEEE802.11n 20M(5GHz) Ant. 1 ShortGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	5240	3.08

[IEEE802.11n 20M(5GHz) Ant. 1 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
36	5180	0.89	1.67	10.14	12.70	18.63
40	5200	3.18	1.61	10.14	14.93	31.12
44	5220	2.78	1.57	10.14	14.49	28.11
48	5240	3.11	1.60	10.15	14.86	30.61
52	5260	3.07	1.64	10.15	14.86	30.59
56	5280	3.01	1.62	10.15	14.78	30.07
60	5300	2.93	1.57	10.15	14.65	29.18
64	5320	2.41	1.59	10.15	14.15	26.03

[IEEE802.11n 20M(5GHz) Ant. 2 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
36	5180	2.01	1.72	10.00	13.73	23.59
40	5200	3.11	1.67	10.00	14.78	30.04
44	5220	3.15	1.64	10.00	14.79	30.15
48	5240	3.05	1.63	10.00	14.68	29.37
52	5260	2.97	1.68	9.99	14.64	29.10
56	5280	2.80	1.69	9.99	14.48	28.08
60	5300	2.98	1.64	9.99	14.61	28.91
64	5320	2.49	1.63	9.99	14.11	25.76

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 :Worst data rate

 :SAR test channel

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[IEEE802.11n 40M(5GHz) Ant. 1 LongGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	5270	1.72
1	5270	1.64
2	5270	1.55
3	5270	1.67
4	5270	1.60
5	5270	1.53
6	5270	1.47
7	5270	1.43

[IEEE802.11n 40M(5GHz) Ant. 1 ShortGI] Rate Check

MCS	Freq. [MHz]	Reading [dBm] AVG
0	5270	1.74

[IEEE802.11n 40M(5GHz) Ant. 1 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
38	5190	-1.90	1.65	10.14	9.89	9.75
46	5230	2.60	1.57	10.15	14.32	27.04
54	5270	2.20	1.64	10.15	13.99	25.04
62	5310	-1.69	1.57	10.15	10.03	10.06

[IEEE802.11n 40M(5GHz) Ant. 2 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
38	5190	-1.79	1.68	10.00	9.89	9.74
46	5230	2.53	1.63	10.00	14.16	26.05
54	5270	2.55	1.69	9.99	14.23	26.48
62	5310	-1.13	1.62	9.99	10.48	11.17

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

: Worst data rate

: SAR test channel

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[IEEE802.11n 20M(5GHz) Ant. 1+2 LongGI] Rate Check

Rate [Mbps]	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	5240	1	0.02	2.84
		2	-0.37	
MCS9	5240	1	-0.05	2.82
		2	-0.34	
MCS 10	5240	1	-0.23	2.83
		2	-0.14	
MCS11	5240	1	-0.12	2.81
		2	-0.29	
MCS 12	5240	1	-0.36	2.75
		2	-0.16	
MCS13	5240	1	-0.30	2.80
		2	-0.12	
MCS 14	5240	1	-0.35	2.76
		2	-0.16	
MCS15	5240	1	-0.37	2.73
		2	-0.20	

[IEEE802.11n 20M(5GHz) Ant. 1+2 ShortGI] Rate Check

Rate [Mbps]	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	5240	1	-0.13	2.83
		2	-0.24	

[IEEE802.11n 20M(5GHz) Ant. 1+2 LongGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	[dBm]	[mW]
36	5180	1	-0.28	1.67	10.14	11.53	14.49	28.12
		2	-0.29	1.72	10.00	11.43		
40	5200	1	-0.45	1.61	10.14	11.30	14.46	27.93
		2	-0.07	1.67	10.00	11.60		
44	5220	1	0.04	1.57	10.14	11.75	14.81	30.28
		2	0.21	1.64	10.00	11.85		
48	5240	1	-0.11	1.60	10.15	11.64	14.54	28.42
		2	-0.22	1.63	10.00	11.41		
52	5260	1	0.06	1.64	10.15	11.85	14.50	28.18
		2	-0.57	1.68	9.99	11.10		
56	5280	1	0.25	1.62	10.15	12.02	14.74	29.77
		2	-0.27	1.69	9.99	11.41		
60	5300	1	0.72	1.57	10.15	12.44	15.31	33.95
		2	0.52	1.64	9.99	12.15		
64	5320	1	0.41	1.59	10.15	12.15	14.92	31.05
		2	0.03	1.63	9.99	11.65		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 :Worst data rate

 :SAR test channel

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[IEEE802.11n 40M(5GHz) Ant. 1+2 LongGI] Rate Check

Rate [Mbps]	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	5230	1	0.08	3.44
		2	0.76	
MCS9	5230	1	0.16	3.37
		2	0.56	
MCS 10	5230	1	0.07	3.30
		2	0.49	
MCS11	5230	1	-0.06	3.20
		2	0.43	
MCS 12	5230	1	-0.26	2.97
		2	0.16	
MCS13	5230	1	-0.63	2.83
		2	0.22	
MCS 14	5230	1	-0.68	2.81
		2	0.23	
MCS15	5230	1	-0.71	2.77
		2	0.18	

[IEEE802.11n 40M(5GHz) Ant. 1+2 ShortGI] Rate Check

Rate [Mbps]	Freq. [MHz]	Antenna	Reading [dBm] AVG	Total [dBm]
MCS8	5230	1	0.14	3.49
		2	0.80	

[IEEE802.11n 40M(5GHz) Ant. 1+2 ShortGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
38	5190	1	-4.13	1.65	10.14	7.66	10.91	12.33
		2	-3.55	1.68	10.00	8.13		
46	5230	1	0.21	1.57	10.15	11.93	15.22	33.25
		2	0.84	1.63	10.00	12.47		
54	5270	1	0.34	1.64	10.15	12.13	15.09	32.31
		2	0.36	1.69	9.99	12.04		
62	5310	1	-3.11	1.57	10.15	8.61	11.40	13.80
		2	-3.45	1.62	9.99	8.16		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 :Worst data rate

 :SAR test channel

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3) WLAN (11a/n(5500-5700MHz):

1. The data rate SAR for highest power and the lowest data rate are required.
2. The other channels are measured if the SAR result at max. AVG power channel will be above 0.4W/kg.

[IEEE802.11a Ant. 1] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
100	5500	2.64	1.70	10.16	14.50	28.17
104	5520	2.71	1.67	10.16	14.54	28.44
108	5540	3.17	1.61	10.16	14.94	31.21
112	5560	2.78	1.62	10.16	14.56	28.60
116	5580	2.86	1.63	10.16	14.65	29.20
120	5600	2.81	1.60	10.16	14.57	28.66
124	5620	2.74	1.59	10.16	14.49	28.12
128	5640	2.83	1.59	10.16	14.58	28.71
132	5660	3.00	1.61	10.16	14.77	29.96
136	5680	2.92	1.62	10.16	14.70	29.52
140	5700	2.88	1.62	10.15	14.65	29.20

[IEEE802.11a Ant. 2] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
100	5500	3.02	1.75	9.99	14.76	29.96
104	5520	2.92	1.75	9.99	14.66	29.23
108	5540	2.92	1.66	9.99	14.57	28.65
112	5560	2.93	1.66	9.99	14.58	28.74
116	5580	2.83	1.68	9.99	14.50	28.19
120	5600	3.18	1.66	9.99	14.83	30.43
124	5620	3.06	1.63	9.99	14.68	29.37
128	5640	2.98	1.65	9.99	14.62	28.94
132	5660	2.88	1.67	9.99	14.54	28.44
136	5680	3.28	1.65	9.99	14.92	31.06
140	5700	3.08	1.65	9.99	14.72	29.68

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Attenuator}$$

:SAR test channel

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[IEEE802.11n 20M Ant. 1 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
100	5500	2.72	1.70	10.16	14.58	28.70
104	5520	2.66	1.67	10.16	14.49	28.11
108	5540	2.69	1.61	10.16	14.46	27.94
112	5560	2.69	1.62	10.16	14.47	28.01
116	5580	2.81	1.63	10.16	14.60	28.87
120	5600	2.81	1.60	10.16	14.57	28.66
124	5620	2.75	1.59	10.16	14.50	28.19
128	5640	2.74	1.59	10.16	14.49	28.12
132	5660	3.07	1.61	10.16	14.84	30.45
136	5680	3.15	1.62	10.16	14.93	31.13
140	5700	2.92	1.62	10.15	14.69	29.47

[IEEE802.11n 20M Ant. 2 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
100	5500	3.17	1.75	9.99	14.91	31.01
104	5520	3.14	1.75	9.99	14.88	30.75
108	5540	3.15	1.66	9.99	14.80	30.21
112	5560	3.18	1.66	9.99	14.83	30.44
116	5580	3.02	1.68	9.99	14.69	29.45
120	5600	3.14	1.66	9.99	14.79	30.16
124	5620	3.03	1.63	9.99	14.65	29.17
128	5640	2.86	1.65	9.99	14.50	28.16
132	5660	2.88	1.67	9.99	14.54	28.44
136	5680	3.27	1.65	9.99	14.91	30.99
140	5700	3.24	1.65	9.99	14.88	30.80

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

:SAR test channel

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[IEEE802.11n 40M Ant. 1 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
102	5510	1.34	1.70	10.16	13.20	20.87
110	5550	2.81	1.61	10.16	14.58	28.72
118	5590	2.72	1.62	10.16	14.50	28.20
126	5630	2.80	1.59	10.16	14.55	28.49
134	5670	2.65	1.61	10.16	14.42	27.67

[IEEE802.11n 40M Ant. 2 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
102	5510	1.55	1.76	9.99	13.30	21.38
110	5550	3.01	1.66	9.99	14.66	29.24
118	5590	2.94	1.67	9.99	14.60	28.86
126	5630	2.78	1.63	9.99	14.40	27.56
134	5670	2.76	1.65	9.99	14.40	27.57

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Attenuator}$$

 : SAR test channel

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[IEEE802.11n 20M(5GHz) Ant. 1+2 LongGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
100	5500	1	-0.01	1.70	10.16	11.85	15.29	33.82
		2	0.93	1.75	9.99	12.67		
104	5520	1	-0.50	1.67	10.16	11.33	14.80	30.21
		2	0.47	1.75	9.99	12.21		
108	5540	1	-0.52	1.61	10.16	11.25	14.74	29.75
		2	0.50	1.66	9.99	12.15		
112	5560	1	-0.60	1.62	10.16	11.18	14.68	29.40
		2	0.46	1.66	9.99	12.11		
116	5580	1	-0.69	1.63	10.16	11.10	14.59	28.78
		2	0.34	1.68	9.99	12.01		
120	5600	1	-0.25	1.60	10.16	11.51	14.99	31.56
		2	0.75	1.66	9.99	12.40		
124	5620	1	-0.66	1.59	10.16	11.09	14.50	28.20
		2	0.24	1.63	9.99	11.86		
128	5640	1	-0.65	1.59	10.16	11.10	14.52	28.32
		2	0.25	1.65	9.99	11.89		
132	5660	1	-0.35	1.61	10.16	11.42	14.55	28.54
		2	0.01	1.67	9.99	11.67		
136	5680	1	-0.37	1.62	10.16	11.41	14.72	29.66
		2	0.35	1.65	9.99	11.99		
140	5700	1	0.05	1.62	10.15	11.82	15.12	32.53
		2	0.74	1.65	9.99	12.38		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

:SAR test channel

[IEEE802.11n 40M(5GHz) Ant. 1+2 ShortGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
102	5510	1	-1.64	1.70	10.16	10.22	13.80	23.97
		2	-0.46	1.76	9.99	11.29		
110	5550	1	-1.01	1.61	10.16	10.76	14.31	26.95
		2	0.12	1.66	9.99	11.77		
118	5590	1	-0.96	1.62	10.16	10.82	14.35	27.23
		2	0.14	1.67	9.99	11.80		
126	5630	1	-0.75	1.59	10.16	11.00	14.46	27.90
		2	0.23	1.63	9.99	11.85		
134	5670	1	-0.59	1.61	10.16	11.18	14.32	27.04
		2	-0.21	1.65	9.99	11.43		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

:SAR test channel

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4) WLAN (11a/n(5745-5825MHz):

1. The data rate SAR for highest power and the lowest data rate are required.
2. The other channels are measured if the SAR result at max. AVG power channel will be above 0.8W/kg.

[IEEE802.11a Ant. 1] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
149	5745	3.02	1.61	10.15	14.78	30.07
153	5765	2.94	1.66	10.15	14.75	29.87
157	5785	3.15	1.62	10.15	14.92	31.06
161	5805	3.02	1.59	10.15	14.76	29.89
165	5825	3.10	1.63	10.15	14.88	30.73

[IEEE802.11a Ant. 2] 6Mbps

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
149	5745	3.15	1.65	9.98	14.78	30.09
153	5765	2.99	1.69	9.98	14.66	29.24
157	5785	2.95	1.66	9.98	14.59	28.77
161	5805	2.94	1.61	9.98	14.53	28.35
165	5825	2.88	1.65	9.98	14.51	28.24

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

31.06 :SAR test channel

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[IEEE802.11n 20M Ant. 1 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
149	5745	2.74	1.61	10.15	14.50	28.19
153	5765	2.90	1.66	10.15	14.71	29.60
157	5785	2.89	1.62	10.15	14.66	29.26
161	5805	2.93	1.59	10.15	14.67	29.28
165	5825	2.87	1.63	10.15	14.65	29.14

[IEEE802.11n 20M Ant. 2 LongGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
149	5745	2.96	1.65	9.98	14.59	28.81
153	5765	2.93	1.69	9.98	14.60	28.83
157	5785	2.90	1.66	9.98	14.54	28.44
161	5805	2.99	1.61	9.98	14.58	28.68
165	5825	2.93	1.65	9.98	14.56	28.56

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 : SAR test channel

[IEEE802.11n 40M Ant. 1 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
151	5755	2.93	1.65	10.15	14.73	29.71
159	5795	2.88	1.60	10.15	14.63	29.04

[IEEE802.11n 40M Ant. 2 ShortGI] MCS0

Ch	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
151	5755	2.78	1.68	9.98	14.44	27.79
159	5795	2.80	1.63	9.98	14.41	27.62

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

 : SAR test channel

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[IEEE802.11n 20M(5GHz) Ant. 1+2 LongGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
149	5745	1	-0.33	1.61	10.15	11.43	14.46	27.95
		2	-0.16	1.65	9.98	11.47		
153	5765	1	-0.25	1.66	10.15	11.56	14.65	29.19
		2	0.05	1.69	9.98	11.72		
157	5785	1	-0.13	1.62	10.15	11.64	14.60	28.82
		2	-0.11	1.66	9.98	11.53		
161	5805	1	0.25	1.59	10.15	11.99	14.74	29.81
		2	-0.12	1.61	9.98	11.47		
165	5825	1	0.09	1.63	10.15	11.87	14.67	29.32
		2	-0.18	1.65	9.98	11.45		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

:SAR test channel

[IEEE802.11n 40M(5GHz) Ant. 1+2 ShortGI] MCS8

Ch	Frequency [MHz]	Antenna	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result AVG		
						[dBm]	Total [dBm]	[mW]
151	5755	1	0.01	1.65	10.15	11.81	14.67	29.32
		2	-0.15	1.68	9.98	11.51		
159	5795	1	-0.32	1.60	10.15	11.43	14.39	27.49
		2	-0.28	1.63	9.98	11.33		

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

:SAR test channel

5) Bluetooth

Bluetooth

Mode	Frequency [MHz]	Reading [dBm] AVG	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm] AVG	[mW] AVG
DH5	2402	-5.22	1.33	9.95	6.06	4.04
	2441	-5.21	1.36	9.95	6.10	4.07
	2480	-5.13	1.46	9.95	6.28	4.24
3DH5	2402	-9.33	1.33	9.95	1.95	1.57
	2441	-8.90	1.36	9.95	2.41	1.74
	2480	-8.36	1.46	9.95	3.05	2.02
LE	2402	-7.08	1.33	9.95	4.20	2.63
	2440	-7.06	1.36	9.95	4.25	2.66
	2480	-7.08	1.46	9.95	4.33	2.71

Sample Calculation: Result = Reading + Cable Loss + Attenuator

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5.3 Confirmation before SAR testing

Correlation of Output Power between EMC and SAR tests

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)

SAR power is equal to DATA of EMC test based on the following reason.

- EMC and SAR tests are performed with the same test sample such as serial number under the same condition.
- EMC and SAR tests are performed at the same laboratory.

<Peak power result for maximum data rate in FCC 15.247 test>

11b 1Mbps

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	5.95	1.20	10.00	17.15	51.87
2437	6.55	1.22	10.00	17.77	59.85
2462	6.36	1.33	10.00	17.69	58.74

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	5.97	1.32	10.00	17.29	53.59
2437	5.86	1.35	10.00	17.21	52.56
2462	5.68	1.45	10.00	17.13	51.67

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11g 6Mbps

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	10.34	1.20	10.00	21.54	142.53
2437	10.83	1.22	10.00	22.05	160.35
2462	9.93	1.33	10.00	21.26	133.63

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	9.36	1.32	10.00	20.68	116.97
2437	10.34	1.35	10.00	21.69	147.46
2462	9.03	1.45	10.00	20.48	111.76

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

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11n 20MHz BW MISO MCS0 Long GI

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	10.21	1.20	10.00	21.41	138.32
2437	10.90	1.22	10.00	22.12	162.95
2462	9.76	1.33	10.00	21.09	128.50

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	9.18	1.32	10.00	20.50	112.22
2437	10.42	1.35	10.00	21.77	150.20
2462	9.07	1.45	10.00	20.52	112.79

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11n 40MHz BW MISO MCS0 Short GI

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2422	7.78	1.19	10.00	18.97	78.85
2437	9.86	1.22	10.00	21.08	128.25
2452	7.80	1.29	10.00	19.09	81.03

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2422	7.19	1.31	10.00	18.50	70.86
2437	8.81	1.35	10.00	20.16	103.67
2452	6.90	1.42	10.00	18.32	67.86

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11n 20MHz BW MIMO MCS8 Long GI

Antenna 1 + 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result	
			[dBm]	[mW]
2412	99.98	90.38	22.80	190.35
2437	108.66	102.72	23.25	211.38
2462	75.49	97.56	22.38	173.06

Sample Calculation:

Result = Antenna 1 + 2

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	8.73	1.20	10.07	20.00	99.98
2437	9.07	1.22	10.07	20.36	108.66
2462	7.38	1.33	10.07	18.78	75.49

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	8.24	1.32	10.00	19.56	90.38
2437	8.77	1.35	10.00	20.12	102.72
2462	8.44	1.45	10.00	19.89	97.56

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11n 40MHz BW MIMO MCS8 Short GI

Antenna 1 + 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result	
			[dBm]	[mW]
2422	45.90	38.06	19.24	83.95
2437	94.85	90.50	22.68	185.36
2452	49.74	46.52	19.83	96.25

Sample Calculation:

Result = Antenna 1 + 2

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2422	5.36	1.19	10.07	16.62	45.90
2437	8.48	1.22	10.07	19.77	94.85
2452	5.61	1.29	10.07	16.97	49.74

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2422	4.49	1.31	10.00	15.80	38.06
2437	8.22	1.35	10.00	19.57	90.50
2452	5.26	1.42	10.00	16.68	46.52

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

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11a 6Mbps

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5745	10.13	1.61	10.15	21.89	154.58
5785	9.84	1.62	10.15	21.61	144.95
5825	9.54	1.63	10.15	21.32	135.38

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5745	10.45	1.65	9.98	22.08	161.61
5785	10.33	1.66	9.98	21.97	157.38
5825	10.28	1.65	9.98	21.91	155.17

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11n 20MHz BW MISO MCS0 LongGI

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5745	10.06	1.61	10.15	21.82	152.11
5785	9.72	1.62	10.15	21.49	141.00
5825	9.38	1.63	10.15	21.16	130.48

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5745	10.59	1.65	9.98	22.22	166.91
5785	10.47	1.66	9.98	22.11	162.54
5825	10.25	1.65	9.98	21.88	154.10

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11n 40MHz BW MISO MCS0 ShortGI

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5755	10.15	1.65	10.15	21.95	156.63
5795	9.89	1.60	10.15	21.64	145.89

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5755	10.62	1.68	9.98	22.28	169.01
5795	10.44	1.63	9.98	22.05	160.40

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

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11n 20MHz BW MIMO MCS12 LongGI

Antenna 1 + 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result	
			[dBm]	[mW]
5745	104.51	101.97	23.15	206.48
5785	107.21	99.99	23.16	207.20
5825	99.67	104.19	23.09	203.85

Sample Calculation:

Result = Antenna 1 + 2

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5745	8.43	1.61	10.15	20.19	104.51
5785	8.53	1.62	10.15	20.30	107.21
5825	8.21	1.63	10.15	19.99	99.67

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5745	8.45	1.65	9.98	20.08	101.97
5785	8.36	1.66	9.98	20.00	99.99
5825	8.55	1.65	9.98	20.18	104.19

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

11n 40MHz BW MIMO MCS12 ShortGI

Antenna 1 + 2

Freq. [MHz]	Antenna 1 Result [mW]	Antenna 2 Result [mW]	Result	
			[dBm]	[mW]
5755	106.14	114.00	23.43	220.14
5795	99.77	112.26	23.26	212.03

Sample Calculation:

Result = Antenna 1 + 2

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5755	8.46	1.65	10.15	20.26	106.14
5795	8.24	1.60	10.15	19.99	99.77

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
5755	8.91	1.68	9.98	20.57	114.00
5795	8.89	1.63	9.98	20.50	112.26

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

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<Peak power result for maximum data rate in FCC 15.407 test>

11a 6Mbps

Antenna 2

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	1.04	3.56	10.00	2.33	14.60	16.93
5220.0	1.80	3.49	10.00	2.33	15.29	17.62
5240.0	1.71	3.49	10.00	2.33	15.20	17.53
5260.0	1.49	3.54	9.99	2.33	15.02	17.35
5300.0	1.57	3.51	9.99	2.33	15.07	17.40
5320.0	1.44	3.51	9.99	2.33	14.94	17.27
5500.0	1.08	3.67	9.99	2.33	14.74	17.07
5580.0	1.46	3.61	9.99	2.33	15.06	17.39
5700.0	1.68	3.60	9.99	2.33	15.27	17.60

Result(Cond.) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss

Result(e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss + Antenna

11n 20MHz BW MIMO MCS8 LongGI

Antenna 1+2

Freq. [MHz]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	15.12	17.21
5220.0	15.25	17.33
5240.0	15.27	17.35
5260.0	14.91	16.99
5300.0	15.68	17.75
5320.0	15.43	17.50
5500.0	15.77	17.87
5580.0	15.09	17.19
5700.0	15.66	17.76

Result [dBm] = 10 x log (10 ^ (Ant1 Result [dBm] / 10) + 10 ^ (Ant2 Result [dBm] / 10) + 10 ^ (Ant3 Result [dBm] / 10))

Antenna 1

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	-1.51	3.51	10.14	1.83	12.14	13.97
5220.0	-1.17	3.42	10.14	1.83	12.39	14.22
5240.0	-1.21	3.46	10.15	1.83	12.40	14.23
5260.0	-1.64	3.50	10.15	1.83	12.01	13.84
5300.0	-0.67	3.44	10.15	1.83	12.92	14.75
5320.0	-0.92	3.47	10.15	1.83	12.70	14.53
5500.0	-1.26	3.62	10.16	1.83	12.52	14.35
5580.0	-1.86	3.56	10.16	1.83	11.86	13.69
5700.0	-1.32	3.57	10.15	1.83	12.40	14.23

Antenna 2

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	-1.48	3.56	10.00	2.33	12.08	14.41
5220.0	-1.41	3.49	10.00	2.33	12.08	14.41
5240.0	-1.38	3.49	10.00	2.33	12.11	14.44
5260.0	-1.75	3.54	9.99	2.33	11.78	14.11
5300.0	-1.10	3.51	9.99	2.33	12.40	14.73
5320.0	-1.38	3.51	9.99	2.33	12.12	14.45
5500.0	-0.67	3.67	9.99	2.33	12.99	15.32
5580.0	-1.31	3.61	9.99	2.33	12.29	14.62
5700.0	-0.70	3.60	9.99	2.33	12.89	15.22

Result(Cond.) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss

Result(e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss + Antenna Gain

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11n 40MHz BW MIMO MCS8 ShortGI

Antenna 1+2

Freq.	Result (Cond.)	Result (e.i.r.p.)
[MHz]	[dBm]	[dBm]
5190.0	11.68	13.77
5230.0	15.80	17.88
5270.0	15.77	17.86
5310.0	12.13	14.20
5510.0	14.28	16.39
5550.0	14.91	17.01
5670.0	14.85	16.94

Result [dBm] = 10 x log (10 ^ (Ant1 Result [dBm] / 10) + 10 ^ (Ant2 Result [dBm] / 10) + 10 ^ (Ant3 Result [dBm] / 10))

Antenna 1

Freq.	S/A Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (Cond.)	Result (e.i.r.p.)
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]
5190.0	-5.02	3.50	10.14	1.83	8.62	10.45
5230.0	-0.77	3.42	10.15	1.83	12.80	14.63
5270.0	-0.94	3.50	10.15	1.83	12.71	14.54
5310.0	-4.18	3.44	10.15	1.83	9.41	11.24
5510.0	-2.87	3.62	10.16	1.83	10.91	12.74
5550.0	-2.14	3.54	10.16	1.83	11.56	13.39
5670.0	-1.88	3.56	10.15	1.83	11.83	13.66

Antenna 2

Freq.	S/A Reading	Cable Loss	Atten. Loss	Antenna Gain	Result (Cond.)	Result (e.i.r.p.)
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]
5190.0	-4.82	3.53	10.00	2.33	8.71	11.04
5230.0	-0.71	3.48	10.00	2.33	12.77	15.10
5270.0	-0.73	3.55	9.99	2.33	12.81	15.14
5310.0	-4.68	3.49	9.99	2.33	8.80	11.13
5510.0	-2.07	3.68	9.99	2.33	11.60	13.93
5550.0	-1.37	3.59	9.99	2.33	12.21	14.54
5670.0	-1.74	3.60	9.99	2.33	11.85	14.18

Result(Cond.) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss

Result(e.i.r.p.) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss + Antenna Gain

5.4 Confirmation after SAR testing

It was checked that the power drift [W] is within +/-5%. The verification of power drift during the SAR test is that DASY5 system calculates the power drift by measuring the E-field at the same location at beginning and the end of the scan measurement for each test position.

DASY5 system calculation Power drift value[dB] = $20\log(E_a)/(E_b)$
Before SAR testing : E_b [V/m]
After SAR testing : E_a [V/m]

Limit of power drift[W] = +/-5%
 $X[\text{dB}] = 10\log[P] = 10\log(1.05/1) = 10\log(1.05) - 10\log(1) = 0.212\text{dB}$

from E-field relations with power.

$$p = E^2/\eta = E^2/377$$

Therefore, The correlation of power and the E-field

$$X_{\text{dB}} = 10\log(P) = 10\log(E^2) = 20\log(E)$$

Therefore,

The calculated power drift of DASY5 System must be the less than +/-0.212dB.

SECTION6 : Description of the Body setup

6.1 Description of the Body setup

i) Procedure for SAR testing

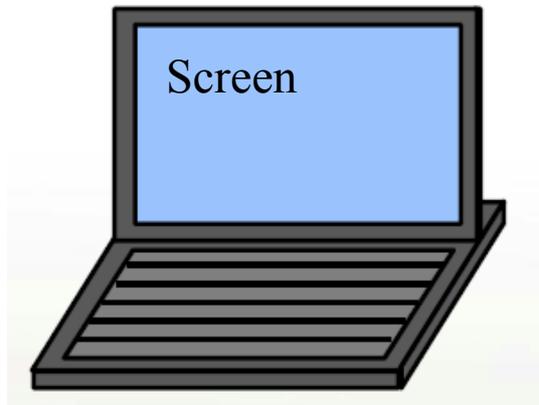
-The tested procedure was performed according to the KDB 447498 D01 (Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies)

ii) Test mode

WLAN 2.4G	Data transmission mode (11b/g/n)
WLAN 5G	Data transmission mode (11a/n)

The Body exposure configuration has two styles for “Laptop” and “Tablet” since this EUT has displays of sliding type.

6.2 Laptop

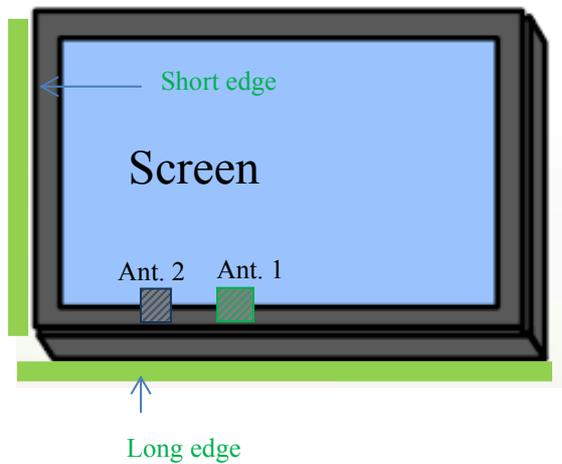


i) Test position

(1) Lap top Bottom :

The test was performed in touch with bottom surface of the EUT (Laptop style) to the flat phantom.

6.3 Tablet



<Antenna position>

The antennas use for WLAN and Bluetooth are both separate in a single fixed position. The antennas are integral part of the device

<Test position>

Test position is required to the edge within 5cm from antenna, according to the KDB 447498 D01

Device dimensions (HxWxD):309.7x198.8x17.85

Ant1: WLAN Main antenna

Ant2: WLAN Sub and Bluetooth antenna

i) Test position

(1) Tablet Rear :

The test was performed in touch with rear surface of the EUT (Tablet style) to the flat phantom.

(2) Tablet Long edge :

The test was performed in touch with long edge of the EUT (Tablet style) to the flat phantom.

(3) Tablet Short edge :

The test was performed in touch with short edge of the EUT (Tablet style) to the flat phantom.

Refer to the Appendix 1.

SECTION 7 : Test surrounding

7.1 Measurement uncertainty

The uncertainty budget has been determined for the DASY5 measurement system according to the SPEAG documents[2] and is given in the following Table.

<WLAN 300M-3GHz>

Error Description	Uncertai value \pm	Probability distribution	divisor	(ci) lg	Standard (lg)	vi or veff
Measurement System						
Probe calibration	± 6.00	Normal	1	1	± 6.00	∞
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	0.7	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	0.7	± 3.9	∞
Boundary effects	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner	± 0.4	Rectangular	$\sqrt{3}$	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Max.SAR Eval.	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	10
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	3
Power drift	± 5.0	Rectangular	$\sqrt{3}$	1	± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	+ 0.5	Rectangular	1	0.64	+ 0.3	∞
Liquid permittivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.6	± 1.7	∞
Liquid permittivity (meas.)	- 4.6	Rectangular	1	0.6	- 2.8	∞
Combined Standard Uncertainty					± 11.124	
Expanded Uncertainty (k=2)					± 22.2	

<WLAN 3-6GHz>

Error Description	Uncertain value ±	Probability distribution	divisor	(ci) lg	Standard (1g)	vi or veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	0.7	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	0.7	± 3.9	∞
Boundary effects	± 1.0	Rectangular	√3	1	± 0.6	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	√3	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	√3	1	± 1.7	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Max.SAR Eval.	± 1.0	Rectangular	√3	1	± 0.6	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	38
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	3
Power drift	± 5.0	Rectangular	√3	1	± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.64	± 1.8	∞
Liquid conductivity (meas.)	+ 4.8	Rectangular	1	0.64	+ 3.1	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (meas.)	- 5.0	Rectangular	1	0.6	- 3.0	∞
Combined Standard Uncertainty						
					± 11.890	
Expanded Uncertainty (k=2)						
					± 23.8	

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SECTION 8 : Measurement results**8.1 WLAN Body SAR (2.4G)****(1)Method of measurement**

Step.1 The searching for the worst position

The test was performed in mode of the maximum average output power

Step.2 The searching for the worst transmitter mode.

The other mode was performed at the worst position of Step.1.

Step.3 11n MIMO mode

The test was performed in mode of the maximum average output power

Note:

1)The other channel was not required since maximum average output power channel SAR value is less than 0.8W/kg.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
19-Aug	24.5	50	MSL 2450	24.0	2450	ϵ_r	52.7	50.3	-4.6	+/-5
						σ [mho/m]	1.95	1.96	0.5	+/-5
20-Aug	24.5	54	MSL 2450	24.0	2450	ϵ_r	52.7	50.4	-4.4	+/-5
						σ [mho/m]	1.95	1.96	0.5	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of Body SAR

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
6	2437	11n 20M MCS0	Flat	Ant.1	Lap top	Bottom	0	0.00292
6	2437	11n 20M MCS0	Flat	Ant.1	Tablet	Rear	0	0.042
6	2437	11n 20M MCS0	Flat	Ant.1	Tablet	Long edge	0	0.356
6	2437	11n 20M MCS0	Flat	Ant.1	Tablet	Short edge	0	0.00514
Step.2 Mode change								
6	2437	11b 1Mbps	Flat	Ant.1	Fixed	Long edge	0	0.422

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BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
6	2437	11n 20M MCS0	Flat	Ant.2	Lap top	Bottom	0	0.00745
6	2437	11n 20M MCS0	Flat	Ant.2	Tablet	Rear	0	0.012
6	2437	11n 20M MCS0	Flat	Ant.2	Tablet	Long edge	0	0.040
6	2437	11n 20M MCS0	Flat	Ant.2	Tablet	Short edge	0	0.00408
Step.2 Mode change								
6	2437	11b 1Mbps	Flat	Ant.2	Fixed	Long edge	0	0.033

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step3. 11n MIMO mode								
6	2437	11n 20M MCS8	Flat	Ant.1+2	Tablet	Long edge	0	0.171

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8.2 WLAN Body SAR (5G)

(1) Method of measurement

- Step.1 The searching for the worst position
The test was performed in mode of the maximum average output power
- Step.2 The changing to the channels (Low, Mid, High)
The test was performed at the worst condition of Step1.
- Step.3 11n MIMO mode
The test was performed in mode of the maximum average output power
- Step.4 The changing to the channels in 11n MIMO mode (Low, Mid, High)
The test was performed at the worst condition of Step1.

Note:

2) For 5180-5320MHz band & 5500-5700MHz band, the other channel was not required since maximum average output power channel SAR value is less than 0.4W/kg.

3) For 5745-5825MHz band, the other channel was not required since maximum average output power channel SAR value is less than 0.8W/kg.

(2) Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
8-Aug	24.5	53	MSL 3-6GHz	24.0	5200	ϵ_r	49.0	46.9	-4.3	+/-5
						σ [mho/m]	5.30	5.47	3.3	+/-5
8-Aug	24.5	53	MSL 3-6GHz	24.0	5300	ϵ_r	48.9	46.6	-4.6	+/-5
						σ [mho/m]	5.42	5.61	3.5	+/-5
16-Aug	24.5	50	MSL 3-6GHz	24.0	5500	ϵ_r	48.6	46.6	-4.1	+/-5
						σ [mho/m]	5.65	5.76	2.0	+/-5
16-Aug	24.5	48	MSL 3-6GHz	24.0	5600	ϵ_r	48.5	46.4	-4.3	+/-5
						σ [mho/m]	5.77	5.90	2.3	+/-5
16-Aug	24.5	48	MSL 3-6GHz	24.0	5700	ϵ_r	48.3	46.2	-4.4	+/-5
						σ [mho/m]	5.88	6.03	2.6	+/-5
18-Aug	24.5	52	MSL 3-6GHz	24.0	5700	ϵ_r	48.3	46.0	-4.7	+/-5
						σ [mho/m]	5.88	6.13	4.3	+/-5
18-Aug	24.5	52	MSL 3-6GHz	24.0	5800	ϵ_r	48.2	45.8	-5.0	+/-5
						σ [mho/m]	6.00	6.28	4.7	+/-5
19-Aug	24.5	50	MSL 3-6GHz	24.0	5700	ϵ_r	48.3	46.1	-4.6	+/-5
						σ [mho/m]	5.88	6.14	4.4	+/-5
19-Aug	24.5	50	MSL 3-6GHz	24.0	5800	ϵ_r	48.2	45.9	-4.9	+/-5
						σ [mho/m]	6.00	6.29	4.8	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

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(3)Result of Body SAR

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
64	5320	11a 6Mbps	Flat	Ant.1	Lap top	Bottom	0	0.00309
64	5320	11a 6Mbps	Flat	Ant.1	Tablet	Rear	0	0.056
64	5320	11a 6Mbps	Flat	Ant.1	Tablet	Long edge	0	0.360
64	5320	11a 6Mbps	Flat	Ant.1	Tablet	Short Right edge	0	0.0098

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
40	5200	11a 6Mbps	Flat	Ant.2	Lap top	Bottom	0	0.038
40	5200	11a 6Mbps	Flat	Ant.2	Tablet	Rear	0	0.00666
40	5200	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.699
40	5200	11a 6Mbps	Flat	Ant.2	Tablet	Short Right edge	0	0.037
Step.2 Channel change (If SAR level in Step.1 > 0.4 w/kg)								
48	5240	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.960
52	5260	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	1.13
64	5320	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	1.16

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.3 11n MIMO mode								
60	5300	11n 20M MCS8	Flat	Ant.1+2	Tablet	Long edge	0	0.394

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BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
108	5540	11a 6Mbps	Flat	Ant.1	Lap top	Bottom	0	0.00586
108	5540	11a 6Mbps	Flat	Ant.1	Tablet	Rear	0	0.063
108	5540	11a 6Mbps	Flat	Ant.1	Tablet	Long edge	0	0.894
108	5540	11a 6Mbps	Flat	Ant.1	Tablet	Short Right edge	0	0.019
Step.2 Channel change (If SAR level in Step.1 > 0.4 w/kg)								
116	5580	11a 6Mbps	Flat	Ant.1	Tablet	Long edge	0	0.854
128	5640	11a 6Mbps	Flat	Ant.1	Tablet	Long edge	0	0.887
132	5660	11a 6Mbps	Flat	Ant.1	Tablet	Long edge	0	0.801

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
136	5680	11a 6Mbps	Flat	Ant.2	Lap top	Bottom	0	0.098
136	5680	11a 6Mbps	Flat	Ant.2	Tablet	Rear	0	0.00591
136	5680	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.454
136	5680	11a 6Mbps	Flat	Ant.2	Tablet	Short Right edge	0	0.049
Step.2 Channel change (If SAR level in Step.1 > 0.4 w/kg)								
100	5500	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.620
112	5560	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.566
120	5600	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.460

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.3 11n MIMO mode								
100	5500	11n 20M MCS8	Flat	Ant.1+2	Tablet	Long edge	0	0.417
Step.4 Channel change (If SAR level in Step.1 > 0.4 w/kg)								
120	5600	11n 20M MCS8	Flat	Ant.1+2	Tablet	Long edge	0	0.393
128	5640	11n 20M MCS8	Flat	Ant.1+2	Tablet	Long edge	0	0.387
140	5700	11n 20M MCS8	Flat	Ant.1+2	Tablet	Long edge	0	0.238

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BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
157	5785	11a 6Mbps	Flat	Ant.1	Lap top	Bottom	0	0.00301
157	5785	11a 6Mbps	Flat	Ant.1	Tablet	Rear	0	0.014
157	5785	11a 6Mbps	Flat	Ant.1	Tablet	Long edge	0	0.384
157	5785	11a 6Mbps	Flat	Ant.1	Tablet	Short Right edge	0	0.0071

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching								
149	5745	11a 6Mbps	Flat	Ant.2	Lap top	Bottom	0	0.025
149	5745	11a 6Mbps	Flat	Ant.2	Tablet	Rear	0	0.013
149	5745	11a 6Mbps	Flat	Ant.2	Tablet	Long edge	0	0.318
149	5745	11a 6Mbps	Flat	Ant.2	Tablet	Short Right edge	0	0.038

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Style	Position	Separation [mm]	Maximum value of multi-peak
Step.3 11n MIMO mode								
161	5805	11n 20M MCS8	Flat	Ant.1+2	Tablet	Main Worst	0	0.191

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SECTION 9 Test instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	Power measurement	2012/02/06 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	Power measurement	2012/06/01 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	Power measurement	2012/06/01 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	Power measurement	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	Power measurement	2011/09/13 * 12
MAT-20	Attenuator(10dB)(above1 GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	Power measurement	2012/01/12 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	Power measurement	2012/03/27 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	Power measurement	2011/10/28 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	Power measurement	2012/03/27 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	Power measurement	2012/02/06 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	Power measurement	2011/11/23 * 12
MPM-01	Power Meter	Agilent	E4417A	GB41290639	SAR	2012/03/05 * 12
MPSE-01	Power Sensor	Agilent	E9300B	US40010300	SAR	2012/02/29 * 12
MPSE-03	Power sensor	Agilent	E9327A	US40440576	SAR	2012/03/07 * 12
MAT-15	Attenuator(30dB)	Agilent	8498A	US40010300	SAR	2012/03/15 * 12
MSG-10	Signal Generator	Agilent	N5181A	MY47421098	SAR	2011/09/22 * 12
MRFA-08	Pre Amplifier	TSJ	TCBP0206	-	SAR	2012/03/22 * 12
MHDC-12	Dual Directional Coupler	Hewlett Packard	772D	2839A0016	SAR	Pre Check
MNA-01	Network Analyzer	Agilent/HP	E8358A	US41080381	SAR	2011/08/22 * 12
MDPK-01	Dielectric probe kit	Agilent	85070D	702	SAR	2010/10/25 * 36
MNCK-01	Type N Calibration Kit	Agilent	85032F	MY41495257	SAR	2011/08/12 * 12
MPB-07	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	3825	SAR	2011/12/16 * 12
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE4	509	SAR	2012/07/13 * 12
COTS-MSAR-03	Dasy5	Schmid&Partner Engineering AG	DASY52.6.1.408	-	SAR	-
COTS-MSAR-02	S-Parameter Network Analyzer	Agilent	-	-	SAR	-
MDA-07	Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	713	SAR	2010/09/13 * 36
MDA-08	Dipole Antenna	Schmid&Partner Engineering AG	D5GHzV2	1020	SAR	2011/08/23 * 24
MPF-02	2mmOval Flat Phantom ERI 4.0	Schmid&Partner Engineering AG	QD VA 001B (ERI4.0)	1045	SAR	2012/05/08 * 12
MOS-26	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q29	SAR	2012/05/14 * 12
MOS-10	Digital thermometer	HANNA	Checktemp-2	MOS-10	SAR	2012/08/06 * 12
MBM-13	Barometer	Sunoh	SBR121	837	SAR	2011/03/14 * 36
MSL2450MHz					Daily check	Target value ± 5%
MSL5GHz					Daily check	Target value ± 5%
SAR room					Daily check	Ambient Noise<0.012W/kg

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

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