

TEST REPORT For FCC

FCC Standards : FCC 47CFR part 15 subpart C

Test Report No. : CTK-2017-00790
Date of Issue : 2017-04-29
FCC ID : 2ALVHS07
Model/Type No. : S07
Kind of Product : Android Module
Applicant : CLABSYS Co., Ltd.
Applicant Address : A-Dong, 2floor., 895-20, Sicheong-ro, Platan-myeon,
Hwaseong-si, Gyeonggi-do, Republic of Korea
Manufacturer : CLABSYS Co., Ltd.
Manufacturer Address : A-Dong, 2floor., 895-20, Sicheong-ro, Platan-myeon,
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Contact Person : Hakbum LEE
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Received Date : 2017-04-07
Test period : Start : 2017-04-10 End : 2017-04-28

The test results presented in this report relate only to the object tested.

Tested by



Ji-Hye, Kim
Test Engineer
Date: 2017-04-29

Reviewed by



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Technical Manager
Date: 2017-04-29

REPORT REVISION HISTORY

Date	Revision	Page No
2017-04-29	Issued (CTK-2017-00790)	All

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1.0 General Product Description

Equipment model name	SO7																
Serial number	Prototype																
EUT condition	Pre-production, not damaged																
Frequency Range	802.11b/g/n_HT20 : 2412 MHz - 2462 MHz																
RF output power :																	
<table><tr><td>Frequency Range (MHz)</td><td>Mode</td><td>Channel Bandwidth (MHz)</td><td>RF output power (dBm)</td></tr><tr><td rowspan="3">2412 - 2462</td><td>802.11b</td><td>20</td><td>11.50</td></tr><tr><td>802.11g</td><td>20</td><td>14.73</td></tr><tr><td>802.11n</td><td>20</td><td>14.29</td></tr></table>				Frequency Range (MHz)	Mode	Channel Bandwidth (MHz)	RF output power (dBm)	2412 - 2462	802.11b	20	11.50	802.11g	20	14.73	802.11n	20	14.29
Frequency Range (MHz)	Mode	Channel Bandwidth (MHz)	RF output power (dBm)														
2412 - 2462	802.11b	20	11.50														
	802.11g	20	14.73														
	802.11n	20	14.29														
Number of channels	11																
Transfer Rate	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n : up to 72.2 Mbps																
Type of Modulation	802.11b : DSSS 802.11g/n : OFDM																
Power Source	DC 12 V																
Duty Cycle	802.11b : 99.2 % 802.11g : 94.1 % 802.11n_HT20 : 94.1 %																
Antenna Type	PCB antenna																
Antenna Gain	2 dBi																
Hardware Rev	V0.3																
Software Rev	android-6.0.1																
Firmware Rev	r2																

1.1 Test mode

Test Item	Modulation	Data Rate
6 dB Bandwidth Maximum Output Power Conducted Spurious emission Band Edge Power Spectral Density Radiated Emissions Above 1GHz	802.11b	1 Mbps
	802.11g	6 Mbps
	802.11n	MCS 0
Radiated Emissions Below 1GHz AC Conducted Emissions	Nomal Mode	Auto

1.2 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

1.3 Tested Frequency

802.11b, 802.11g, 802.11n HT20

	LOW	MID	HIGH
Frequency (MHz)	2412	2437	2462

1.4 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.5 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	HP	ProBook 650 G1	5CG5114KD2
AC ADAPTER	HP	PPP012D-S	-
AC / DC ADAPTER	Shenzhen Simsukian Electronics Technology CO., LTD	SK02T-1200100K	-

1.6 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.7 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.8 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
USA	FCC	FCC Part 15 & 18 EMI (Electromagnetic Interference / Emission)	805871	
CANADA	IC	IC EMI (3/10m test site)	8737A-2	
JAPAN	VCCI	VCCI V-3 EMI (Electromagnetic Interference / Emission)	C-986 T-1843 R-3627 G-387	
KOREA	MSIP	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	KR0025	

2.0 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Maximum Output Power	< 1 Watt		C
15.247(d)	Conducted Spurious emission	> 30 dBc		C
15.247(d)	Band Edge	> 30 dBc		C
15.247(e)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C
				C
15.209	Field Strength of Harmonics	15.209(a)	Radiated	C
15.207	AC Conducted Emissions	15.207(a)	Line Conducted	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

- FCC Part 15.247, ANSI C63.10-2013

The tests were performed according to the method of measurements prescribed in

KDB No.558074

2.1 Technical Characteristic Test

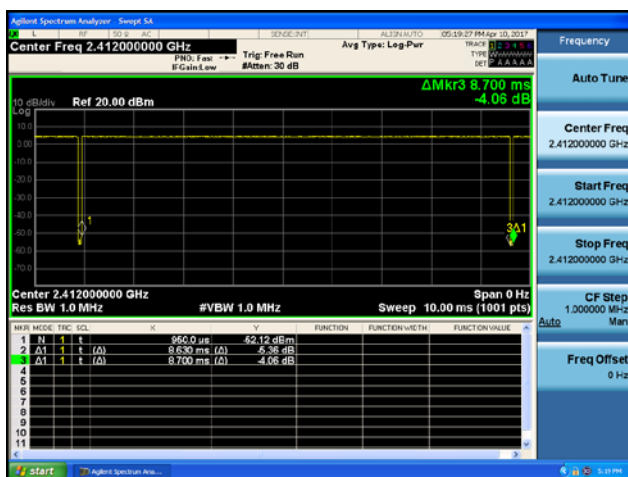
2.1.1 ON Time, Duty Cycle

Procedure:

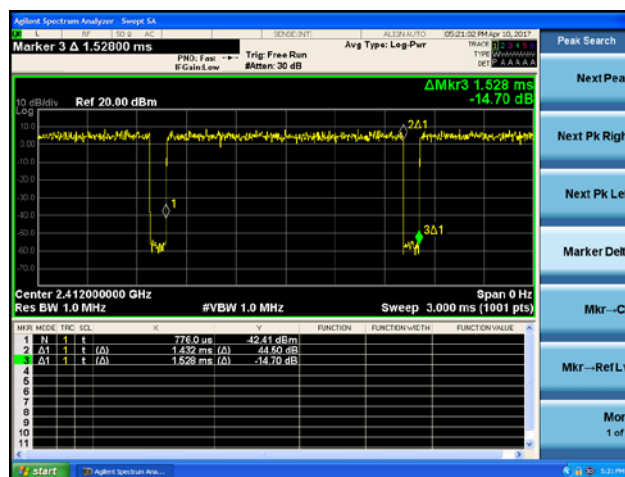
KDB 558074 Zero-Span Spectrum Analyzer Method.

Test Data:

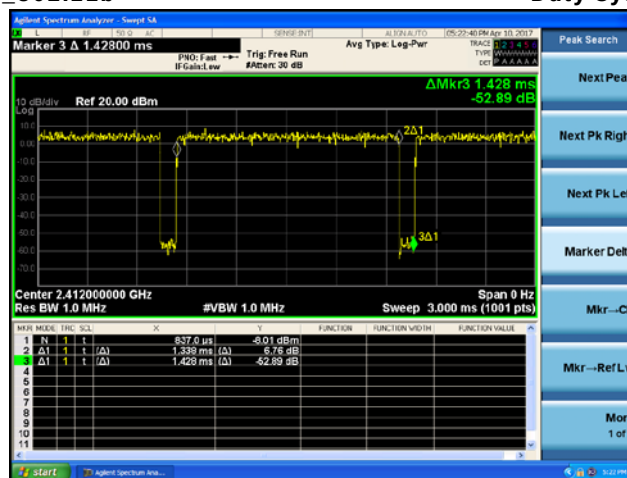
	ON Time (ms)	Period (ms)	TX OFF (ms)	Duty Cycle (linear)	Duty Cycle (%)
802.11b	8.630	8.700	0.070	0.992	99.2
802.11g	1.432	1.528	0.096	0.941	94.1
802.11n_HT20	1.338	1.428	0.090	0.941	94.1



Duty Cycle_802.11b



Duty Cycle_802.11g



Duty Cycle_802.11n_HT20

2.1.2 6dB Bandwidth

Test Procedures(ANSI C63.10-2013 6.9.2)

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Procedures(ANSI C63.10-2013 6.9.3)

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

Test Settings :

Center frequency = the highest, middle and the lowest channels

a) RBW = 100 kHz

b) VBW $\geq 3 \times$ RBW

c) Detector = peak

d) Trace mode = Max hold

e) Sweep = auto couple

f) Allow trace to fully stabilize

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

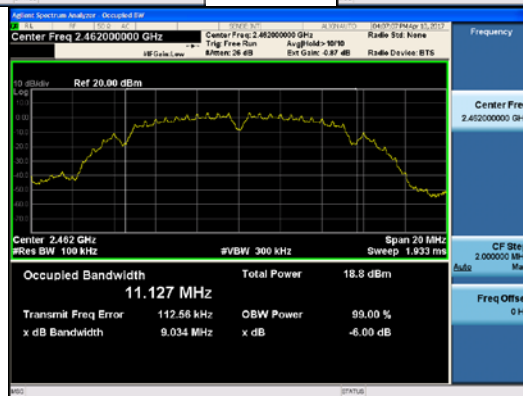
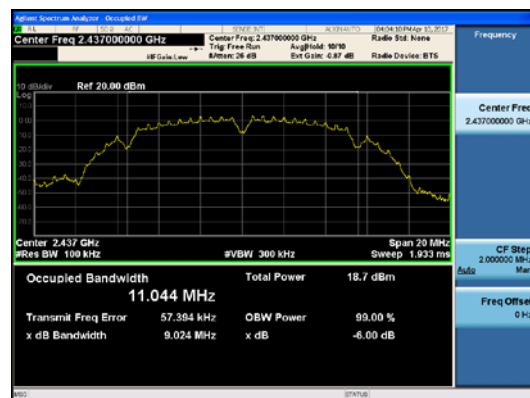
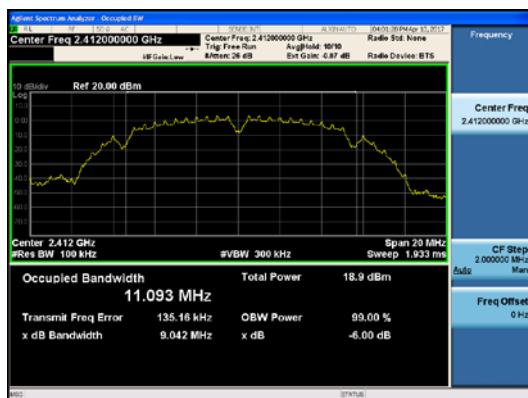
Minimum Standard:

6 dB Bandwidth > 500kHz

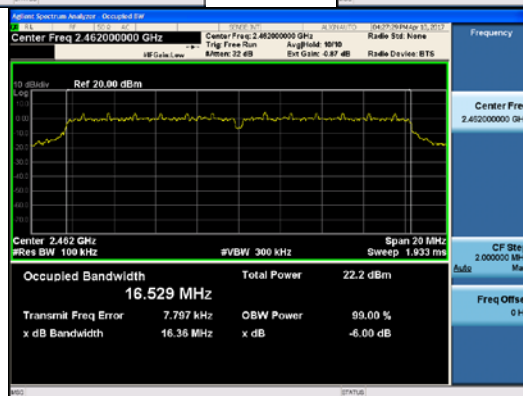
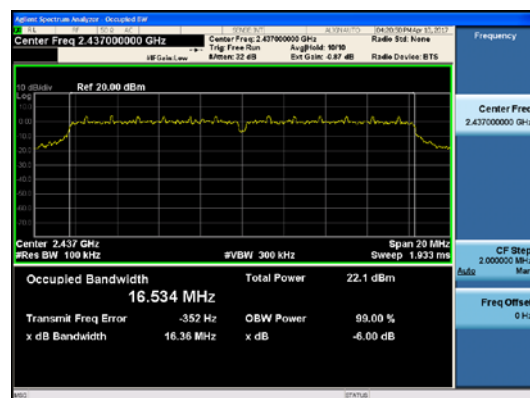
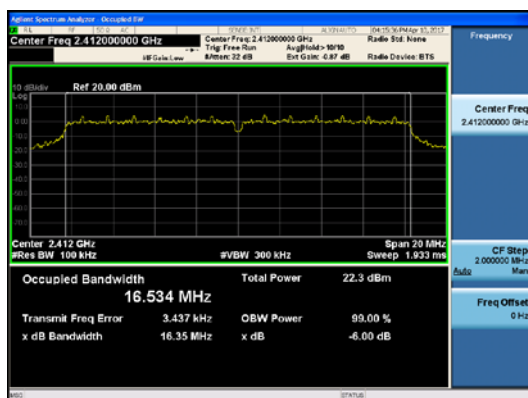
Test Data:

	6 dB Bandwidth and 99% Bandwidth (MHz)					
Frequency	2412 MHz		2437 MHz		2462 MHz	
Mode	6dB	99%	6dB	99%	6dB	99%
802.11b	9.04	11.09	9.02	11.04	9.03	11.13
802.11g	16.35	16.53	16.36	16.53	16.36	16.53
802.11n HT20	17.57	17.70	17.61	17.72	17.58	17.69
Measurement uncertainty	± 3 dB					

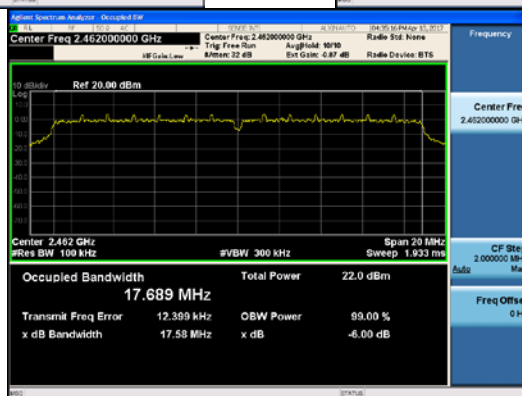
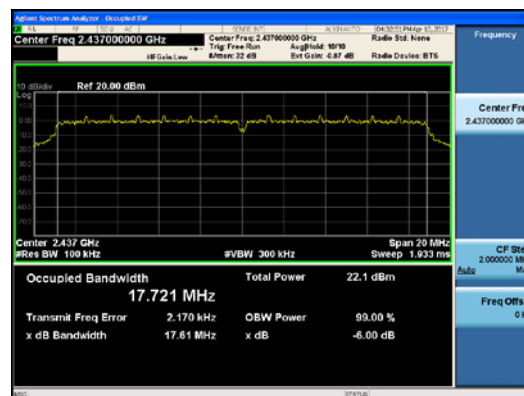
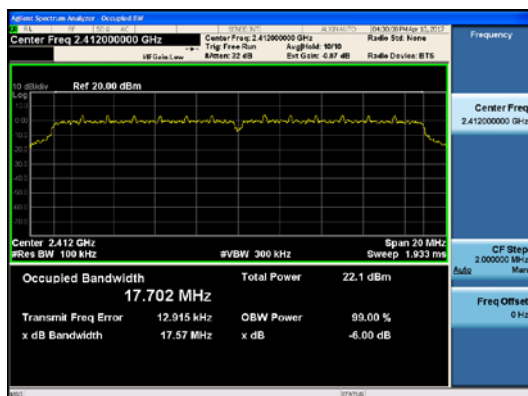
See next pages for actual measured spectrum plots.



802.11b



802.11g



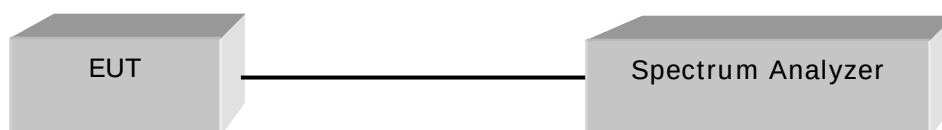
802.11n

2.1.3 OUTPUT POWER

Test Procedures

Average Power(Procedure 9.2.2.2 in KDB 558074, Method AVGSA-1)

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



Test Settings:

Center frequency = the highest, middle and the lowest channels

- | | |
|--------------------------------------|-------------------------|
| a) span $\geq 1.5 \times \text{OBW}$ | b) RBW = 1 MHz |
| c) VBW $\geq 3 \times \text{RBW}$ | d) Sweep time = auto |
| e) Detector = RMS | f) average at least 100 |

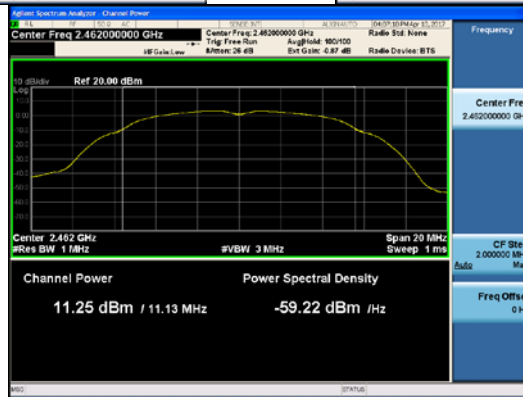
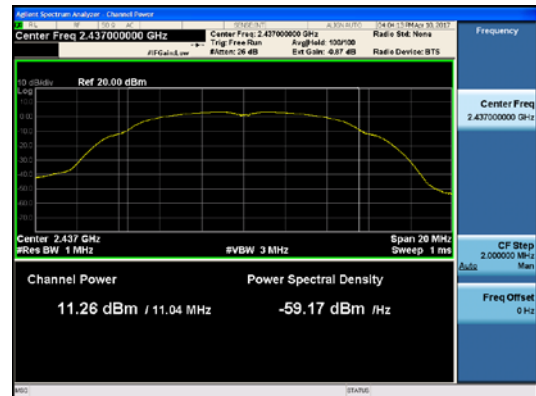
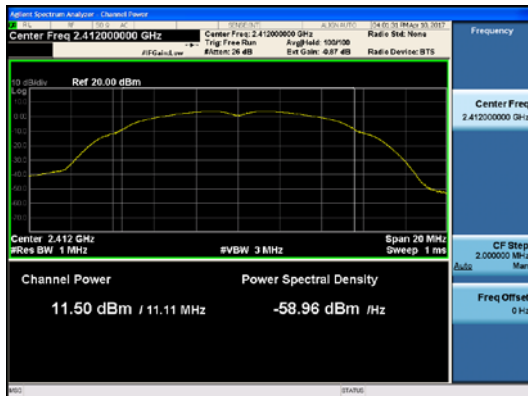
Limit

Mode	ANT Gain (dBi)	Limit (dBm)
802.11b	2	30
802.11g		30
802.11n_HT20		30

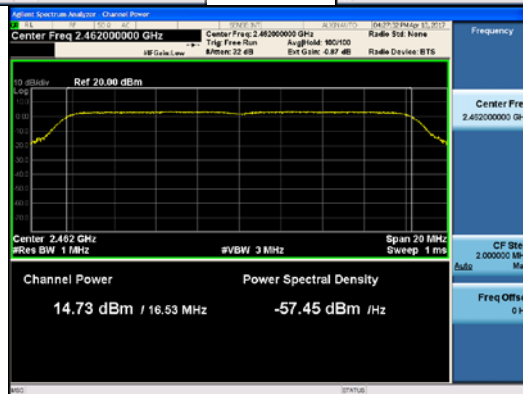
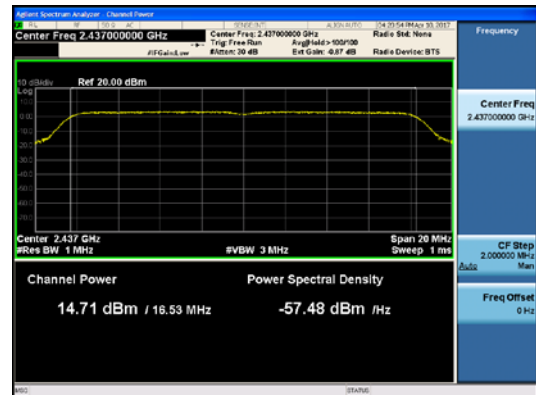
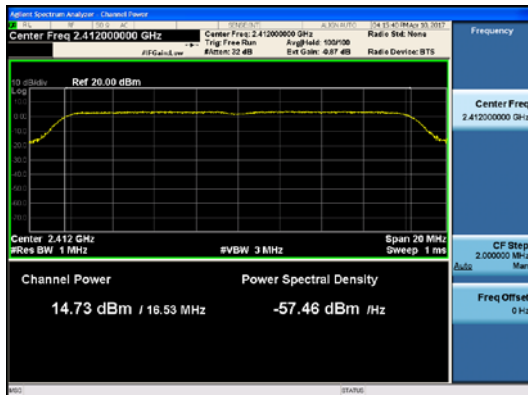
Test Data

	Measured Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	11.50	11.26	11.25
802.11g	14.73	14.71	14.73
802.11n_HT20	14.26	14.22	14.29
Measurement uncertainty	± 3 dB		

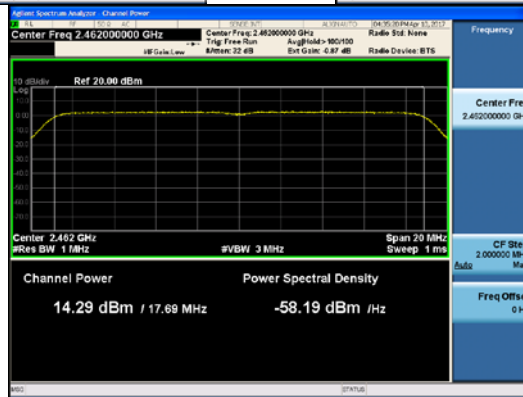
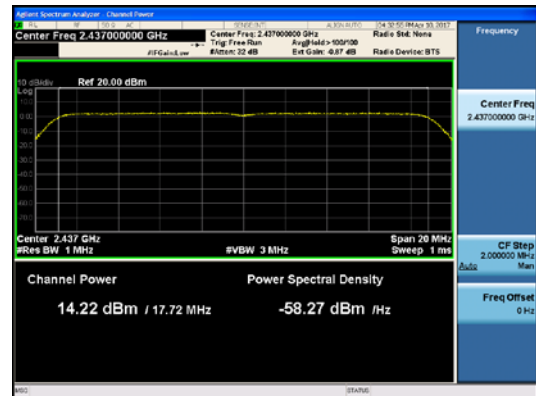
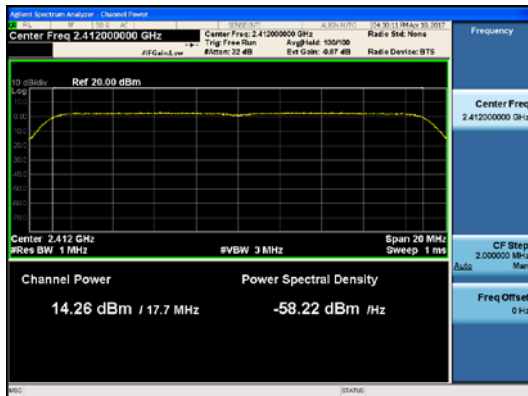
See next pages for actual measured spectrum plots.



A1_802.11b



802.11g



802.11n

2.1.4 Power Spectral Density

Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Test Settings:

Center frequency = the highest, middle and the lowest channels

- a) RBW : $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
- b) VBW $\geq 3 \times \text{RBW}$
- c) span $\geq 1.5 \times \text{DTS bandwidth}$
- d) Sweep time = auto couple
- e) Detector = peak
- f) Trace mode = max hold
- g) Allow trace to fully stabilize
- h) Use the peak marker function to determine the maximum amplitude level within the RBW.

Limit

Mode	ANT Gain (dBi)	Limit (dBm)
802.11b	2	8
802.11g		8
802.11n_HT20		8

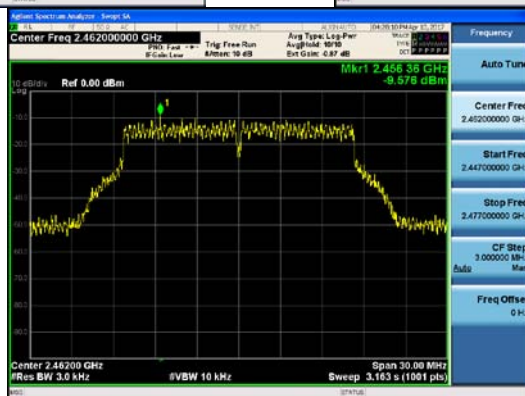
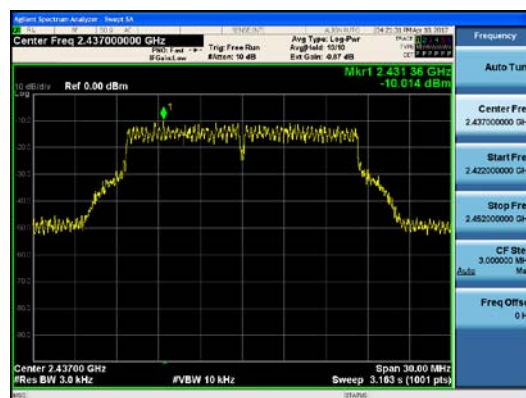
Test Data

Mode	Measured Power Density (dBm)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	-9.597	-11.165	-10.419
802.11g	-9.705	-10.014	-9.576
802.11n_HT20	-10.347	-10.956	-10.665
Measurement uncertainty	± 3 dB		

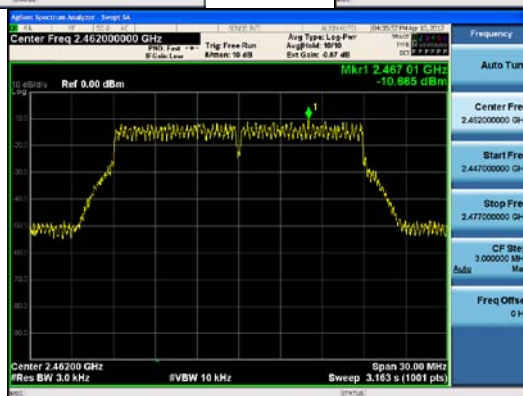
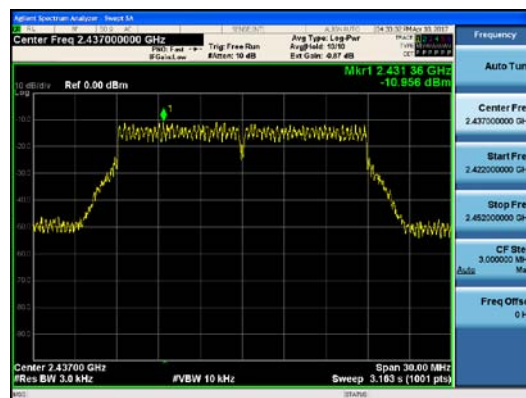
See next pages for actual measured spectrum plots.



802.11b



802.11g



802.11n

2.1.5 Band - edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

Test Settings:

Center frequency = the highest, middle and the lowest channels

- a) RBW = 100 kHz
- b) VBW $\geq 3 \times$ RBW
- c) Detector = peak
- d) Sweep time = auto couple
- e) Trace mode = max hold
- f) Allow trace to fully stabilize
- g) Use the peak marker function to determine the maximum amplitude level.

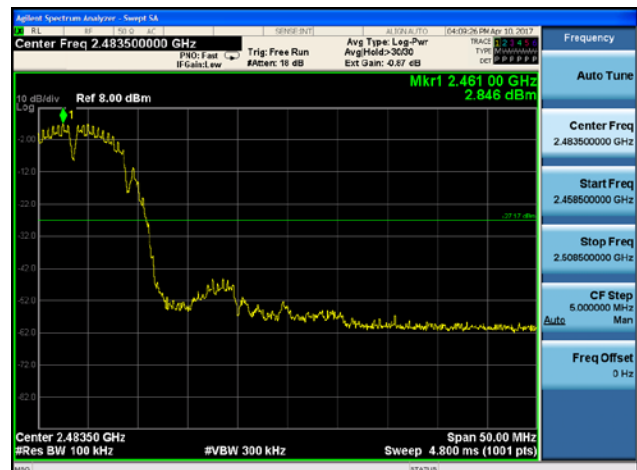
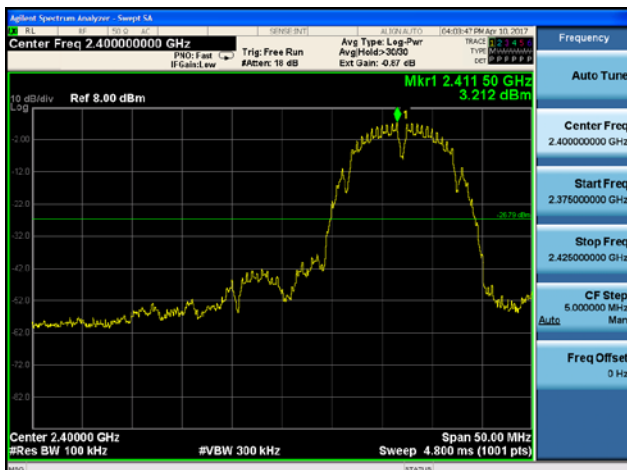
Limit :

Emission level < 30 dBc

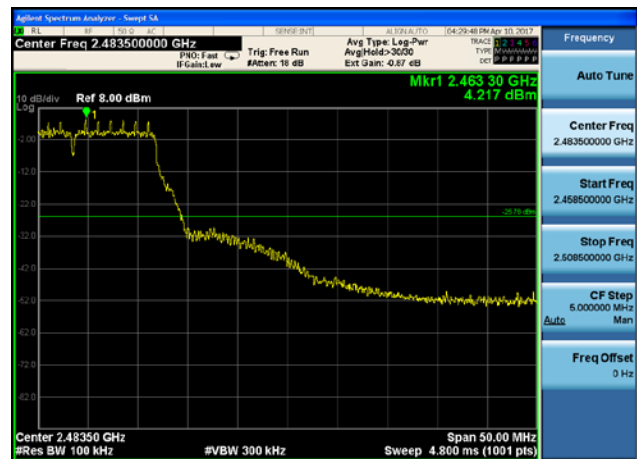
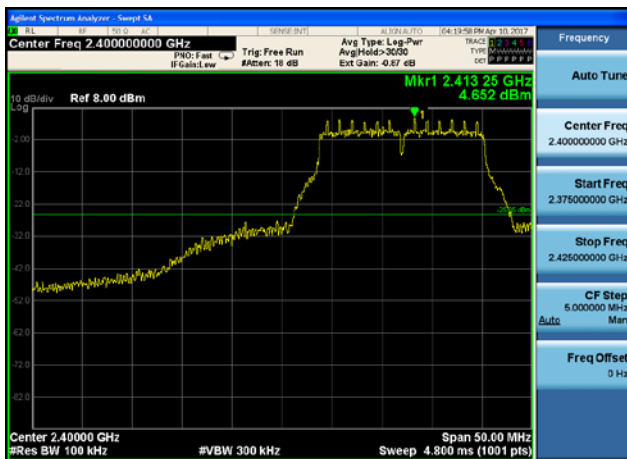
Test Data: Complies

- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 30dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.

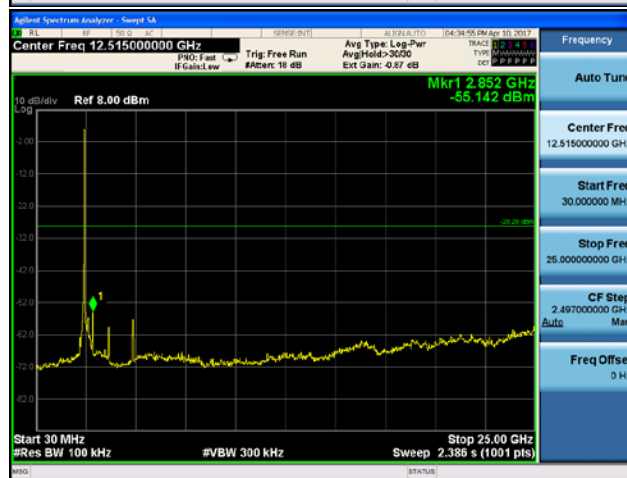
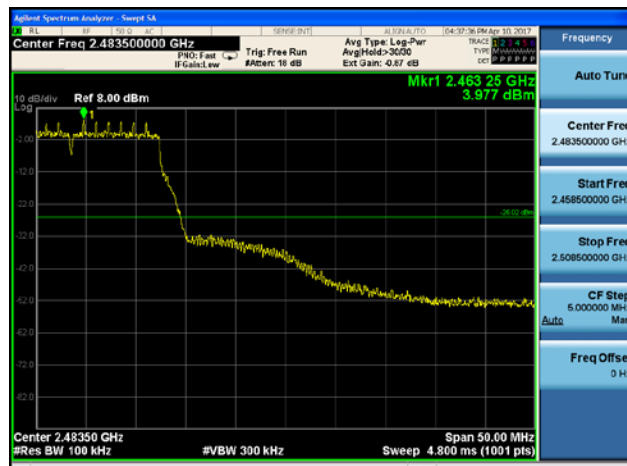
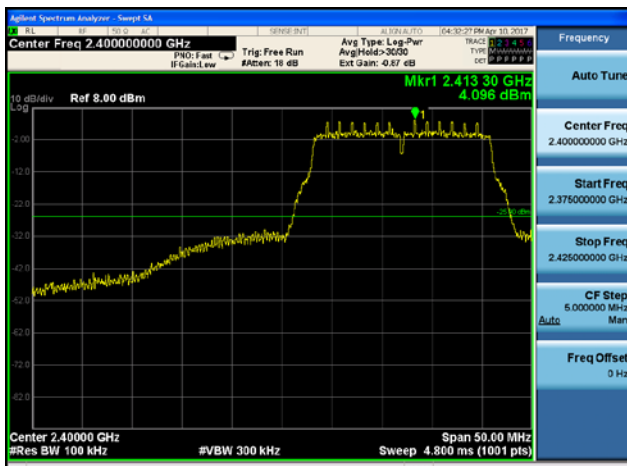
See next pages for actual measured spectrum plots.



802.11b



802.11g



802.11n

2.1.6 Field Strength of Emissions

Test Location

- ☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- 2) In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

Test Settings:

Frequency Range = 9 kHz ~ 25 GHz (2.4 GHz 10th harmonic)

- a) RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, 9 kHz for $f < 30$ MHz
- b) VBW $\geq$ RBW
- c) Sweep time = auto couple

Limit

- 15.209(a)

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

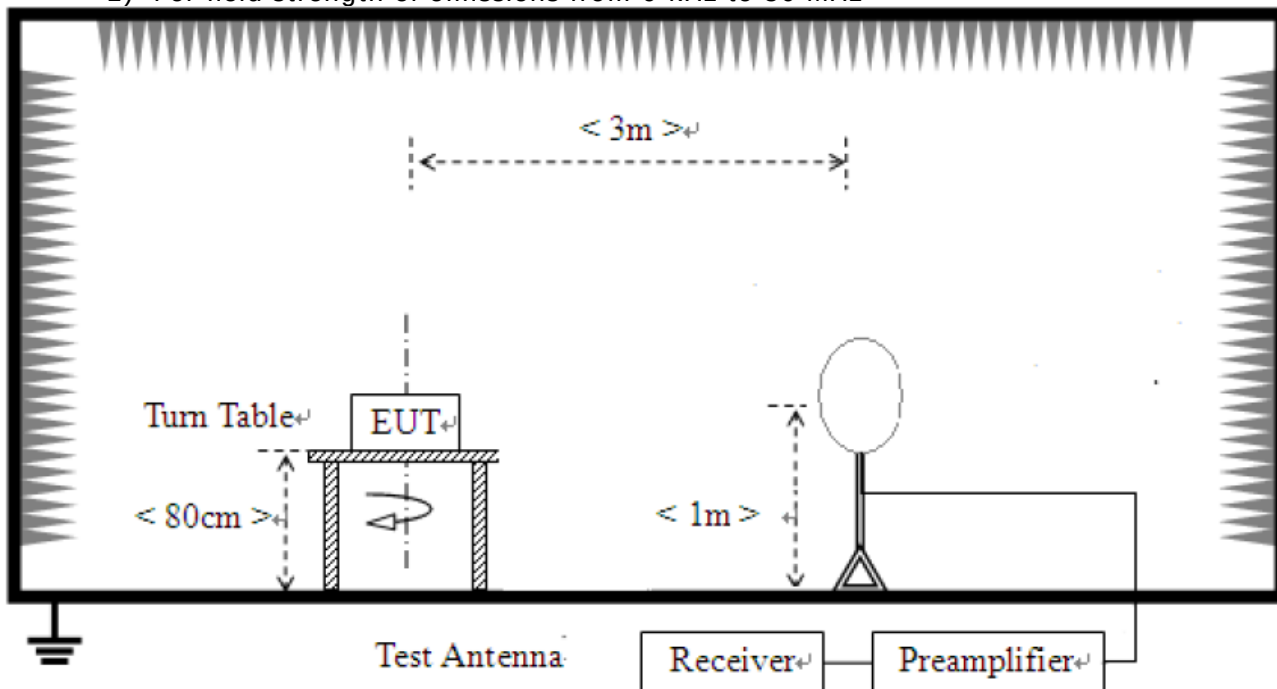
** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note :

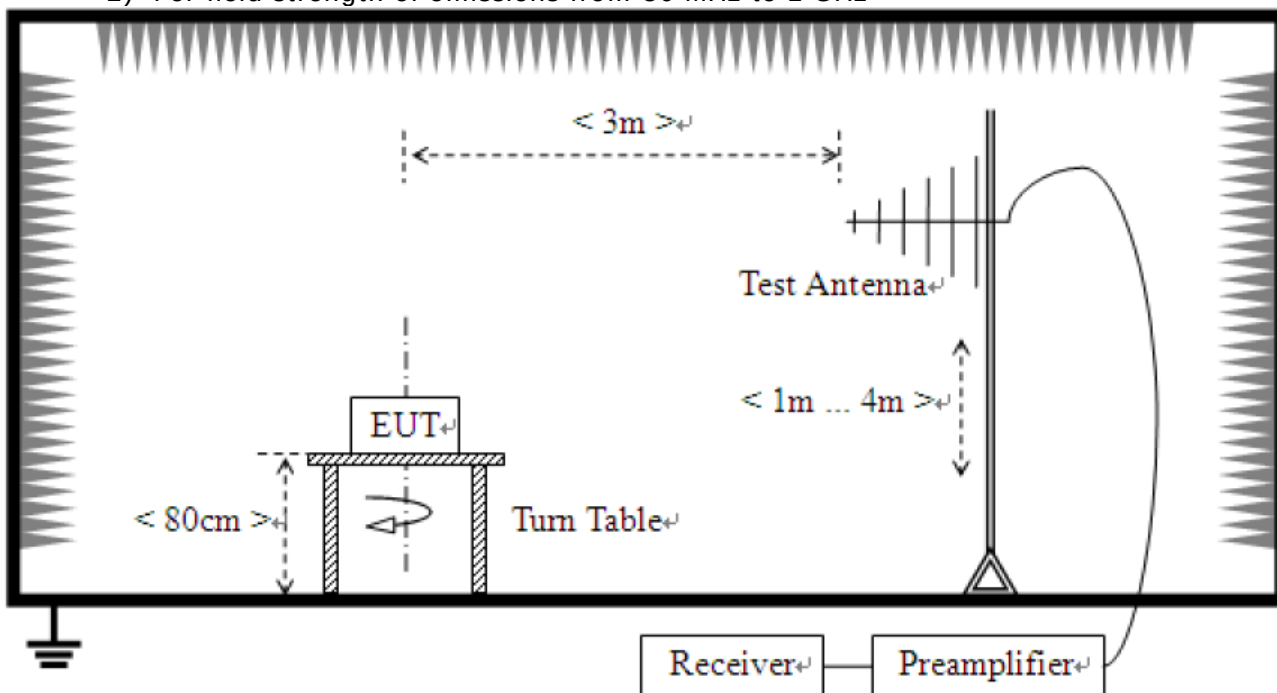
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- 2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)

Test Setup:

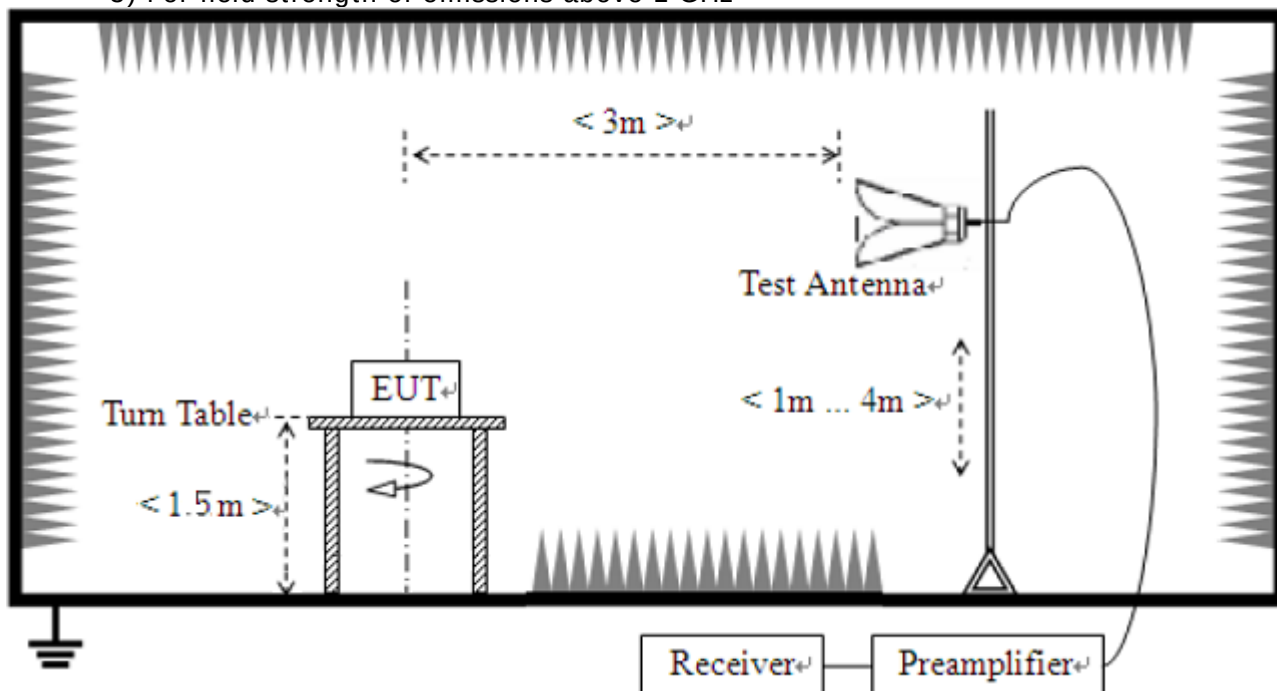
- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



Test Results

1) 9 kHz to 30 MHz

EUT	Android Module	Measurement Detail	
Model	SO7	Frequency Range	9 kHz – 30 MHz
Test mode	802.11b, 802.11g, 802.11n	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
-	-	-	See note

Note :

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)

2) 30 MHz to 1 GHz

Test mode : 802.11n(Worst Case)

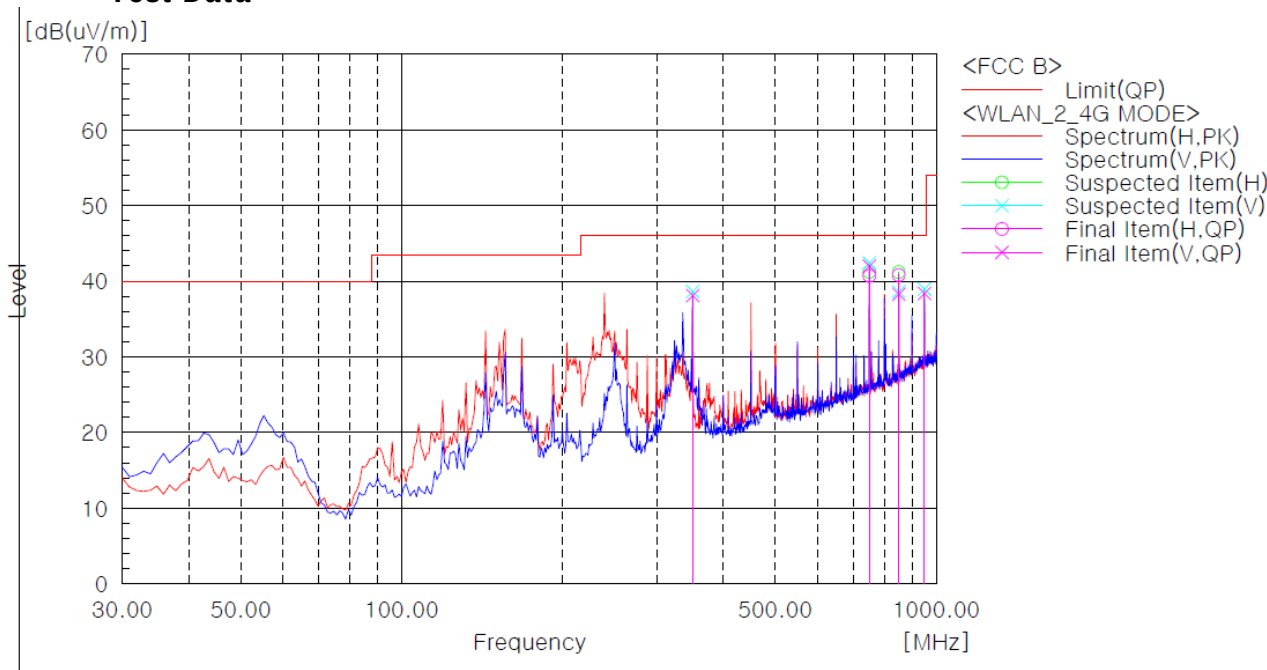
EUT	Android Module	Measurement Detail	
Model	SO7	Frequency Range	Below 1000MHz
Configuration	802.11n	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
749.740	42.0	4.0	Quasi-peak

Test Data



Final Result

No.	Frequency (P) [MHz]	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Angle [deg]
1	350.100	48.7	-10.6	38.1	46.0	7.9	357.3
2	749.740	46.0	-4.0	42.0	46.0	4.0	357.3
3	749.740	44.7	-4.0	40.7	46.0	5.3	295.7
4	850.620	43.2	-2.4	40.8	46.0	5.2	17.2
5	850.620	40.7	-2.4	38.3	46.0	7.7	1.4
6	950.530	38.9	-0.5	38.4	46.0	7.6	357.3

Remark :

1. The field strength of spurious emission was measured in the following position: EUT and antenna stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.

3) above 1 GHz

Test mode : 802.11b

EUT	Android Module	Measurement Detail	
Model	SO7	Frequency Range	1-25GHz
Mode	802.11b	Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
4824.00	48.81	5.19	Average

Ch.1(2412 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4824.00	H	54.00	74.00	48.81	52.32	5.19	21.68
4824.00	V	54.00	74.00	48.03	51.46	5.97	22.54
2390.00	H	54.00	74.00	32.06	47.53	21.94	26.47
2390.00	V	54.00	74.00	29.53	43.18	24.47	30.82
1050.00	H	54.00	74.00	33.91	39.80	20.09	34.20
1050.00	V	54.00	74.00	33.15	39.74	20.85	34.26
1066.00	H	54.00	74.00	37.73	41.29	16.27	32.71
1066.00	V	54.00	74.00	37.48	41.12	16.52	32.88
2132.00	H	54.00	74.00	43.22	46.84	10.78	27.16
2132.00	V	54.00	74.00	42.94	46.33	11.06	27.67
3198.00	H	54.00	74.00	39.36	45.85	14.64	28.15
3198.00	V	54.00	74.00	43.27	47.82	10.73	26.18
5330.00	H	54.00	74.00	38.93	47.95	15.07	26.05
5330.00	V	54.00	78.20	43.29	49.80	10.71	28.40

Ch.6(2437 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4874.00	H	54.00	74.00	46.73	51.63	7.27	22.37
4874.00	V	54.00	74.00	45.08	49.54	8.92	24.46
1066.00	H	54.00	74.00	37.82	41.43	16.18	32.57
1066.00	V	54.00	74.00	37.42	41.16	16.58	32.84
2132.00	H	54.00	74.00	43.01	46.80	10.99	27.20
2132.00	V	54.00	74.00	42.88	46.53	11.12	27.47
3198.00	H	54.00	74.00	39.56	45.73	14.44	28.27
3198.00	V	54.00	74.00	43.00	47.94	11.00	26.06
5330.00	H	54.00	74.00	39.01	47.61	14.99	26.39
5330.00	V	54.00	78.20	42.75	50.29	11.25	27.91

Ch.11(2462 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4924.00	H	54.00	74.00	43.99	48.52	10.01	25.48
4924.00	V	54.00	74.00	40.05	46.66	13.95	27.34
2483.50	H	54.00	74.00	39.37	53.89	14.63	20.11
2483.50	V	54.00	74.00	33.83	49.84	20.17	24.16
1066.00	H	54.00	74.00	37.98	41.40	16.02	32.60
1066.00	V	54.00	74.00	37.26	41.55	16.74	32.45
2132.00	H	54.00	74.00	43.43	46.83	10.57	27.17
2132.00	V	54.00	74.00	42.78	46.42	11.22	27.58
3198.00	H	54.00	74.00	40.41	46.61	13.59	27.39
3198.00	V	54.00	74.00	43.48	47.79	10.52	26.21
5330.00	H	54.00	74.00	39.45	47.30	14.55	26.70
5330.00	V	54.00	78.20	44.17	50.72	9.83	27.48

Test mode : 802.11g

EUT	Android Module	Measurement Detail	
Model	SO7	Frequency Range	1-25GHz
Mode	802.11g	Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2483.50	51.65	2.35	Peak

Ch.1(2412 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4824.00	H	54.00	74.00	40.44	52.02	13.56	21.98
4824.00	V	54.00	74.00	39.72	52.80	14.28	21.21
2390.00	H	54.00	74.00	46.85	62.09	7.15	11.92
2390.00	V	54.00	74.00	42.87	59.07	11.14	14.94
2483.50	H	54.00	74.00	37.39	50.08	16.61	23.92
2483.50	V	54.00	74.00	33.04	44.89	20.96	29.11
1050.00	H	54.00	74.00	34.07	40.12	19.93	33.88
1050.00	V	54.00	74.00	33.54	38.84	20.46	35.16
1066.00	H	54.00	74.00	38.30	42.05	15.70	31.95
1066.00	V	54.00	74.00	37.82	41.87	16.18	32.13
2132.00	H	54.00	74.00	42.50	46.49	11.50	27.51
2132.00	V	54.00	74.00	42.29	46.30	11.71	27.70
3198.00	H	54.00	74.00	40.01	45.70	13.99	28.30
3198.00	V	54.00	74.00	42.92	47.13	11.08	26.87
5330.00	H	54.00	74.00	39.53	47.62	14.47	26.38
5330.00	V	54.00	78.20	44.26	49.45	9.74	28.75

Ch.6(2437 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4874.00	H	54.00	74.00	39.49	50.83	14.51	23.17
4874.00	V	54.00	74.00	37.66	49.28	16.34	24.72
2390.00	H	54.00	74.00	34.38	46.85	19.62	27.15
2390.00	V	54.00	74.00	31.56	43.63	22.44	30.37
2483.50	H	54.00	74.00	41.71	53.52	12.29	20.48
2483.50	V	54.00	74.00	35.87	48.97	18.14	25.03
1050.00	H	54.00	74.00	35.60	39.80	18.40	34.20
1050.00	V	54.00	74.00	33.52	38.77	20.48	35.23
1066.00	H	54.00	74.00	38.43	41.73	15.57	32.27
1066.00	V	54.00	74.00	37.84	41.18	16.16	32.82
2132.00	H	54.00	74.00	42.39	45.98	11.61	28.02
2132.00	V	54.00	74.00	42.19	45.99	11.81	28.01
3198.00	H	54.00	74.00	39.88	45.73	14.12	28.27
3198.00	V	54.00	74.00	42.89	47.57	11.11	26.43
5330.00	H	54.00	74.00	39.53	48.37	14.47	25.63
5330.00	V	54.00	78.20	44.34	49.92	9.66	28.28

Ch.11(2462 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4924.00	H	54.00	74.00	48.70	49.50	5.30	24.50
4924.00	V	54.00	74.00	34.59	46.80	19.42	27.20
2483.50	H	54.00	74.00	51.65	67.06	2.35	6.94
2483.50	V	54.00	74.00	47.00	61.68	7.01	12.32
1050.00	H	54.00	74.00	35.42	40.01	18.58	33.99
1050.00	V	54.00	74.00	33.37	39.06	20.63	34.94
1066.00	H	54.00	74.00	38.31	41.90	15.69	32.10
1066.00	V	54.00	74.00	37.72	41.59	16.28	32.41
2132.00	H	54.00	74.00	42.70	45.69	11.30	28.31
2132.00	V	54.00	74.00	42.16	46.37	11.84	27.63
3198.00	H	54.00	74.00	39.75	45.96	14.25	28.04
3198.00	V	54.00	74.00	42.66	47.25	11.34	26.75
5330.00	H	54.00	74.00	39.45	48.56	14.55	25.44
5330.00	V	54.00	78.20	44.34	50.09	9.66	28.11

Test mode : 802.11n

EUT	Android Module	Measurement Detail	
Model	SO7	Frequency Range	1-25GHz
Mode	802.11n	Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (Z axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2483.50	53.21	0.79	Peak

Ch.1(2412 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4824.00	H	54.00	74.00	38.48	50.68	15.53	23.32
4824.00	V	54.00	74.00	38.71	51.46	15.29	22.54
2390.00	H	54.00	74.00	49.38	65.71	4.62	8.29
2390.00	V	54.00	74.00	44.94	62.52	9.06	11.48
2483.50	H	54.00	74.00	37.25	49.95	16.75	24.05
1050.00	H	54.00	74.00	34.99	39.90	19.01	34.10
1066.00	H	54.00	74.00	38.39	42.19	15.61	31.81
1066.00	V	54.00	74.00	38.40	41.74	15.60	32.26
2132.00	H	54.00	74.00	41.41	45.55	12.59	28.45
2132.00	V	54.00	74.00	43.82	47.43	10.18	26.57
3198.00	H	54.00	74.00	41.55	45.84	12.45	28.16
3198.00	V	54.00	74.00	43.36	47.44	10.64	26.56
5330.00	H	54.00	74.00	38.65	46.75	15.35	27.26
5330.00	V	54.00	78.20	42.72	48.97	11.28	29.23

Ch.6(2437 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4874.00	H	54.00	74.00	37.91	50.16	16.09	23.84
4874.00	V	54.00	74.00	36.69	48.13	17.31	25.87
2390.00	H	54.00	74.00	34.19	47.14	19.81	26.86
1050.00	H	54.00	74.00	34.95	40.35	19.05	33.65
1066.00	H	54.00	74.00	38.38	41.59	15.62	32.41
1066.00	V	54.00	74.00	38.33	42.22	15.67	31.78
2132.00	H	54.00	74.00	41.32	45.39	12.68	28.61
2132.00	V	54.00	74.00	43.81	47.07	10.19	26.93
3198.00	H	54.00	74.00	42.59	46.96	11.41	27.04
3198.00	V	54.00	74.00	43.32	47.96	10.68	26.04
5330.00	H	54.00	74.00	35.58	46.69	18.42	27.32
5330.00	V	54.00	78.20	42.85	49.06	11.15	29.14

Ch.11(2462 MHz)

Frequency [MHz]	(P)	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]
4924.00	H	54.00	74.00	36.02	46.96	17.98	27.04
4924.00	V	54.00	74.00	34.88	47.12	19.12	26.88
2483.50	H	54.00	74.00	53.21	69.54	0.79	4.46
2483.50	V	54.00	74.00	47.28	65.04	6.72	8.96
1050.00	H	54.00	74.00	34.83	39.72	19.17	34.28
1066.00	H	54.00	74.00	38.37	42.26	15.63	31.74
1066.00	V	54.00	74.00	38.32	41.92	15.68	32.08
2132.00	H	54.00	74.00	41.32	45.74	12.68	28.26
2132.00	V	54.00	74.00	43.72	47.15	10.28	26.85
3198.00	H	54.00	74.00	41.51	46.01	12.49	27.99
3198.00	V	54.00	74.00	43.25	47.72	10.75	26.28
5330.00	H	54.00	74.00	38.75	47.32	15.25	26.68
5330.00	V	54.00	78.20	42.85	48.97	11.15	29.23

2.1.7 AC Conducted Emissions

Test Location

Shielded Room

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- 15.207(a)

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

Test Results

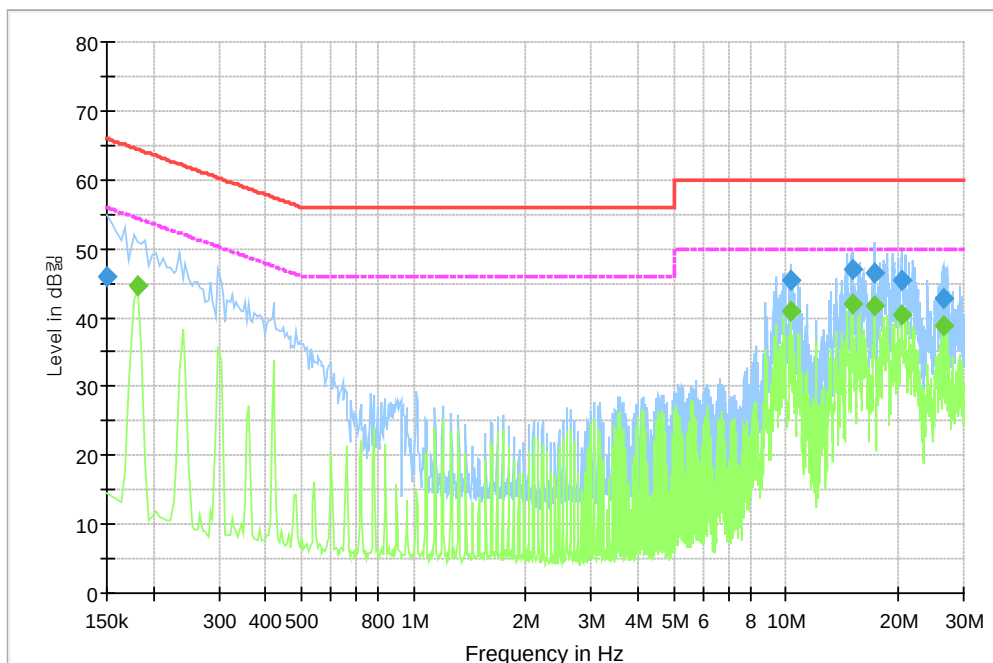
The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
15.135 000	42.4	7.6	Average

Test Data

[LINE]
3CE_Class B_L1



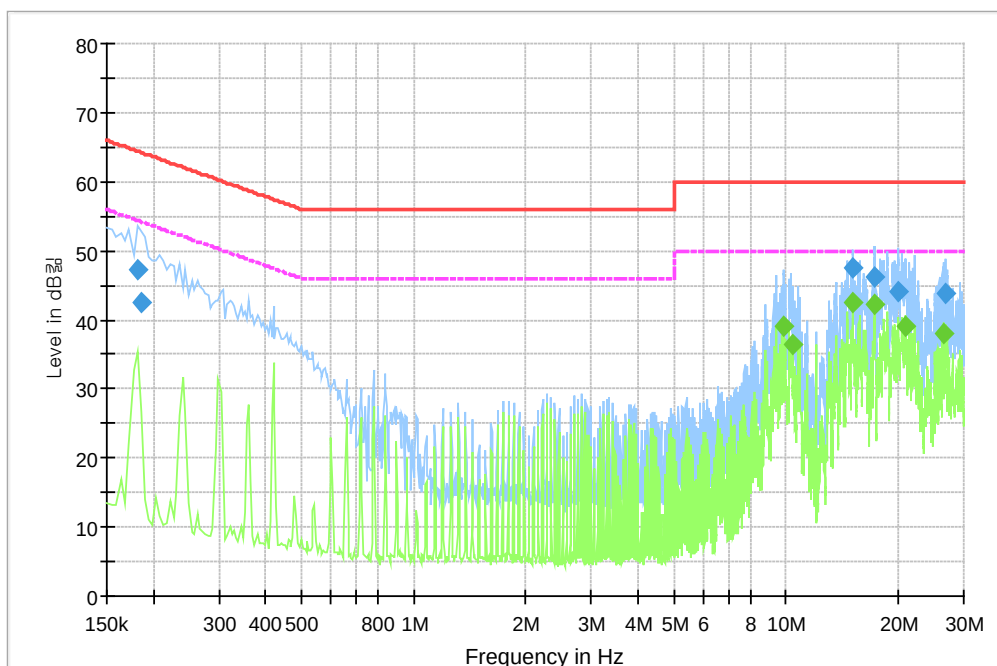
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	45.9	1000.0	9.000	On	L1	9.8	20.1	66.0
10.324500	45.3	1000.0	9.000	On	L1	10.0	14.7	60.0
15.135000	47.0	1000.0	9.000	On	L1	10.0	13.0	60.0
17.245500	46.6	1000.0	9.000	On	L1	10.1	13.4	60.0
20.409000	45.4	1000.0	9.000	On	L1	10.1	14.6	60.0
26.389500	42.9	1000.0	9.000	On	L1	10.1	17.1	60.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.181500	44.6	1000.0	9.000	On	L1	9.9	9.8	54.4
10.329000	40.8	1000.0	9.000	On	L1	10.0	9.2	50.0
15.135000	42.0	1000.0	9.000	On	L1	10.0	8.0	50.0
17.245500	41.6	1000.0	9.000	On	L1	10.1	8.4	50.0
20.413500	40.3	1000.0	9.000	On	L1	10.1	9.7	50.0
26.371500	38.9	1000.0	9.000	On	L1	10.1	11.1	50.0

[NEUTRAL]
3CE_Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.181500	47.4	1000.0	9.000	On	N	9.9	17.1	64.4
0.186000	42.4	1000.0	9.000	On	N	9.9	21.8	64.2
15.130500	47.5	1000.0	9.000	On	N	10.1	12.5	60.0
17.250000	46.3	1000.0	9.000	On	N	10.2	13.7	60.0
19.932000	44.2	1000.0	9.000	On	N	10.2	15.8	60.0
26.947500	43.8	1000.0	9.000	On	N	10.3	16.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
9.856500	39.0	1000.0	9.000	On	N	10.0	11.0	50.0
10.441500	36.5	1000.0	9.000	On	N	10.0	13.5	50.0
15.135000	42.4	1000.0	9.000	On	N	10.1	7.6	50.0
17.241000	42.2	1000.0	9.000	On	N	10.2	7.8	50.0
20.989500	39.1	1000.0	9.000	On	N	10.2	10.9	50.0
26.376000	38.1	1000.0	9.000	On	N	10.3	11.9	50.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2016-11-01	2017-11-01
2	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2016-11-01	2017-11-01
3	Signal Generator	Rohde & Schwarz	SMB100A	175528	2016-11-01	2017-11-01
4	EMI Test Receiver	Rohde & Schwarz	ESCI7	100032	2017-02-02	2018-02-02
5	LISN	Rohde & Schwarz	ENV216	101235	2016-05-14	2017-05-14
6	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2016-11-01	2017-11-01
7	Bilog Antenna	Schaffner	CBL6111C	2551	2016-05-13	2018-05-13
8	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-126	2016-05-25	2018-05-25
9	6dB Attenuator	R&S	DNF	272.4110.50-2	2016-11-01	2017-11-01
10	6dB Attenuator	R&S	DNF	272.4110.50-1	2017-02-03	2018-02-03
11	AMPLIFIER	SONOMA	310	291721	2017-02-02	2018-02-02
12	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2015-05-14	2017-05-14
13	Preamplifier	Agilent	8449B	3008A02011	2016-12-01	2017-12-01
14	Horn Antenna	ETS-Lindgren	3115	00078894	2015-09-02	2017-09-02
15	Horn Antenna	ETS-Lindgren	3116	00062504	2015-09-04	2017-09-04
16	Horn Antenna	ETS-Lindgren	3117	00154525	2015-09-02	2017-09-02
17	Band Reject Filter	Micro Tronics	BRM50702	G233	2017-02-03	2018-02-03
18	Band Reject Filter	Micro Tronics	BRM50716	G184	2017-02-03	2018-02-03
19	Temp&Humi Chamber	ESPEC CORP.	SH-241	92000872	2017-02-02	2018-02-02