

FCC IC Test Report

(Class II permissive change report for change of internal antenna)

Report No.: FCC_IC_RF_SL21050301-SLX-014_2.4G Rev.2

FCC ID: STJ-SDMAC

IC ID: 5627A-SDMAC

Test Model: Plum WiFi

HMN: Plum Duo

Received Date: 08/16/2021

Test Date: 08/23/2021-11/17/2021

Issued Date: 1/27/2022

Applicant: ICU Medical Inc.

Address: 951 Calle Amanecer, San Clemente, CA 92673

Issued By: Bureau Veritas Consumer Products Services, Inc.

Lab Address: 775 Montague Expressway, Milpitas, CA 95035, USA

Test Location (1): 775 Montague Expressway, Milpitas, CA 95035, USA

**FCC Registration /
Designation Number:** 540430

ISED# / CAB identifier: 4842D



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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	6
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes	7
3.3 Test Mode Applicability and Tested Channel Details	8
3.4 Description of Support Units	9
3.4.1 Configuration of System under Test	9
3.5 General Description of Applied Standards	10
4 Test Types and Results	10
4.1 Test Instruments	11
4.2 Test Procedures	11
4.3 Deviation from Test Standard	12
4.3.1 Test Setup	13
4.3.2 EUT Operating Conditions	14
4.3.3 Test Results: Unwanted Emission	15
4.3.4 Test Results: Band Edge	42
5 Pictures of Test Arrangements	50
5.1 Radiated Emissions 9 KHz to 30 MHz	50
5.2 Radiated Emissions up to 1 GHz	54
5.3 Radiated Emissions above 1 GHz	56
Appendix – Information on the Testing Laboratories	60

Release Control Record

Issue No.	Description	Date Issued
FCC_IC_SL21050301-SLX-014_2.4G	Original release	1/10/2022
FCC_IC_SL21050301-SLX-014_2.4G Rev. 1	Updated in formation on Section 3.1	1/27/2022
FCC_IC_SL21050301-SLX-014_2.4G Rev. 2	Revised Model	4/20/2022

1 Certificate of Conformity

Product: Plum Duo (with embedded radio module)

Brand: Plum

HMN: Plum Duo

Test Model: Plum WiFi

Sample Status: Production Sample

Purpose of the testing: Change of Internal antenna

Applicant: ICU Medical Inc.

Test Date: 08/23/2021-11/17/2021

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 Meas Guidance v05r02

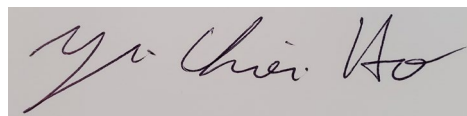
RSS 247 Issue2, February 2017

ANSI C63.10: 2013

RSS Gen Issue5, March 2019

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

Prepared by :

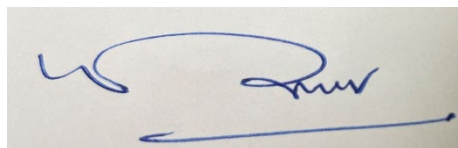


, Date:

12/27/2021

Yu-Chien Ho / Test Engineer

Approved by :



, Date:

1/10/2022

Suresh Kondapalli/ Engineer Reviewer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247) RSS 247 Issue2, RSS Gen Issue5			
FCC / IC Clause	Test Item	Result	Remarks
15.207 RSS Gen 8.8	AC Power Conducted Emission	N/A	N/A
15.205 &15.209 & 15.247(d) RSS 247 5.5C	Radiated Emissions Measurement* and Band Edge Measurement	PASS	Meets the requirement of the limit.
15.247(a)(2) RSS 247 5.2.1 RSS Gen 6.7	Antenna Port Emission	N/A	N/A
15.247(b) RSS 247 5.4.4	6dB bandwidth	N/A	N/A
15.247(e) RSS 247 5.2.2	Conducted power	N/A	N/A
15.203	Power Spectral Density	N/A	N/A
FCC / IC Clause	Antenna Requirement	PASS	Internal to the device

Note: N/A: Please refer to FCC ID: STJ-SDMAC and IC: 5627A-SDMAC test report no. ER/2017/70042 (original report of Modulue with FCC ID: N6C-PMACS and IC: 4908A-PMACS)

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Plum Duo (with embedded radio module)
Brand	Plum
HMN	Plum Duo
Test Model	Plum WiFi
Series Model	N/A
Status of EUT	Production Sample
Power Supply Rating	The EUT consumes power from host, which is designed with AC power supply rating of 100-240Vac, 50/60Hz
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: MCS 0/1/2/3/4/5/6/7
Operating Frequency	2.412 ~ 2.462GHz
Number of Channels	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Antenna Type	High efficiency FPC antenna for low band and high band Wi-Fi
Antenna Gain	2.42 – 2.48 GHz, Peak Gain (dB) 3.00
Antenna Connection	Internal to the device

Note:

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

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.3 Test Mode Applicability and Tested Channel Details

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
1	√	√	-	-	-

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

NOTE: The EUT had been pre-tested in positions of each 3 axis. The worst case was found when positioned on **X-plane**.

NOTE: "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	6	DSSS	BPSK	6.5

Radiated Emission Test (Below 30MHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	6	DSSS	BPSK	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Tony Evers
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Tony Evers

3.4 Description of Support Units

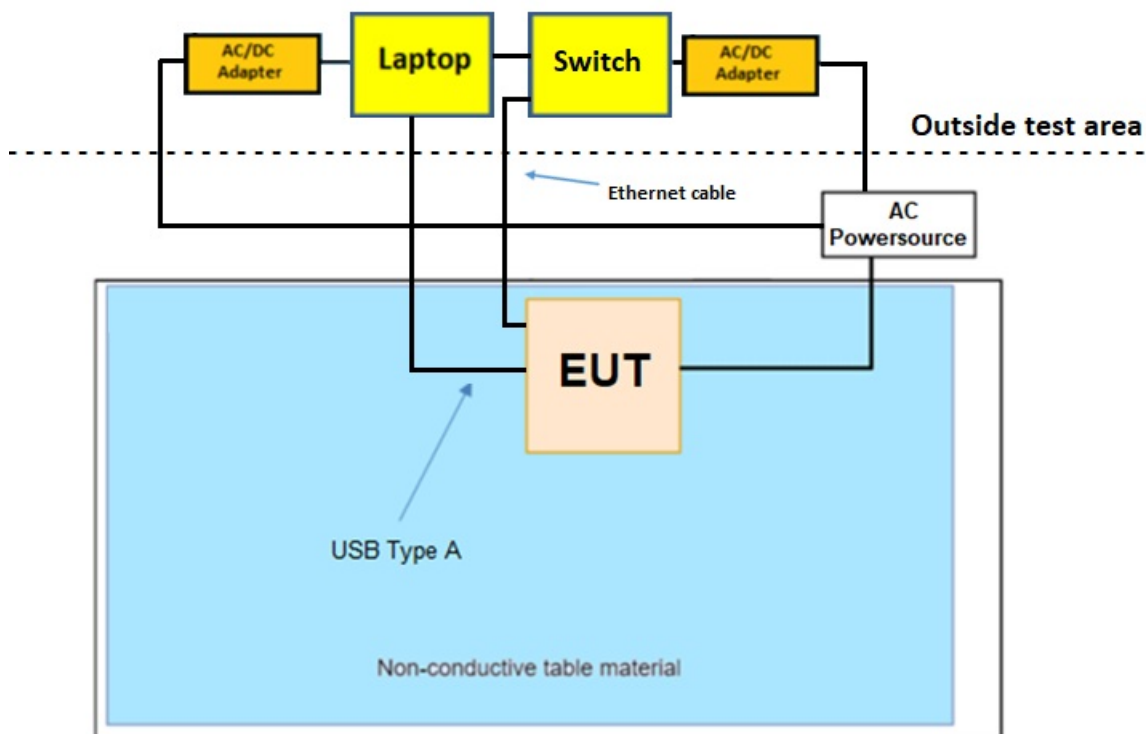
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Dell	Latitude E6420	56CK3R1	N/A	N/A
B.	Power Supply(Laptop)	Dell	DA130PEI-00	JU012	N/A	N/A
C.	Switch	Silex				
D.	Power supply (switch)					

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. EUT is connected to switch via an USB to Ethernet adapter.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 Meas Guidance v05r02

RSS 247 Issue2, February 2017

ANSI C63.10: 2013

RSS Gen Issue5, March 2021

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

4 Test Types and Results

Radiated Emission Measurement

Limits of Radiated Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB (power peak measurement) or 30dB (power Avg. measurement) below the highest level of the desired power:

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

NOTE:

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

4.1 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
EMI Receiver Rohde and Schwarz	ESW44	1328.4100K- 101662-MH	10/23/2020	10/23/2021
Biconilog Antenna Sunol	JB1	A111717	09/04/2020	09/04/2022
Horn Antenna ETS-Lindgren	3117	218554	04/21/2021	04/21/2022
DRG Horn Antenna ETS LINDGREN	3117	214309	08/05/2020	08/05/2022
Pre-Amplifier RF-Lambda	RAMP00M50GA	18040300055	05/07/2021	05/07/2022
Loop Antenna	N/A	00049120	11/25/2020	11/25/2021
FSB Antenna Cable, 0.5m (Microwave Town)	FSB360PK-KMKM- 00.50M	201906110002	10/1/2020	10/1/2021
FSB Antenna Cable, 4m (Microwave Town)	FSB360PK-KMKM- 400M	21030447-002	10/1/2020	10/1/2021
10m Semi-Anechoic Chambe (ETS-Lindgren)	S2010BL8X8	1462	07/21/2020	07/21/2022

4.2 Test Procedures

For Radiated emission below 30MHz

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

NOTE:

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

For Radiated emission above 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

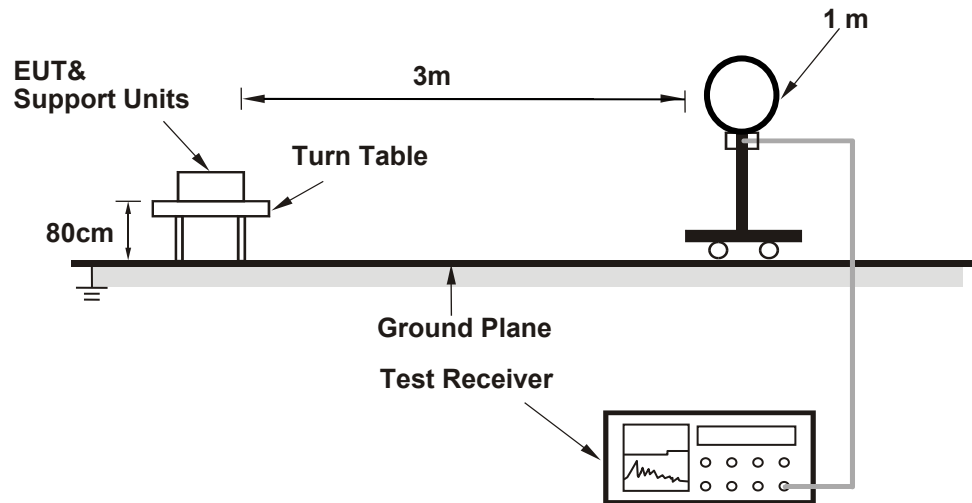
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

4.3 Deviation from Test Standard

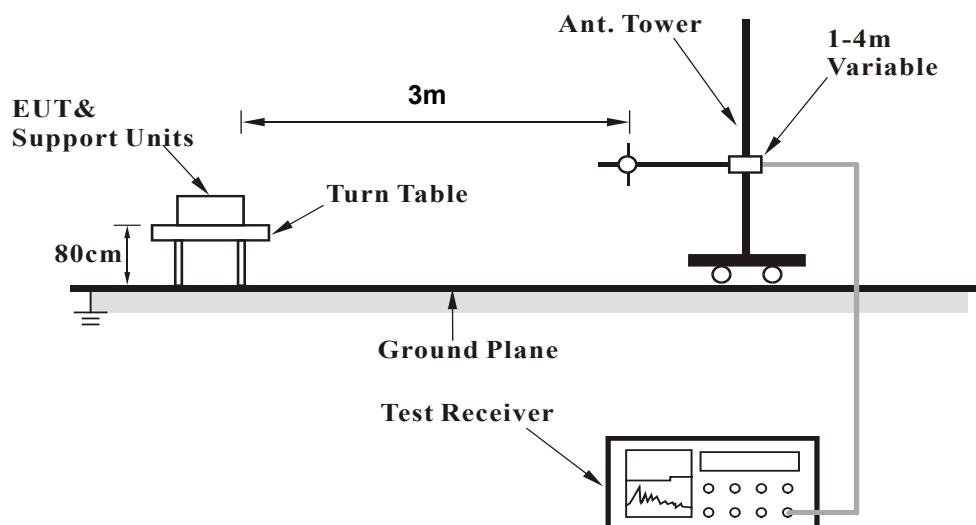
No deviation.

4.3.1 Test Setup

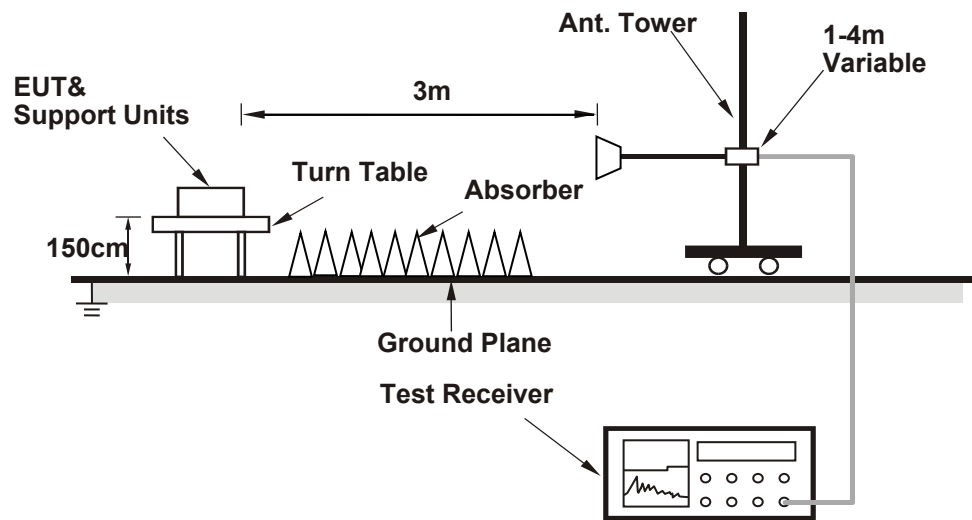
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.3.2 EUT Operating Conditions

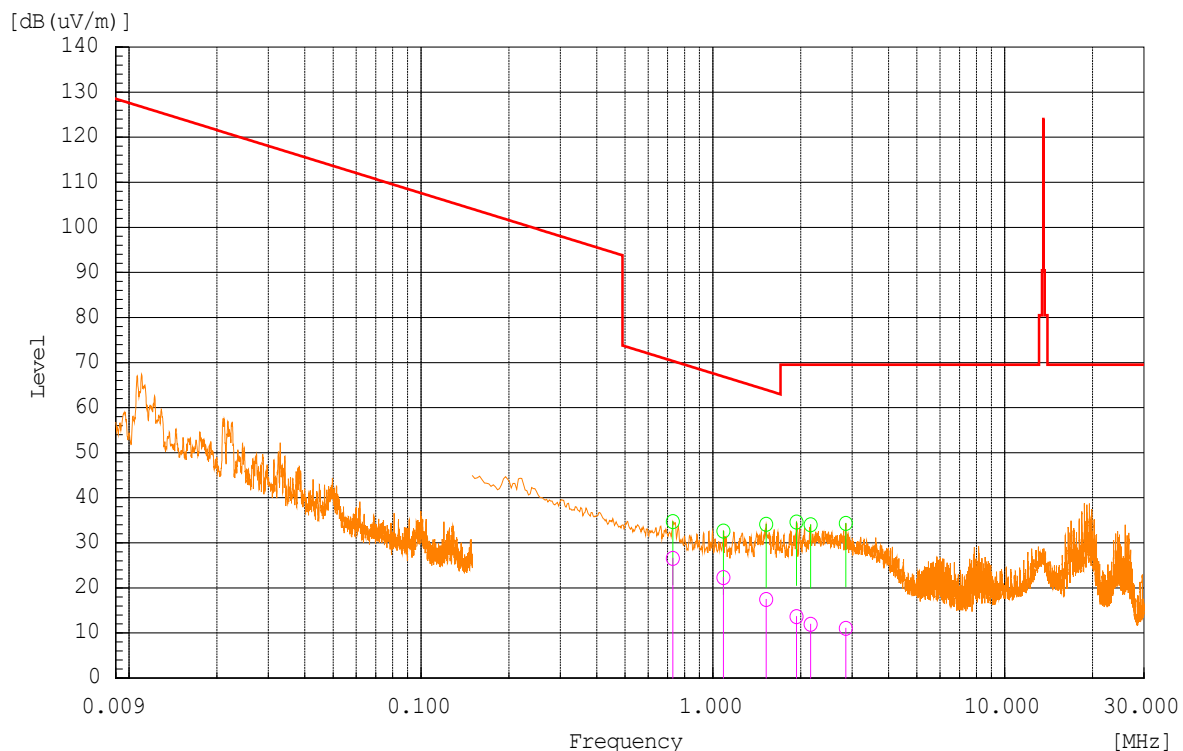
- Placed the EUT on the testing table.
- Prepared notebooks to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a USB cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.3.3 Test Results: Unwanted Emission

Below 30MHz Worst-Case Data:

CHANNEL	802.11b Channel 6	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz – 30MHz	ANTENNA POLARITY	90°

	Frequency [MHz]	Pol	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Pass/Fail
1	1.523	90°	7.6	9.8	17.4	63.9	-46.5	100	0.5	Pass
2	1.087	90°	10	12.3	22.3	66.9	-44.6	100	148	Pass
3	1.935	90°	5.5	8.1	13.6	69.5	-55.9	100	10.7	Pass
4	2.857	90°	5.6	5.4	11	69.5	-58.5	100	257	Pass
5	2.162	90°	4.6	7.3	11.9	69.5	-57.6	100	0	Pass
6	0.729	90°	11.2	15.4	26.6	70.3	-43.7	100	167	Pass



<FCC Below 30 GHz 15.225>

QP

<09-15-2021 FCC SLX-014 2.4GHz 11b Ch6 9kHz-30MHz 90 Deg>

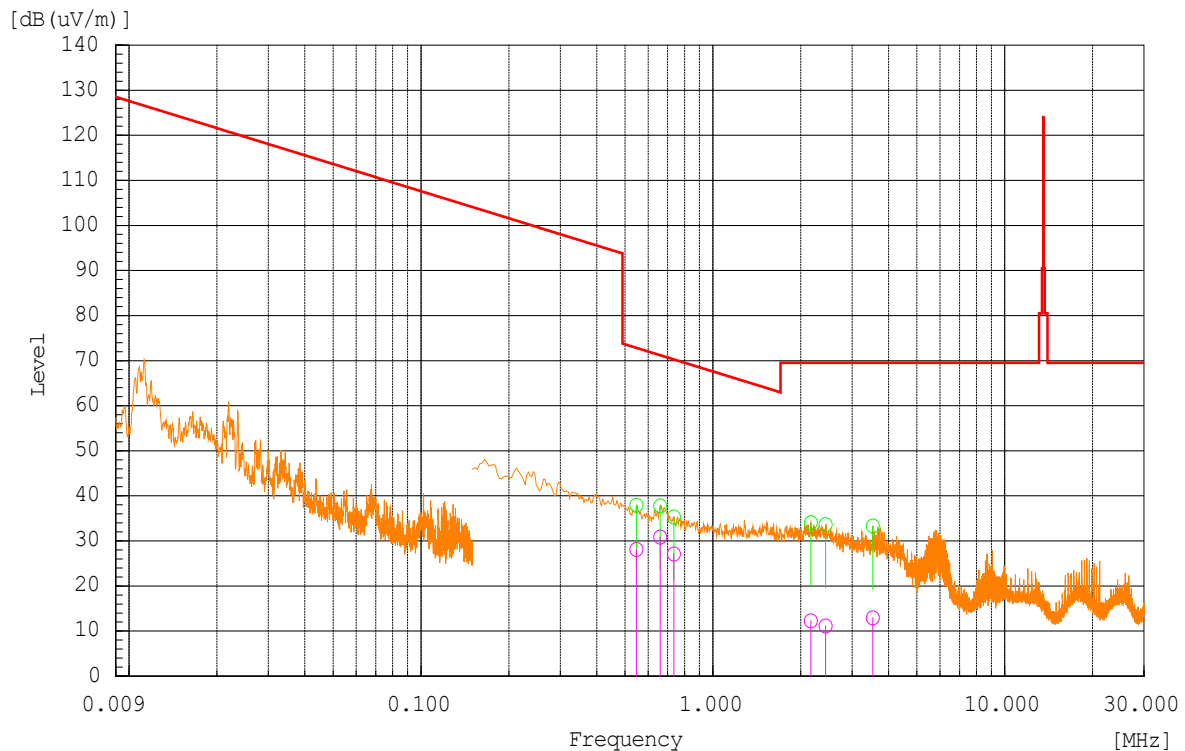
Range (H, PK)

Suspected Item (H)

Final Item (H, QP)

CHANNEL	802.11b Channel 6	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz – 30MHz	ANTENNA POLARITY	0°

	Frequency [MHz]	Pol	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Pass/Fail
1	0.547	0°	10.4	17.7	28.1	72.8	-44.7	Pass	100	0
2	0.66	0°	14.6	16.2	30.8	71.2	-40.4	Pass	100	171
3	0.735	0°	11.7	15.4	27.1	70.3	-43.2	Pass	100	167
4	2.168	0°	5	7.3	12.3	69.5	-57.2	Pass	100	0.1
5	2.434	0°	4.6	6.5	11.1	69.5	-58.4	Pass	100	200
6	3.535	0°	8.9	4	12.9	69.5	-56.6	Pass	100	81.5



<FCC Below 30 GHz 15.225>

QP

<09-17-2021 FCC SLX-014 2.4GHz 11b Ch6 9kHz-30MHz 0 Deg>

Range (H, PK)

Suspected Item (H)

Final Item (H, QP)

Below 1GHz Worst-Case Data:

CHANNEL	802.11b Channel 6	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1000MHz		

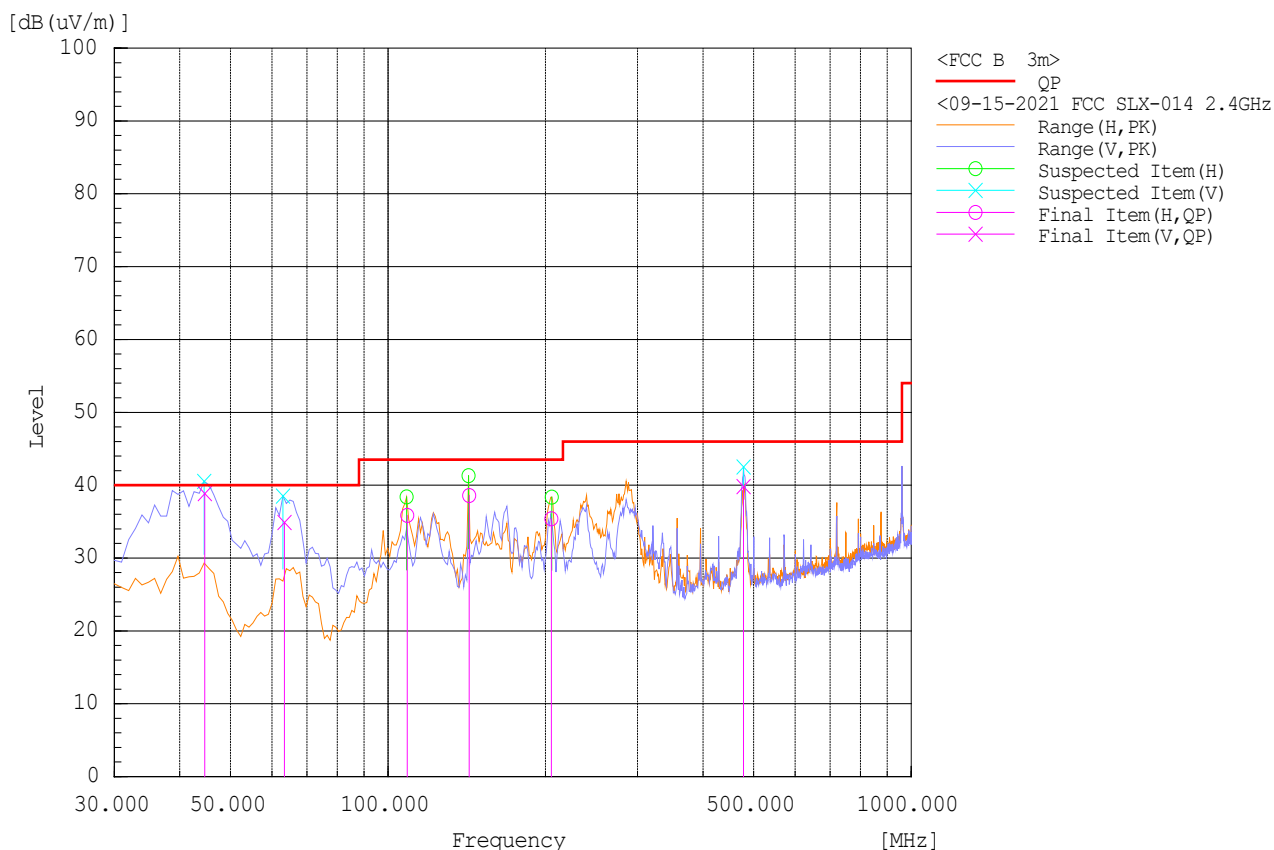
ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m

	Frequency [MHz]	Pol	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Pass/Fail
1	44.658	V	23.3	15.5	38.8	40	-1.2	100	161	Pass
2	63.393	V	21.9	13	34.9	40	-5.1	106	25.1	Pass
3	108.804	H	17.8	18.1	35.9	43.5	-7.6	300	262	Pass
4	142.922	H	19.6	19	38.6	43.5	-4.9	322	94.9	Pass
5	205.253	H	17.5	17.9	35.4	43.5	-8.1	152	280	Pass
6	478.11	V	15.4	24.4	39.8	46	-6.2	106	324	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



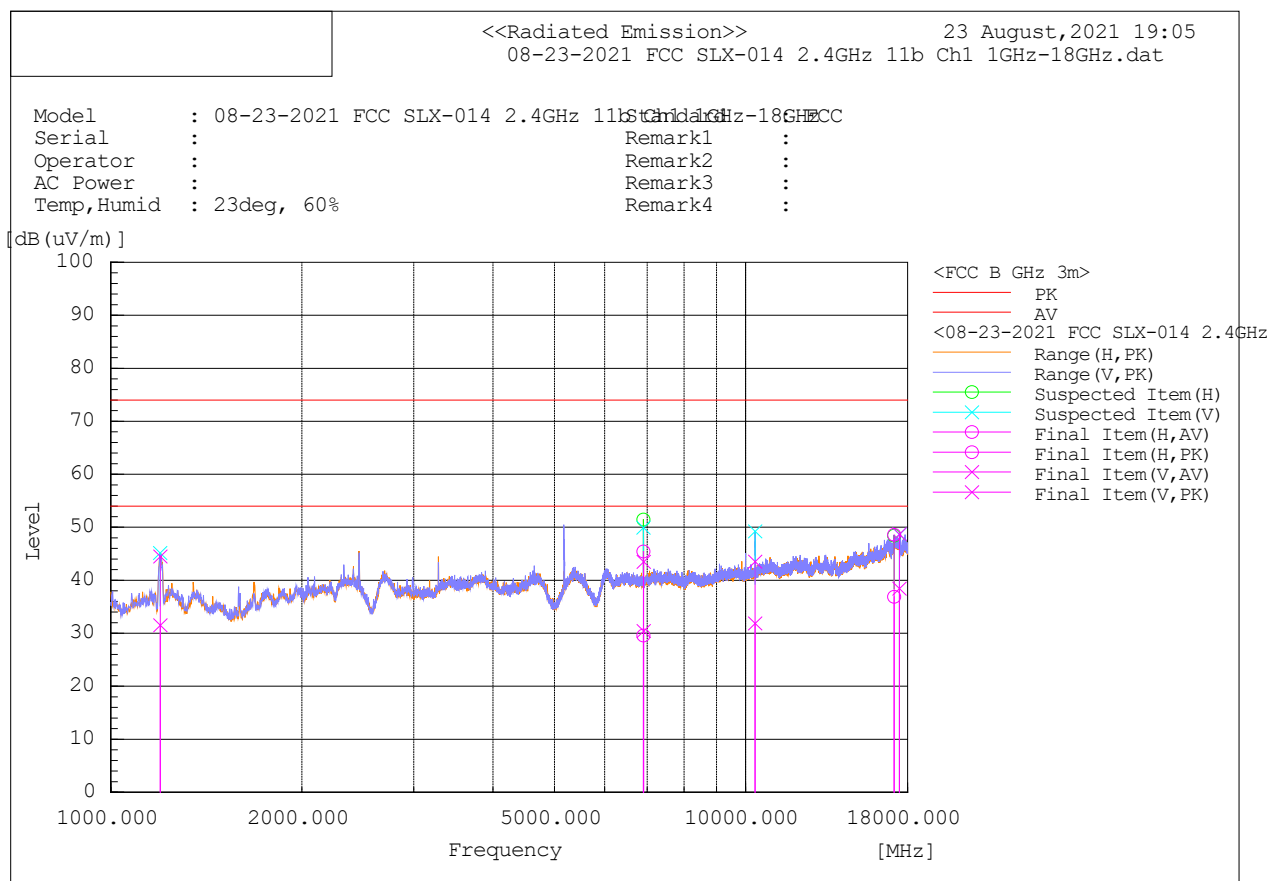
Above 1GHz Worst Case Test Data:

1GHz-18GHz, 802.11b, Ch1 – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	LimitAV [dB(uV/m)]	LimitPK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1196.448	V	48.5	61.5	-17	31.5	44.5	54	74	-22.5	-29.5	147	136	Pass
2	6906.407	V	31.7	44.8	-1.3	30.4	43.5	54	74	-23.6	-30.5	329	179	Pass
3	6904.907	H	30.9	46.7	-1.3	29.6	45.4	54	74	-24.4	-28.6	103	22.5	Pass
4	10352.6	V	26.8	38.4	5.1	31.9	43.5	54	74	-22.1	-30.5	268	212	Pass
5	17136.46	H	20.9	32.6	16	36.9	48.6	54	74	-17.1	-25.4	261	76.2	Pass
6	17469.19	V	22.1	32.4	16.3	38.4	48.7	54	74	-15.6	-25.3	223	91.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

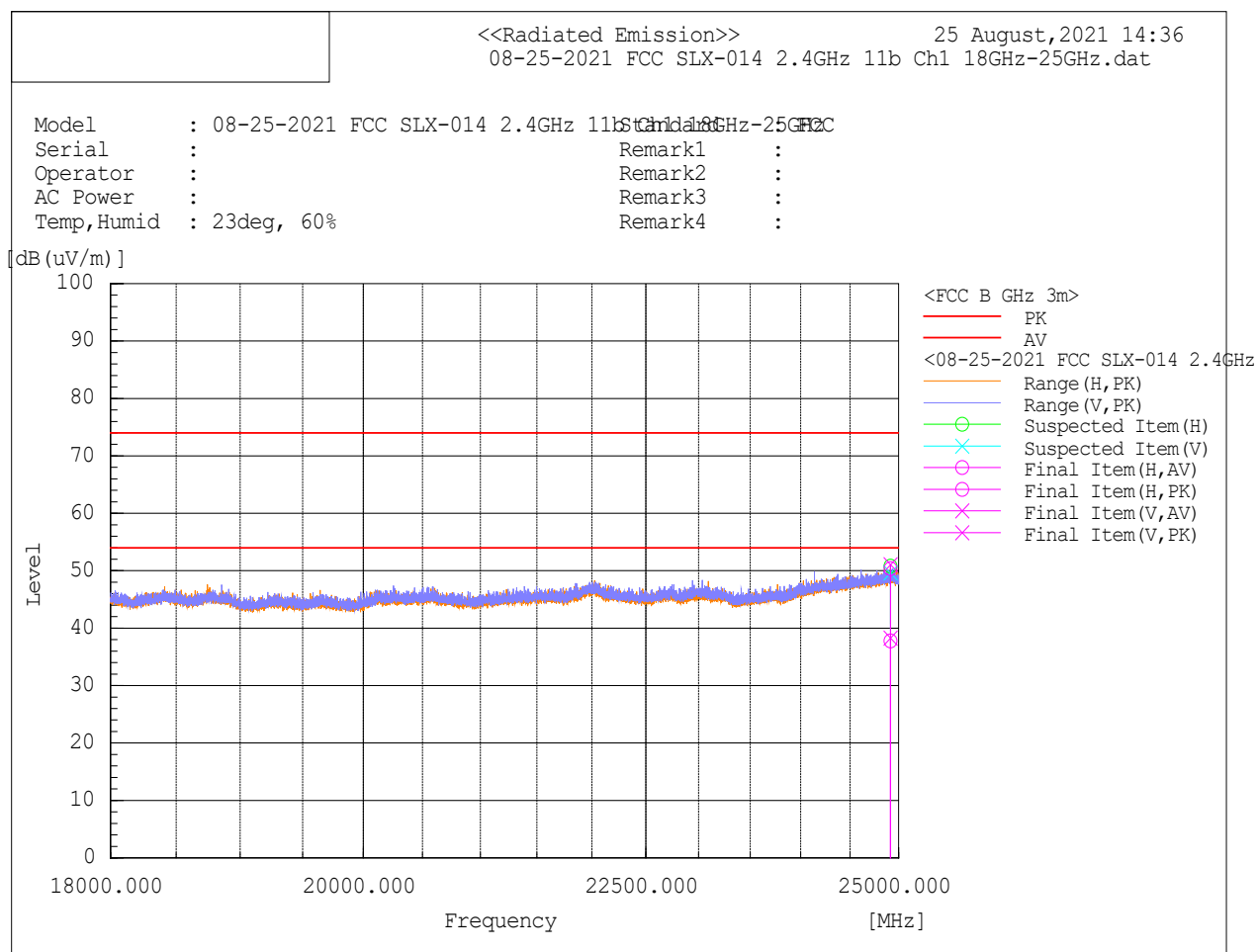


18-25GHz, 802.11b, Ch1 – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24914.49	H	20	32.6	17.8	37.8	50.4	54	74	-16.2	-23.6	Pass	125	360
2	24914.95	V	20.5	33.3	17.8	38.3	51.1	54	74	-15.7	-22.9	Pass	192	282

Note: Lower of the FCC 15B limit/15.209 limit was used.



1GHz-18GHz, 802.11b, Ch6 – 2437MHz

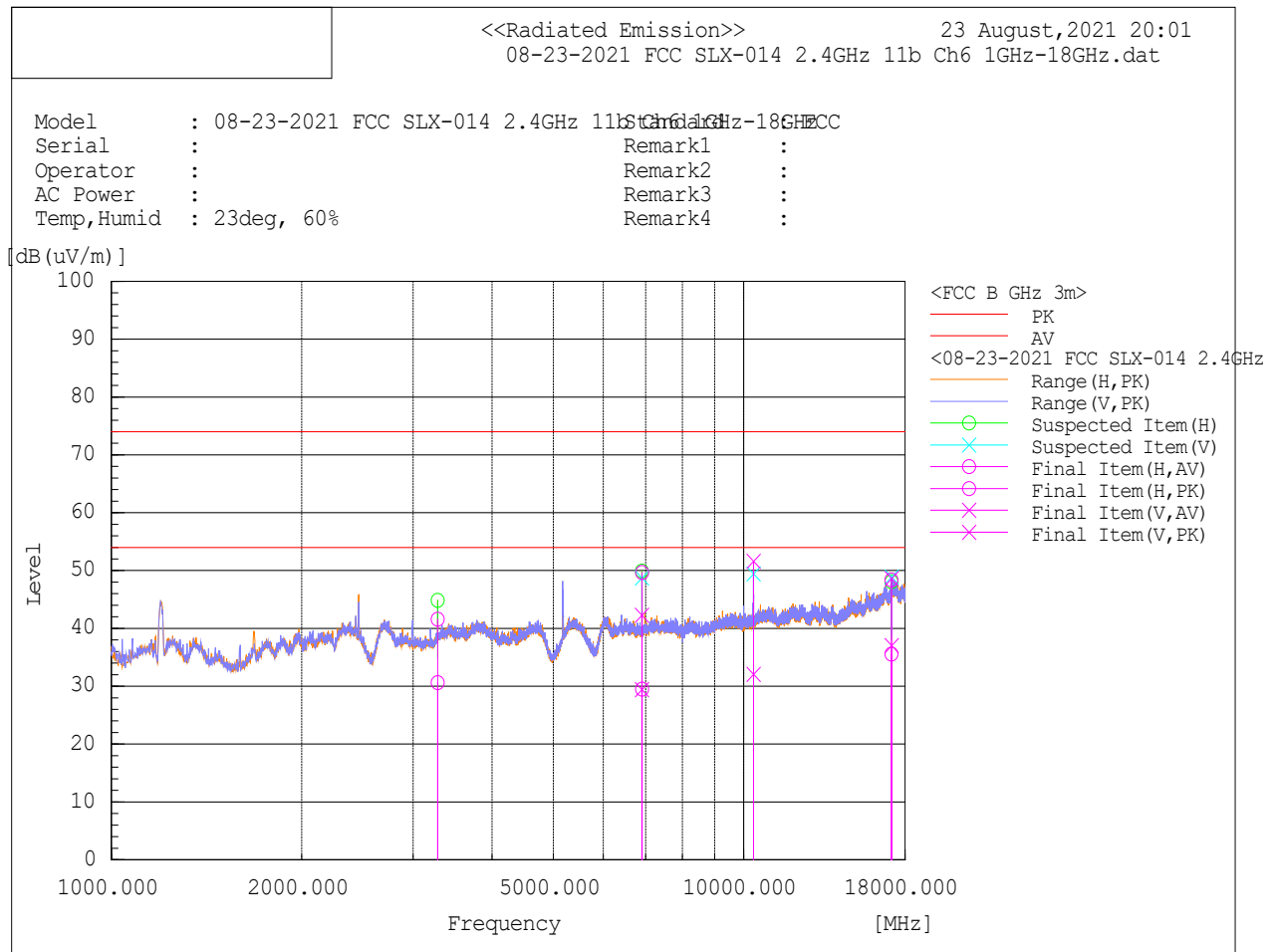
ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1196.448	V	48.5	61.5	-17	31.5	44.5	54	74	-22.5	-29.5	147	136	Pass
2	6906.407	V	31.7	44.8	-1.3	30.4	43.5	54	74	-23.6	-30.5	329	179	Pass
3	6904.907	H	30.9	46.7	-1.3	29.6	45.4	54	74	-24.4	-28.6	103	22.5	Pass
4	10352.6	V	26.8	38.4	5.1	31.9	43.5	54	74	-22.1	-30.5	268	212	Pass
5	17136.46	H	20.9	32.6	16	36.9	48.6	54	74	-17.1	-25.4	261	76.2	Pass
6	17469.19	V	22.1	32.4	16.3	38.4	48.7	54	74	-15.6	-25.3	223	91.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



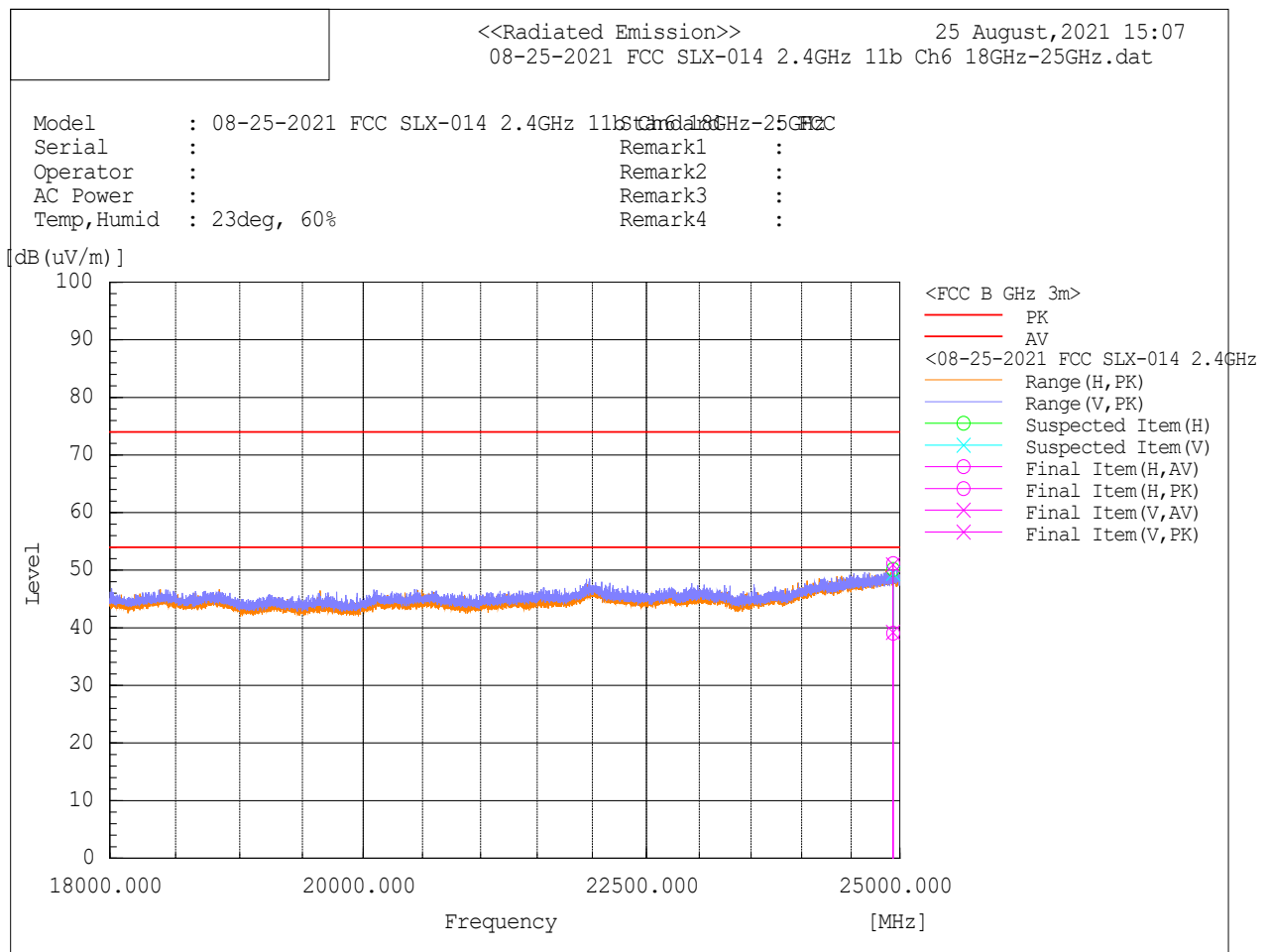
18GHz-25GHz – 802.11b, Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m														
No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24930.33	H	21.3	33.3	17.8	39.1	51.1	54	74	-14.9	-22.9	140	49.7	Pass
2	24928.93	V	21.4	33.2	17.8	39.2	51	54	74	-14.8	-23	170	120	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

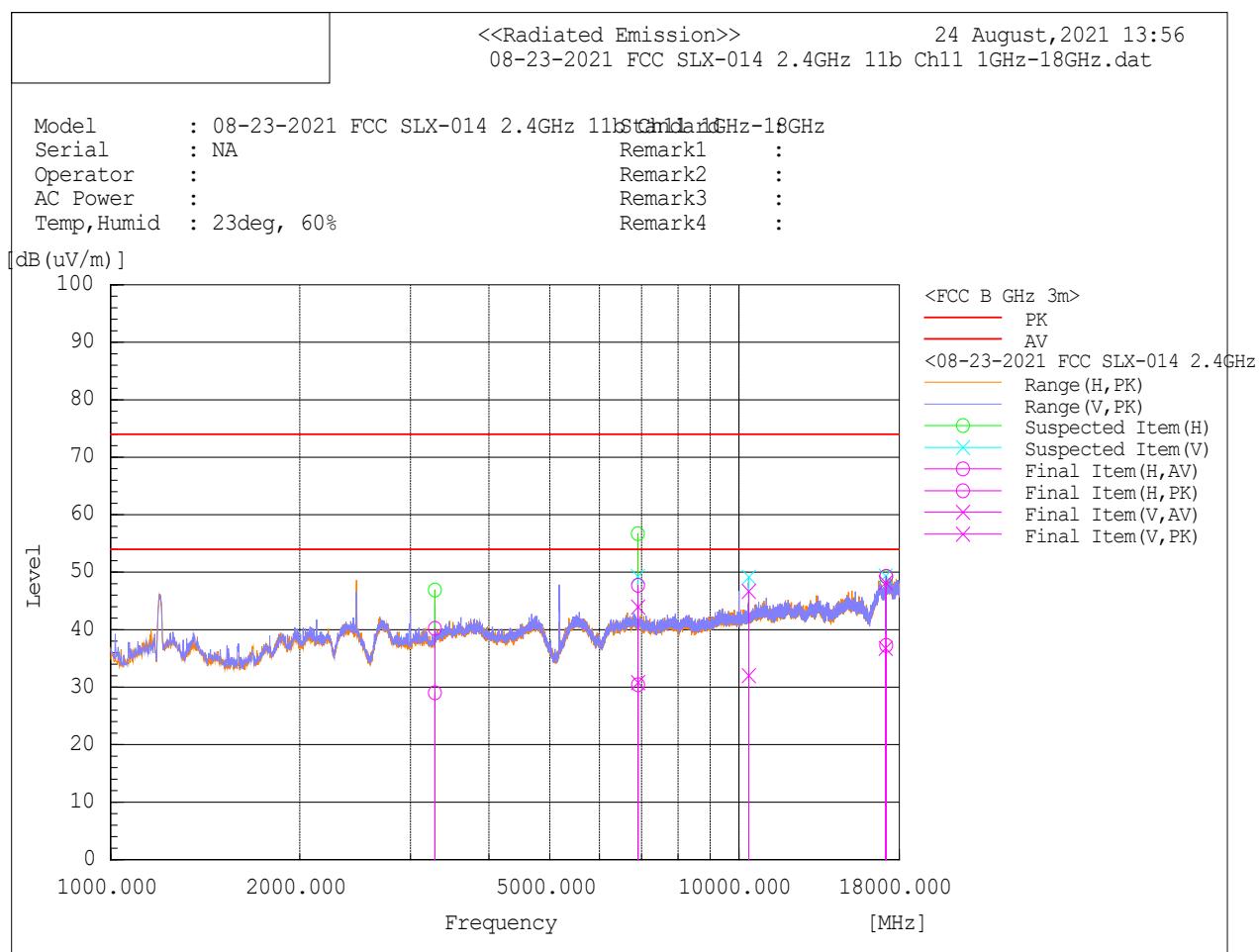


1GHz-18GHz, 802.11b, Ch11 – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	3281.09	H	37.9	49.1	-8.9	29	40.2	54	74	-25	-33.8	Pass	100	282
2	6906.727	H	31.7	49	-1.3	30.4	47.7	54	74	-23.6	-26.3	Pass	192	69.2
3	6906.54	V	32.1	45.3	-1.3	30.8	44	54	74	-23.2	-30	Pass	344	0
4	10368.335	V	26.9	41.6	5.1	32	46.7	54	74	-22	-27.3	Pass	268	118.2
5	17115.372	V	20.8	32.2	16	36.8	48.2	54	74	-17.2	-25.8	Pass	283	155.6
6	17158.79	H	21.4	33.4	15.9	37.3	49.3	54	74	-16.7	-24.7	Pass	162	111.2

Note: Lower of the FCC 15B limit/15.209 limit was used.

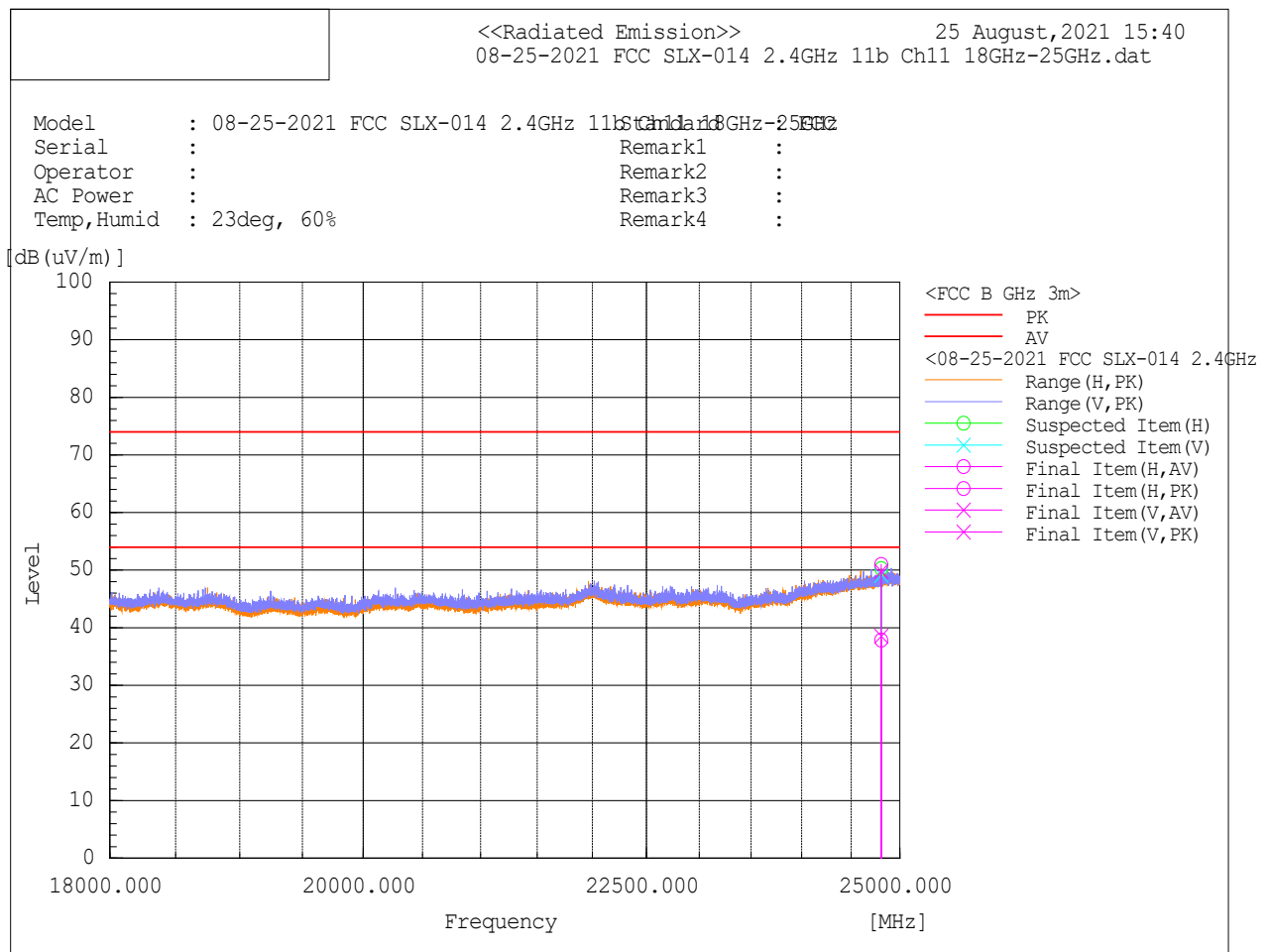


18-25GHz, 802.11b, Ch11 – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24806.744	H	20.2	33.3	17.7	37.9	51	54	74	-16.1	-23	322	123.1	Pass
2	24807.74	V	20.9	32.1	17.7	38.6	49.8	54	74	-15.4	-24.2	261	29.4	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

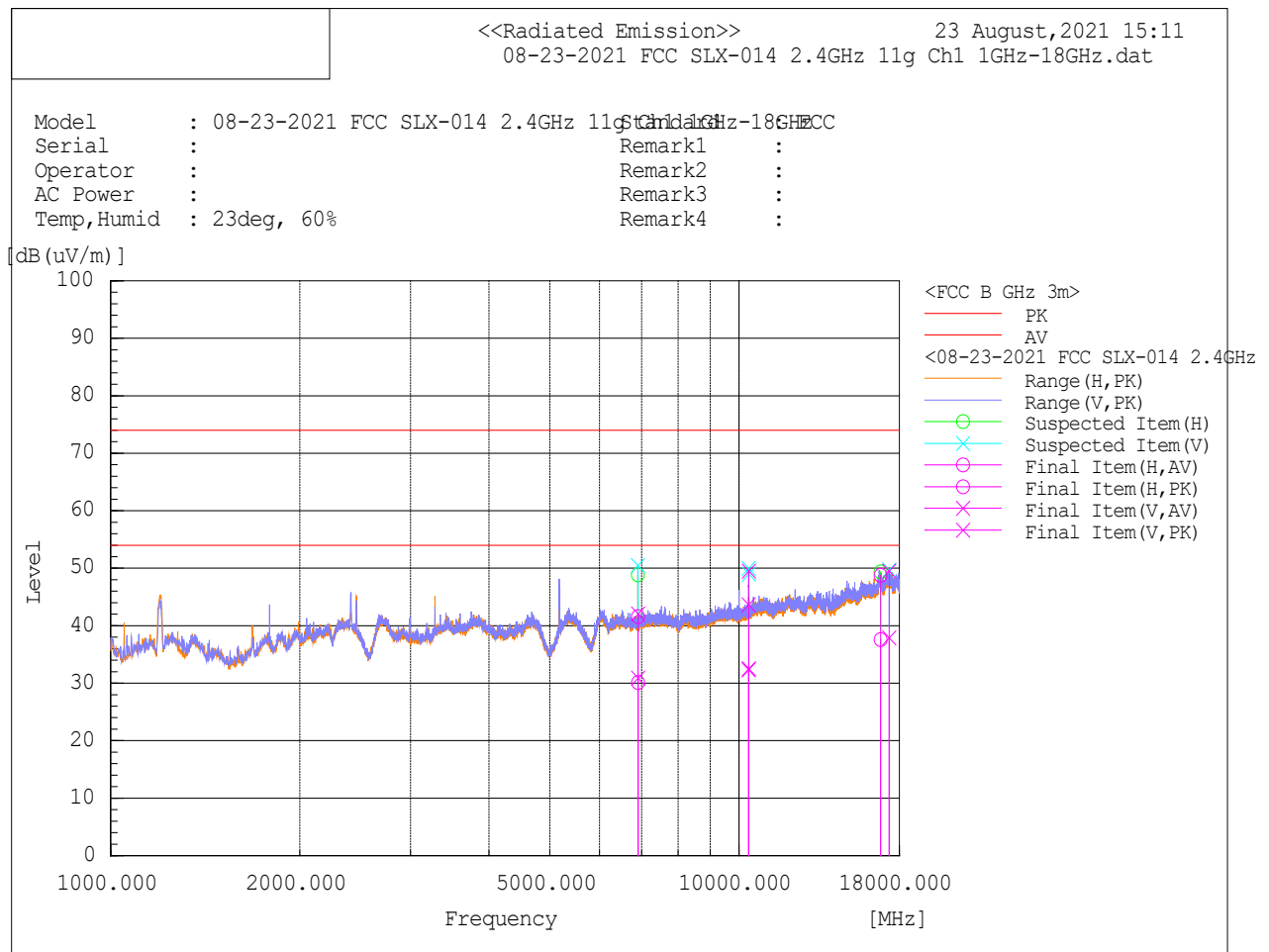


1-18GHz, 802.11g, Ch1 – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	6906.405	V	32.2	43.3	-1.3	30.9	42	54	74	-23.1	-32	291	11.9	Pass
2	6906.493	H	31.4	42.9	-1.3	30.1	41.6	54	74	-23.9	-32.4	367	331.6	Pass
3	10362.307	V	27.2	38.5	5.1	32.3	43.6	54	74	-21.7	-30.4	103	260.7	Pass
4	10369.622	V	27.4	44.4	5.1	32.5	49.5	54	74	-21.5	-24.5	238	87.9	Pass
5	16800.48	H	22.1	33.3	15.5	37.6	48.8	54	74	-16.4	-25.2	208	52.4	Pass
6	17337.382	V	22.6	34.2	15.3	37.9	49.5	54	74	-16.1	-24.5	192	57.1	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

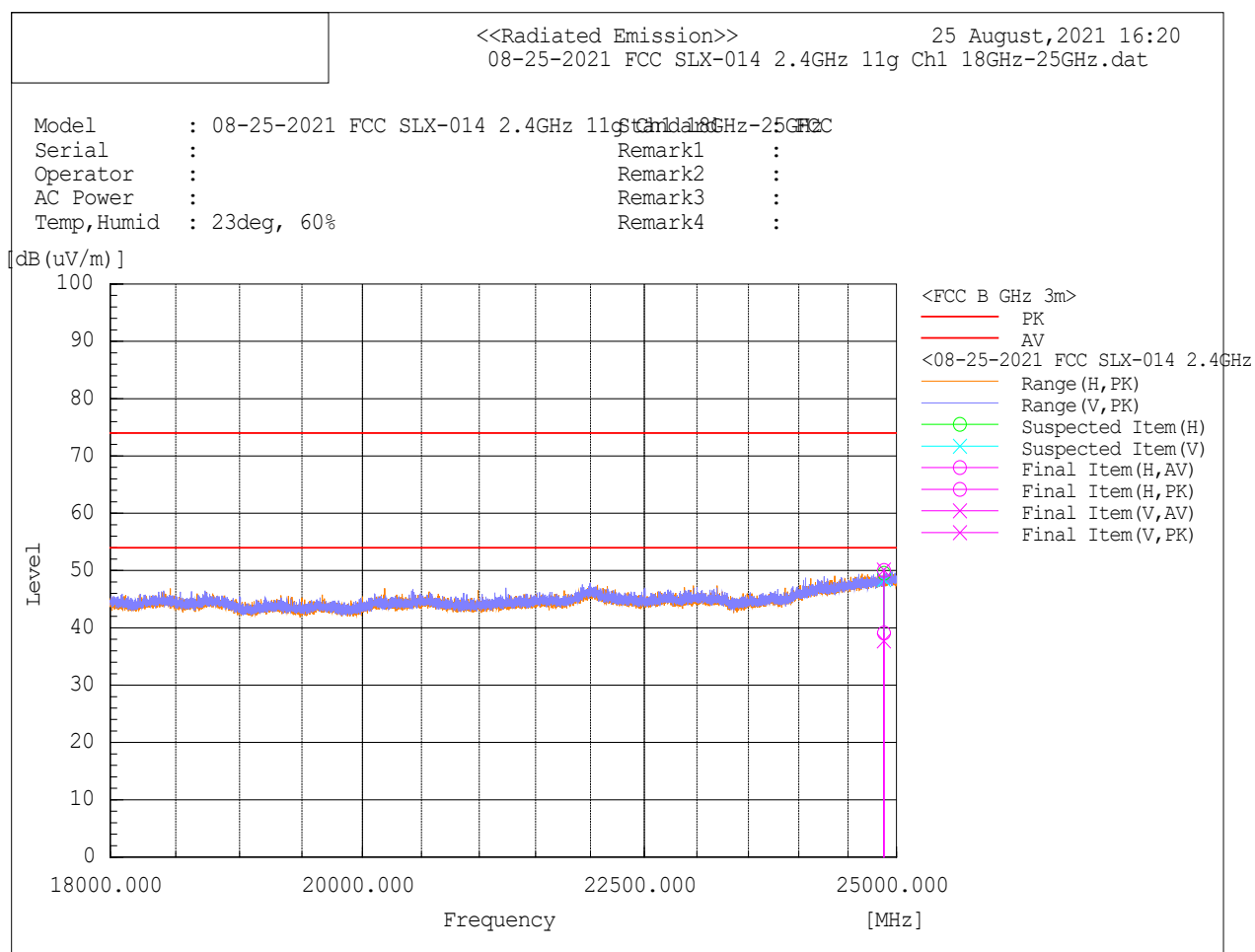


18-25GHz, 802.11g, Ch1 – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24870.674	H	21.4	32.3	17.7	39.1	50	54	74	-14.9	-24	253	108	Pass
2	24868.924	V	20	32.4	17.7	37.7	50.1	54	74	-16.3	-23.9	238	243.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

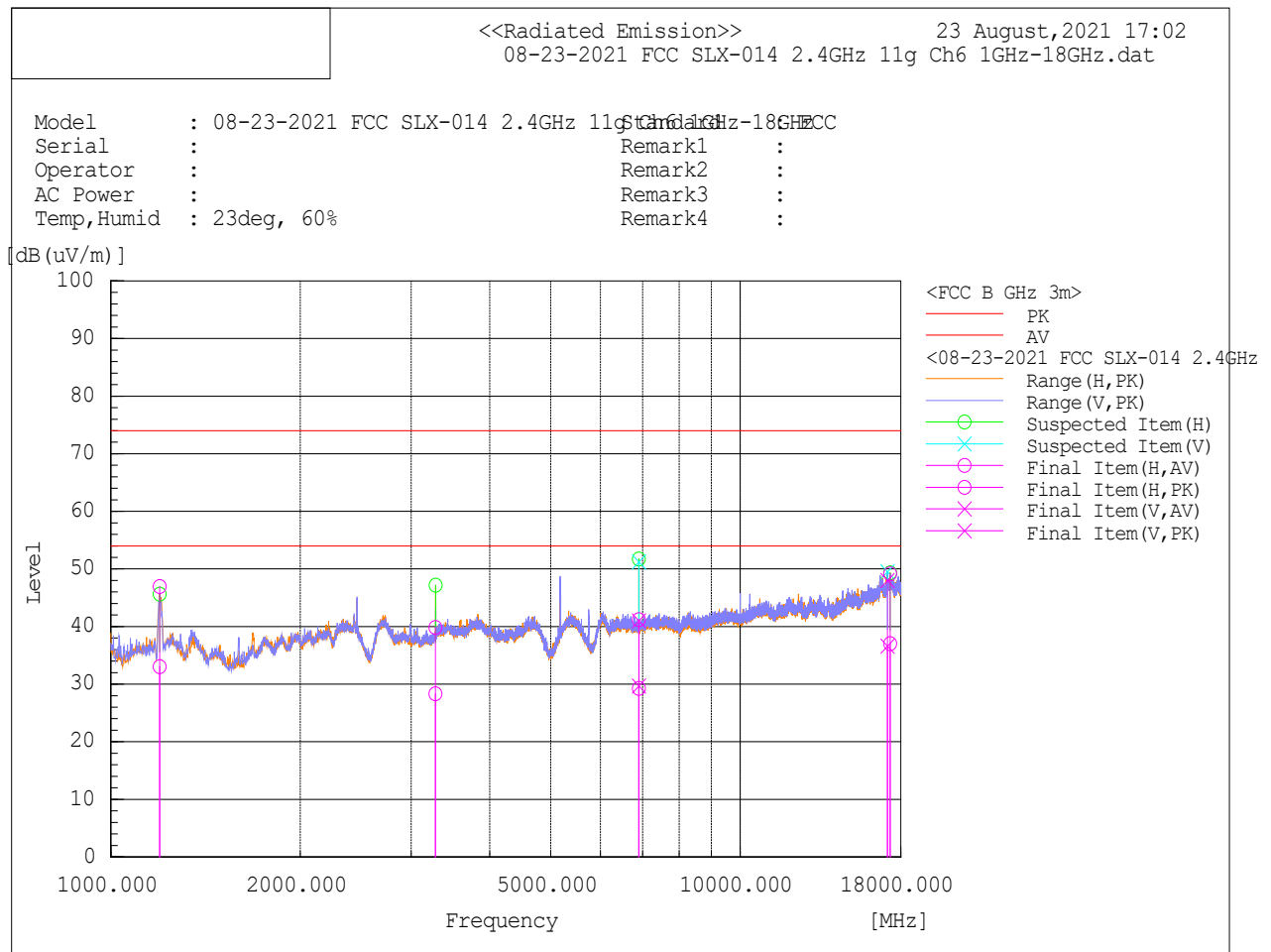


1-18GHz, 802.11g, Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1196.041	H	50	63.9	-17	33	46.9	54	74	-21	-27.1	177	120.3	Pass
2	3280.039	H	37.2	48.8	-8.9	28.3	39.9	54	74	-25.7	-34.1	253	11.9	Pass
3	6905.53	H	30.6	42.5	-1.3	29.3	41.2	54	74	-24.7	-32.8	359	145.3	Pass
4	6905.437	V	31	42.3	-1.3	29.7	41	54	74	-24.3	-33	344	179.6	Pass
5	17135.766	V	20.6	32	16	36.6	48	54	74	-17.4	-26	329	138.9	Pass
6	17310.754	H	21.9	34	15.2	37.1	49.2	54	74	-16.9	-24.8	223	0	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

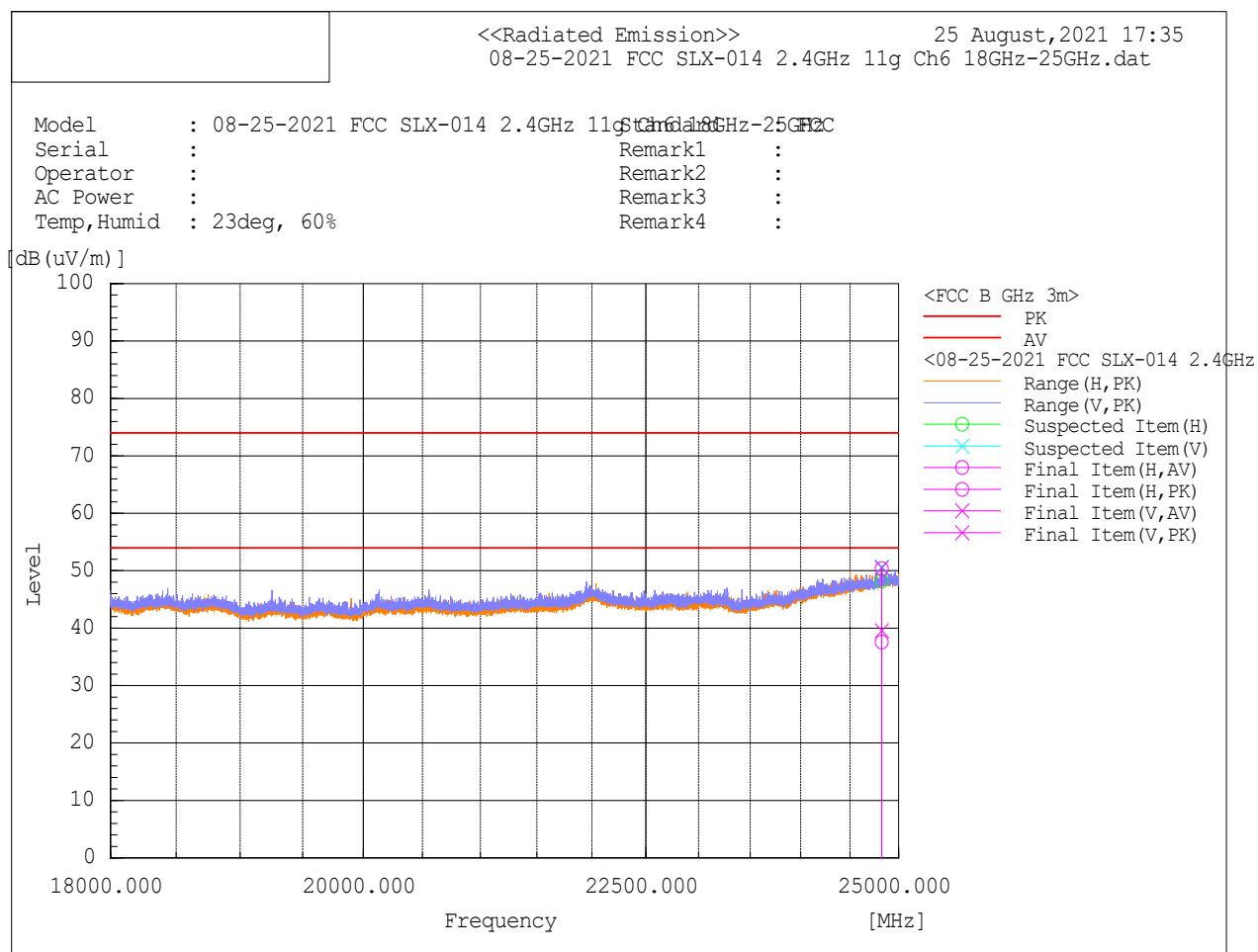


18-25GHz, 802.11g, Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24825.752	V	21.9	32.8	17.7	39.6	50.5	54	74	-14.4	-23.5	313	5.6	Pass
2	24825.362	H	19.9	32.7	17.7	37.6	50.4	54	74	-16.4	-23.6	276	340.8	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

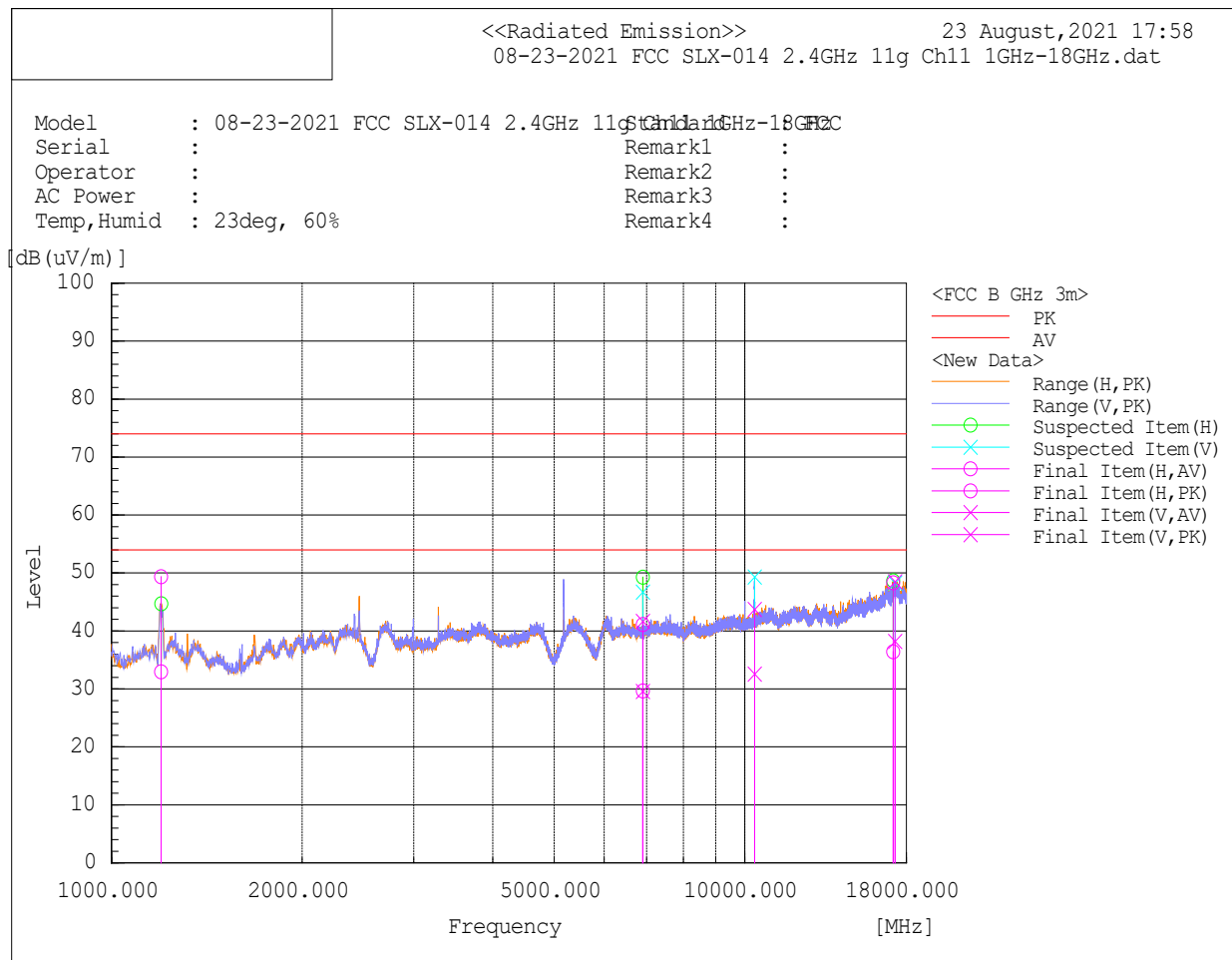


1-18GHz, 802.11g, Ch11 – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1198.047	H	50	66.3	-17	33	49.3	54	74	-21	-24.7	117	144.1	Pass
2	6905.539	H	31	42.4	-1.3	29.7	41.1	54	74	-24.3	-32.9	253	104.3	Pass
3	6905.357	V	30.9	43	-1.3	29.6	41.7	54	74	-24.4	-32.3	268	184.7	Pass
4	10363.89	V	27.4	38.6	5.1	32.5	43.7	54	74	-21.5	-30.3	283	143.4	Pass
5	17159.018	H	20.5	32.4	15.9	36.4	48.3	54	74	-17.6	-25.7	147	290.5	Pass
6	17265.79	V	22.9	33.2	15.3	38.2	48.5	54	74	-15.8	-25.5	313	358.8	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

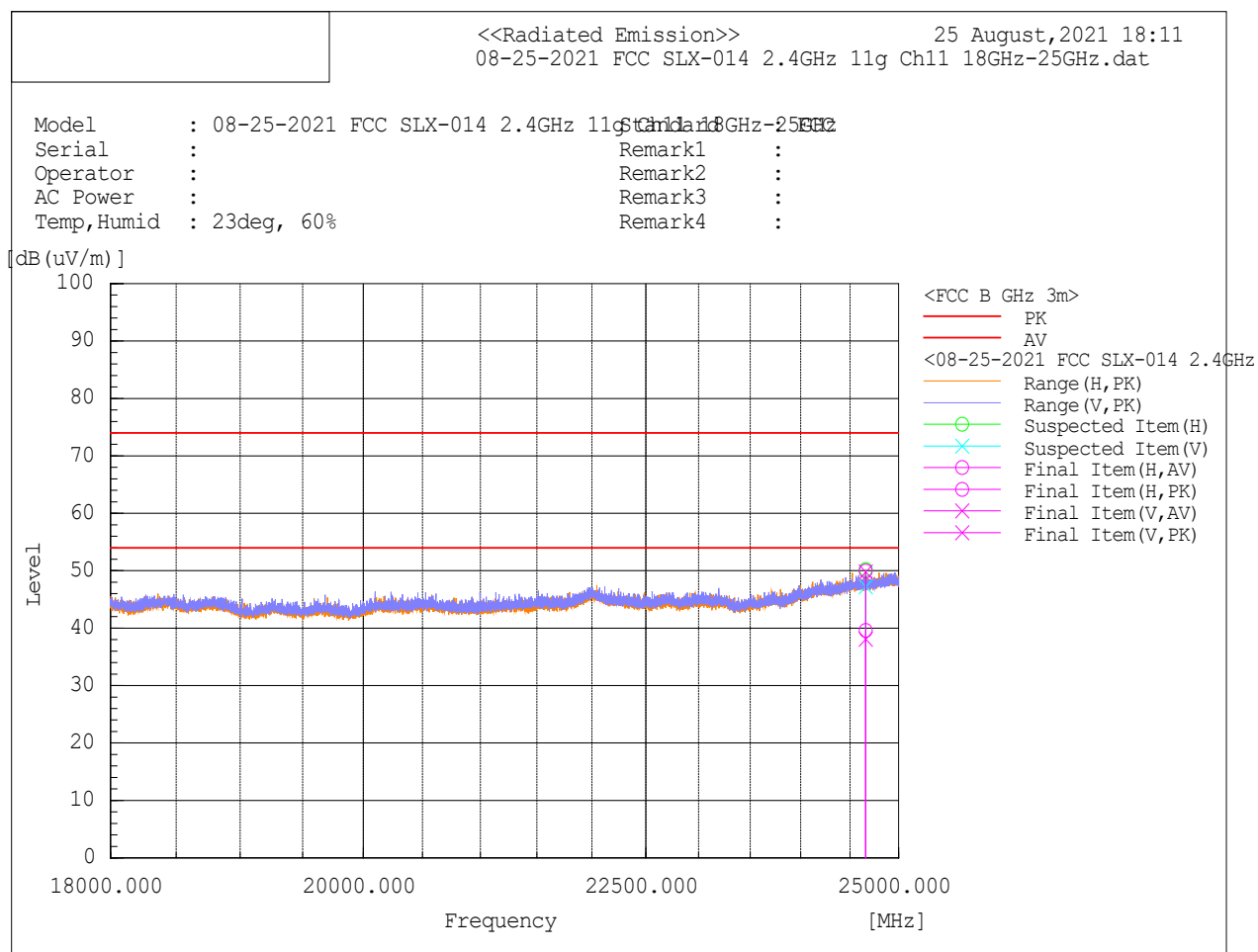


18-25GHz, 802.11g, Ch11 – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24658.532	H	22	32.4	17.6	39.6	50	54	74	-14.4	-24	177	319	Pass
2	24658.396	V	20.5	32.2	17.6	38.1	49.8	54	74	-15.9	-24.2	147	235.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

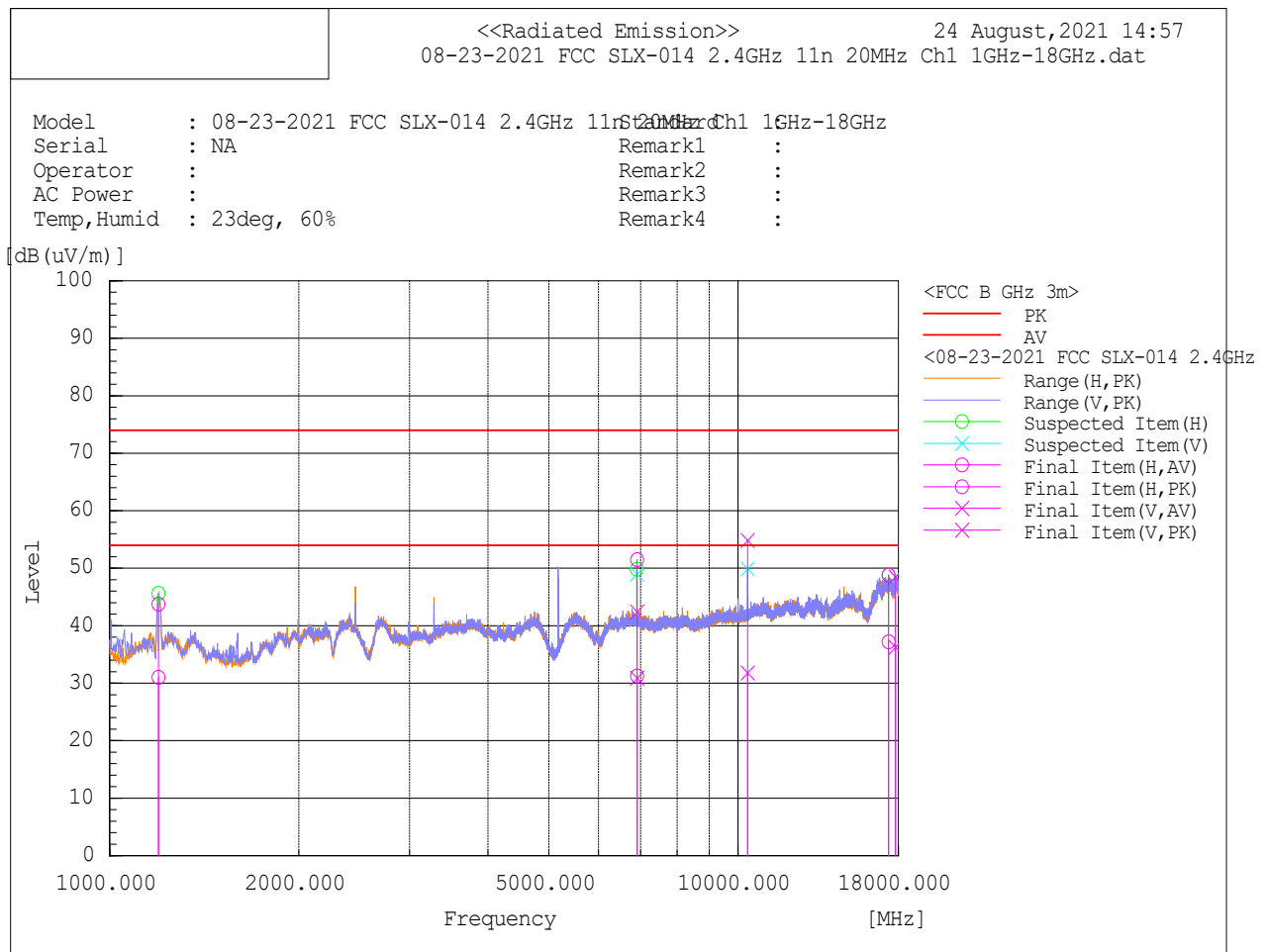


1-18GHz, 802.11n (HT20), Ch1 – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1195.567	H	48	60.8	-17	31	43.8	54	74	-23	30.2	238	93.8	Pass
2	6906.51	H	32.6	52.8	-1.3	31.3	51.5	54	74	-22.7	-22.5	238	222.1	Pass
3	6906.644	V	32.2	43.7	-1.3	30.9	42.4	54	74	-23.1	-31.6	253	178.8	Pass
4	10358.545	V	26.7	49.7	5.1	31.8	54.8	54	74	22.2	-19.2	238	357.2	Pass
5	17366.654	H	21.7	33.3	15.5	37.2	48.8	54	74	-16.8	-25.2	155	0.1	Pass
6	17802.754	V	19.8	31.9	16.5	36.3	48.4	54	74	-17.7	-25.6	223	76.7	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

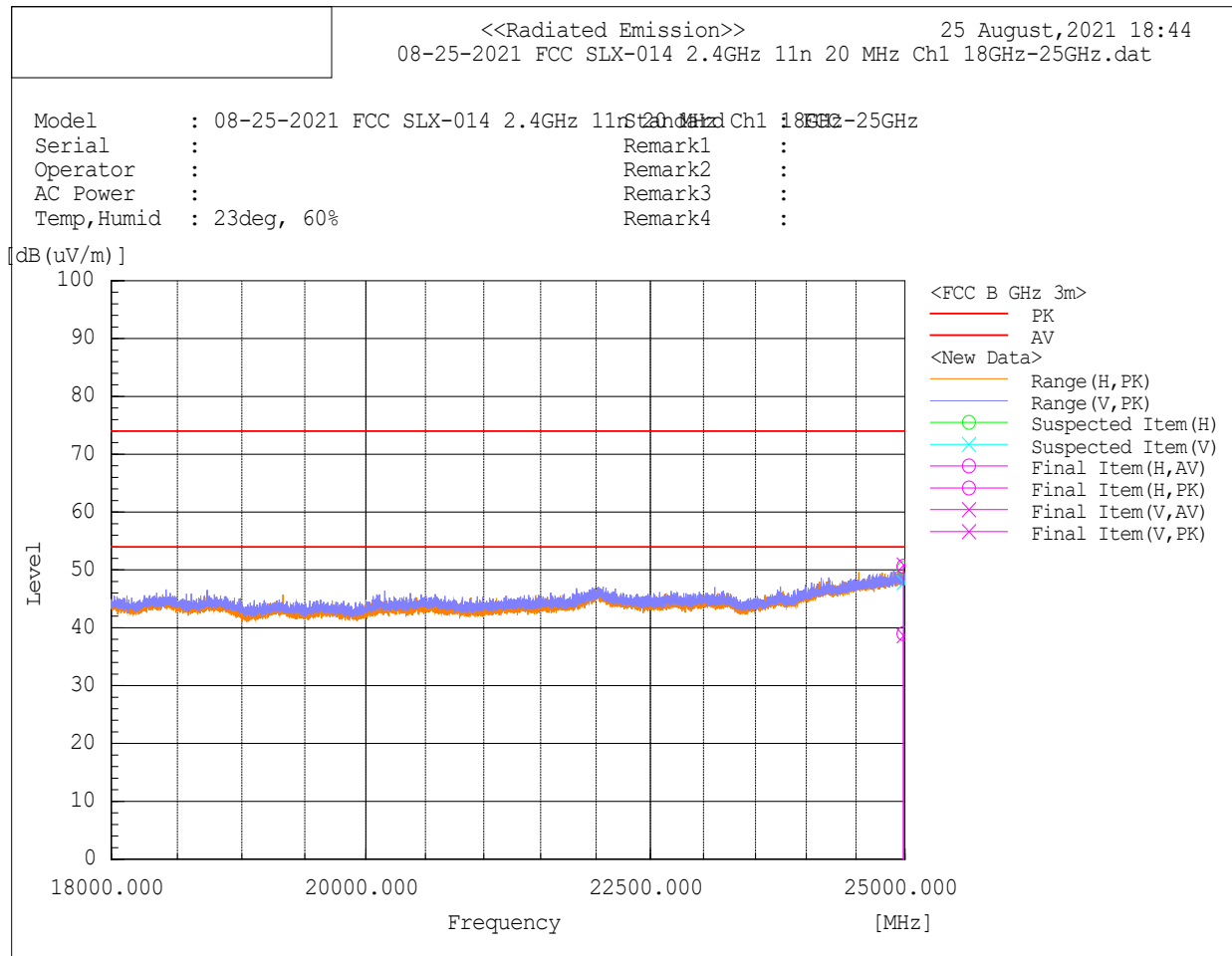


18-25GHz, 802.11n (HT20), Ch1 – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24985.872	H	21.1	32.7	17.9	39	50.6	54	74	-15	-23.4	298	53	Pass
2	24985.974	V	20.7	33	17.9	38.6	50.9	54	74	-15.4	-23.1	246	264.6	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

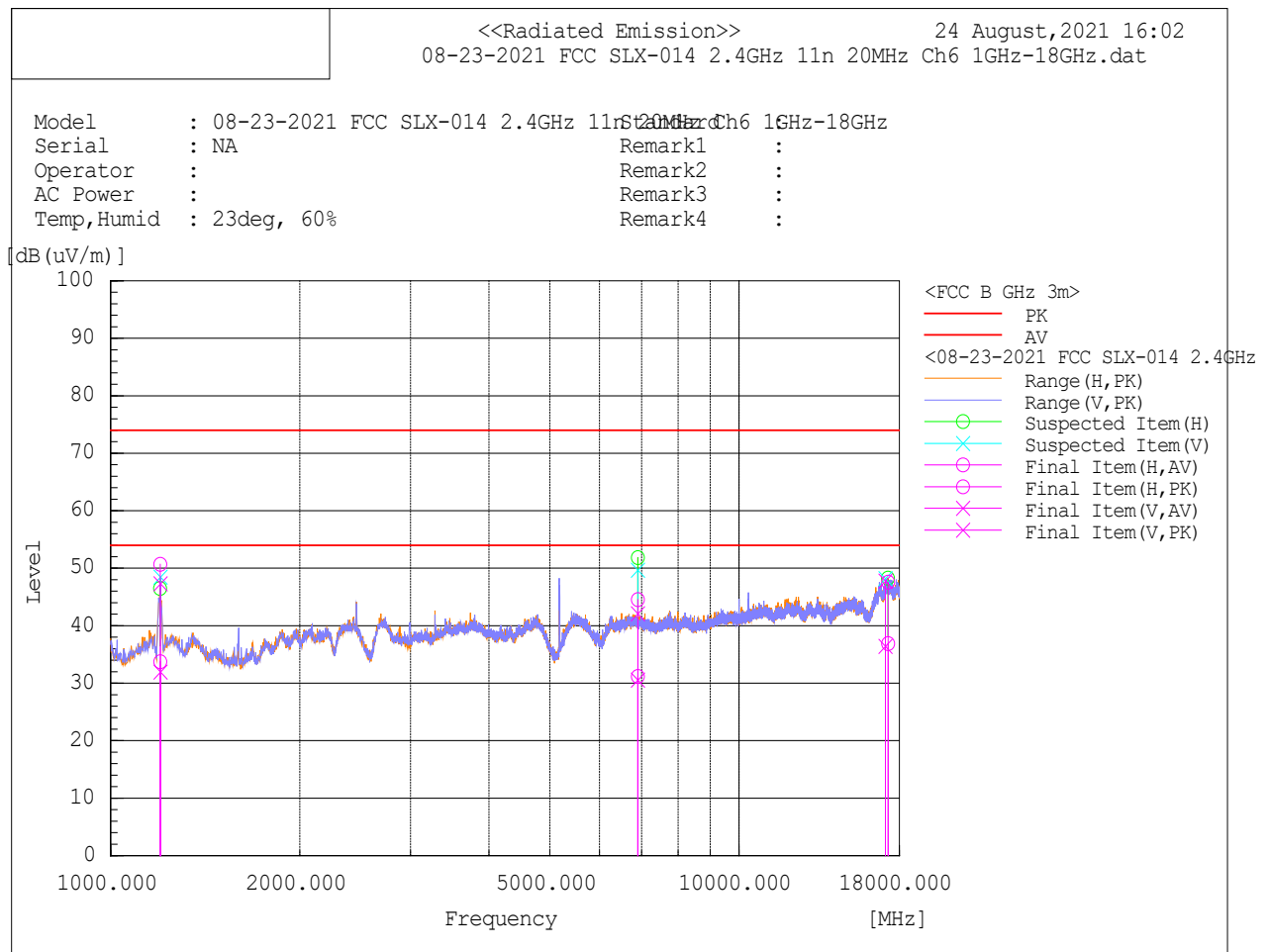


1-18GHz, 802.11n (HT20), Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1199.822	H	50.6	67.6	-16.9	33.7	50.7	54	74	-20.3	-23.3	103	194.2	Pass
2	1200.118	V	48.9	64.2	-16.9	32	47.3	54	74	-22	-26.7	268	73.8	Pass
3	6905.277	V	31.9	43.4	-1.3	30.6	42.1	54	74	-23.4	-31.9	238	37.4	Pass
4	6905.528	H	32.5	45.8	-1.3	31.2	44.5	54	74	-22.8	-29.5	103	172.9	Pass
5	17103.64	V	20.4	31.8	16	36.4	47.8	54	74	-17.6	-26.2	389	20.7	Pass
6	17265.768	H	21.6	32.3	15.3	36.9	47.6	54	74	-17.1	-26.4	268	147.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

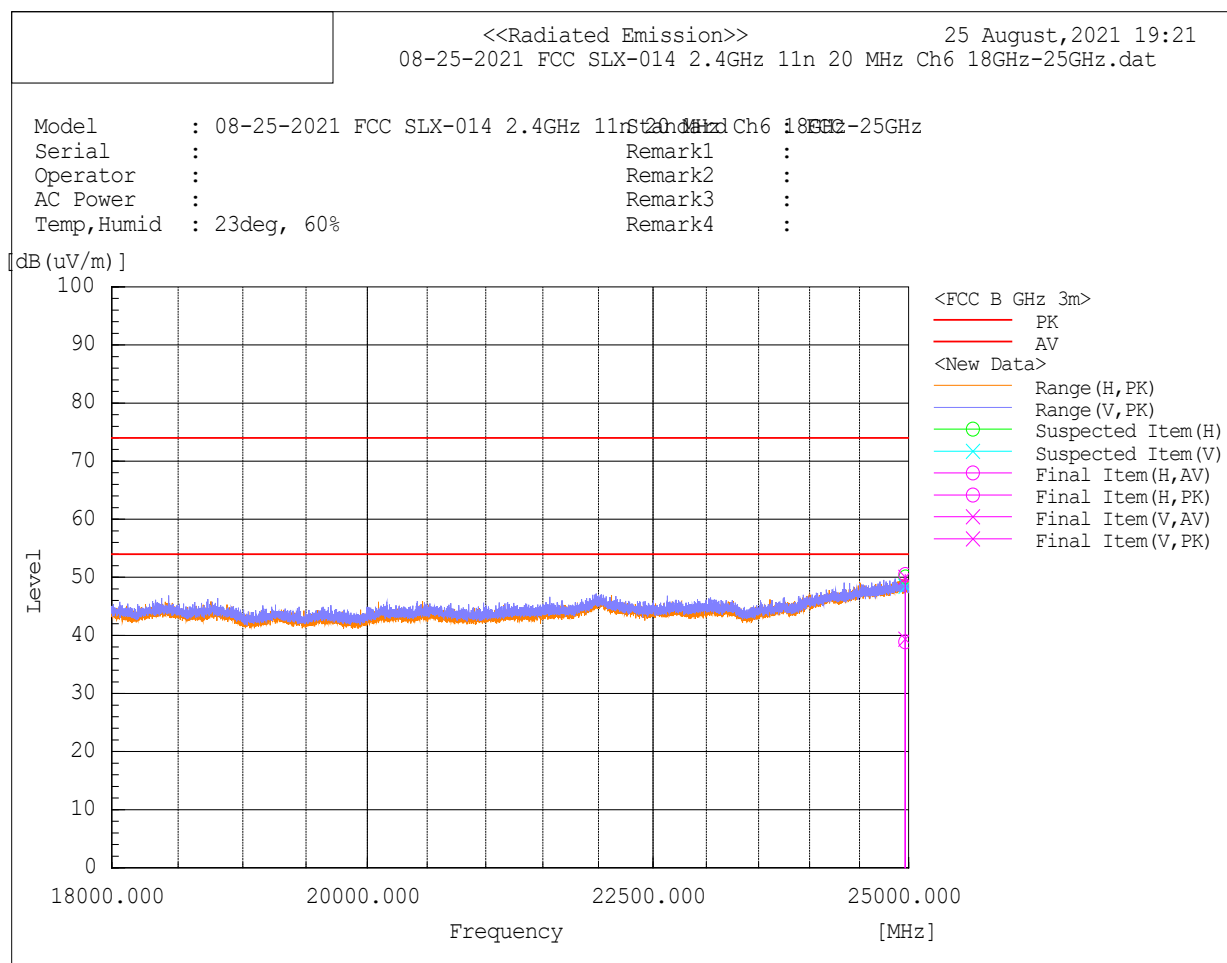


18-25GHz, 802.11n (HT20), Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24965.78	H	21.1	32.7	17.8	38.9	50.5	54	74	-15.1	-23.5	132	183.3	Pass
2	24965.208	V	21.6	32.2	17.8	39.4	50	54	74	-14.6	-24	201	296	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

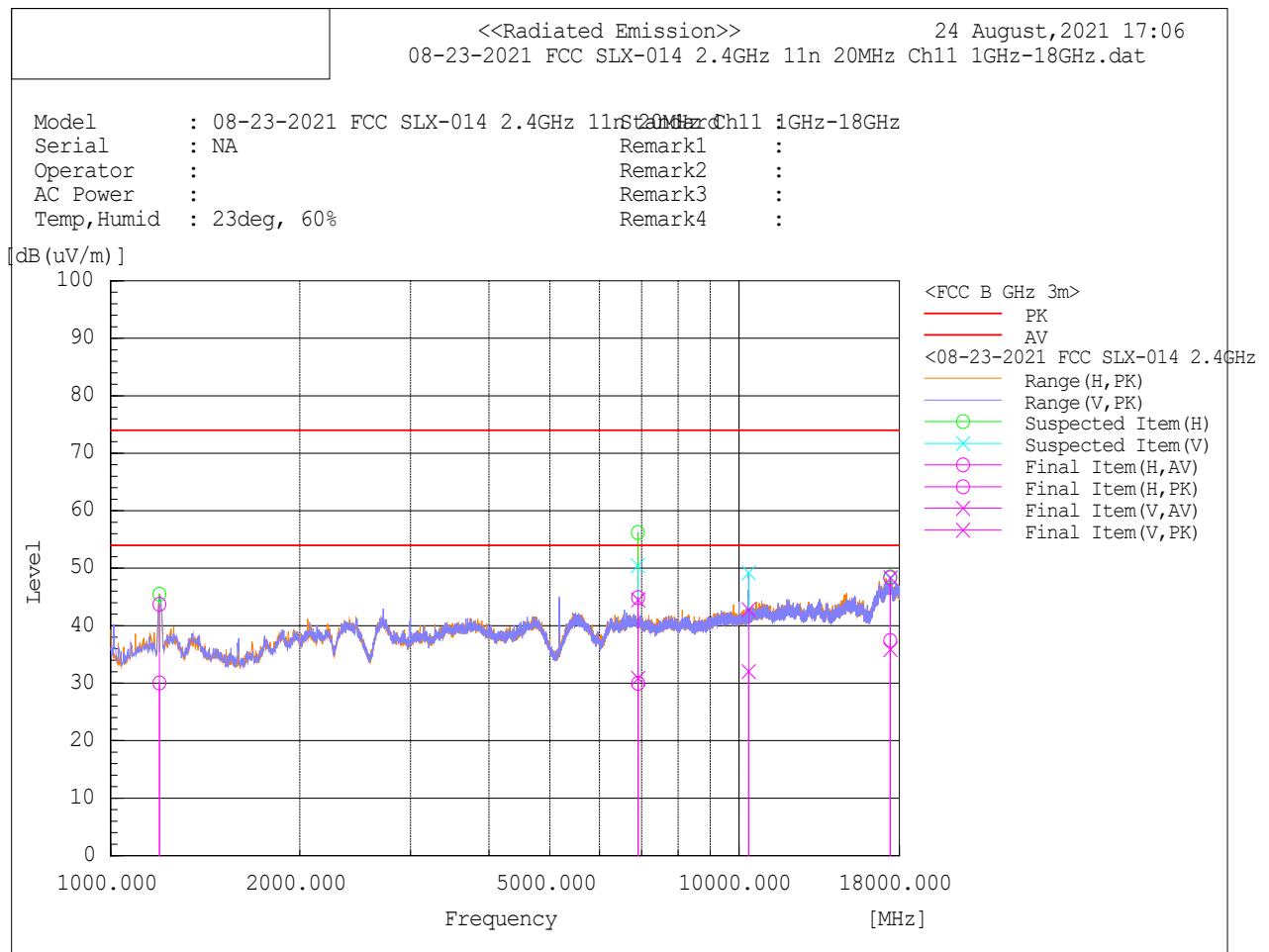


1-18GHz, 802.11n (HT20), Ch11 – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	1195.516	H	47.1	60.7	-17	30.1	43.7	54	74	-23.9	-30.3	208	241.8	Pass
2	6906.148	H	31.3	46.2	-1.3	30	44.9	54	74	-24	-29.1	298	103.6	Pass
3	6906.573	V	32.1	45.8	-1.3	30.8	44.5	54	74	-23.2	-29.5	253	10.5	Pass
4	10358.67	V	26.9	37.7	5.1	32	42.8	54	74	-22	-31.2	389	95.1	Pass
5	17399.478	H	21.6	32.5	15.8	37.4	48.3	54	74	-16.6	-25.7	201	41.2	Pass
6	17416.694	V	20	32.4	15.9	35.9	48.3	54	74	-18.1	-25.7	132	1.8	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

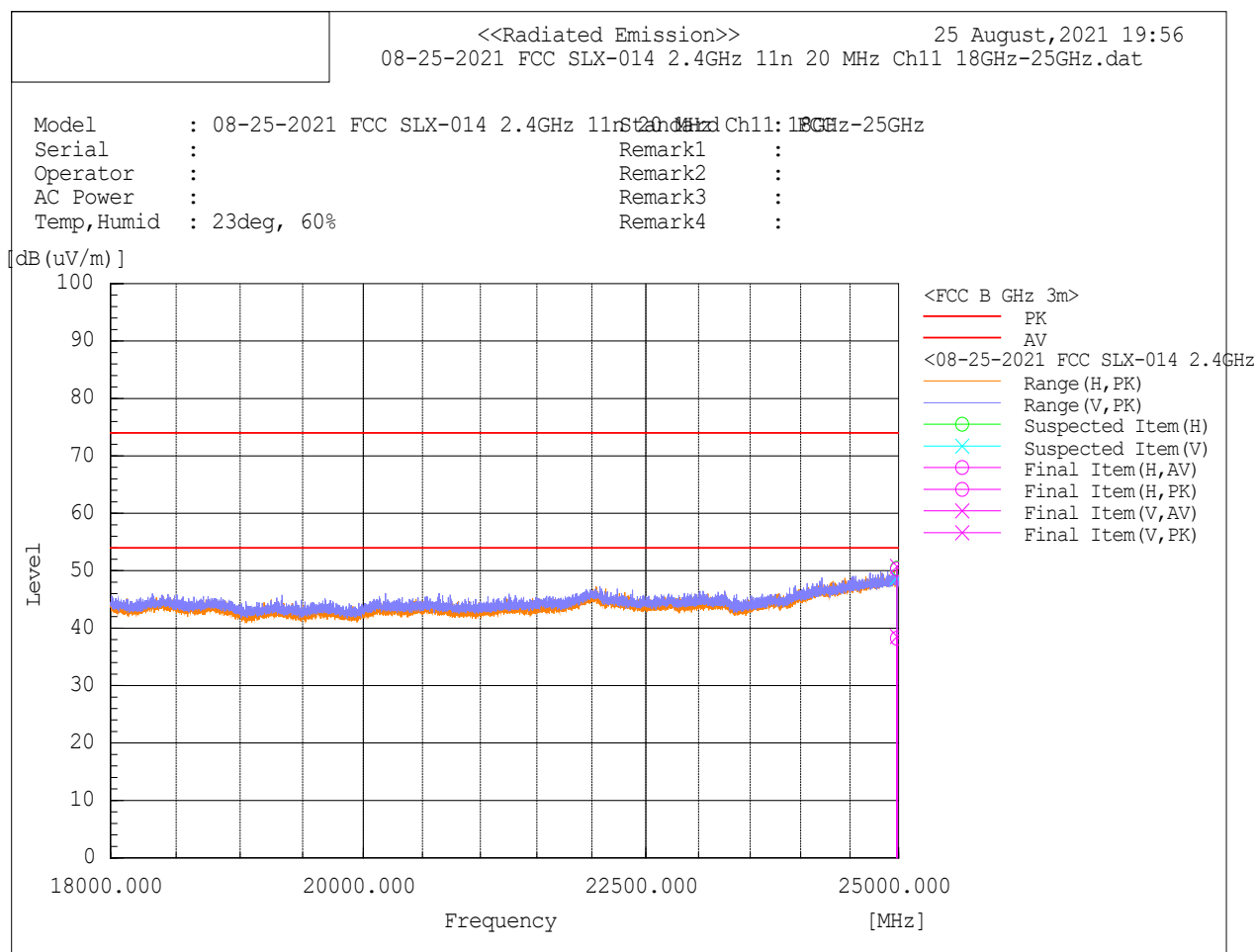


18-25GHz, 802.11n (HT20), Ch11 – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24983.204	H	20.4	32.4	17.9	38.3	50.3	54	74	-15.7	-23.7	100	14.3	Pass
2	24982.394	V	20.7	32.9	17.9	38.6	50.8	54	74	-15.4	-23.2	298	139.5	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

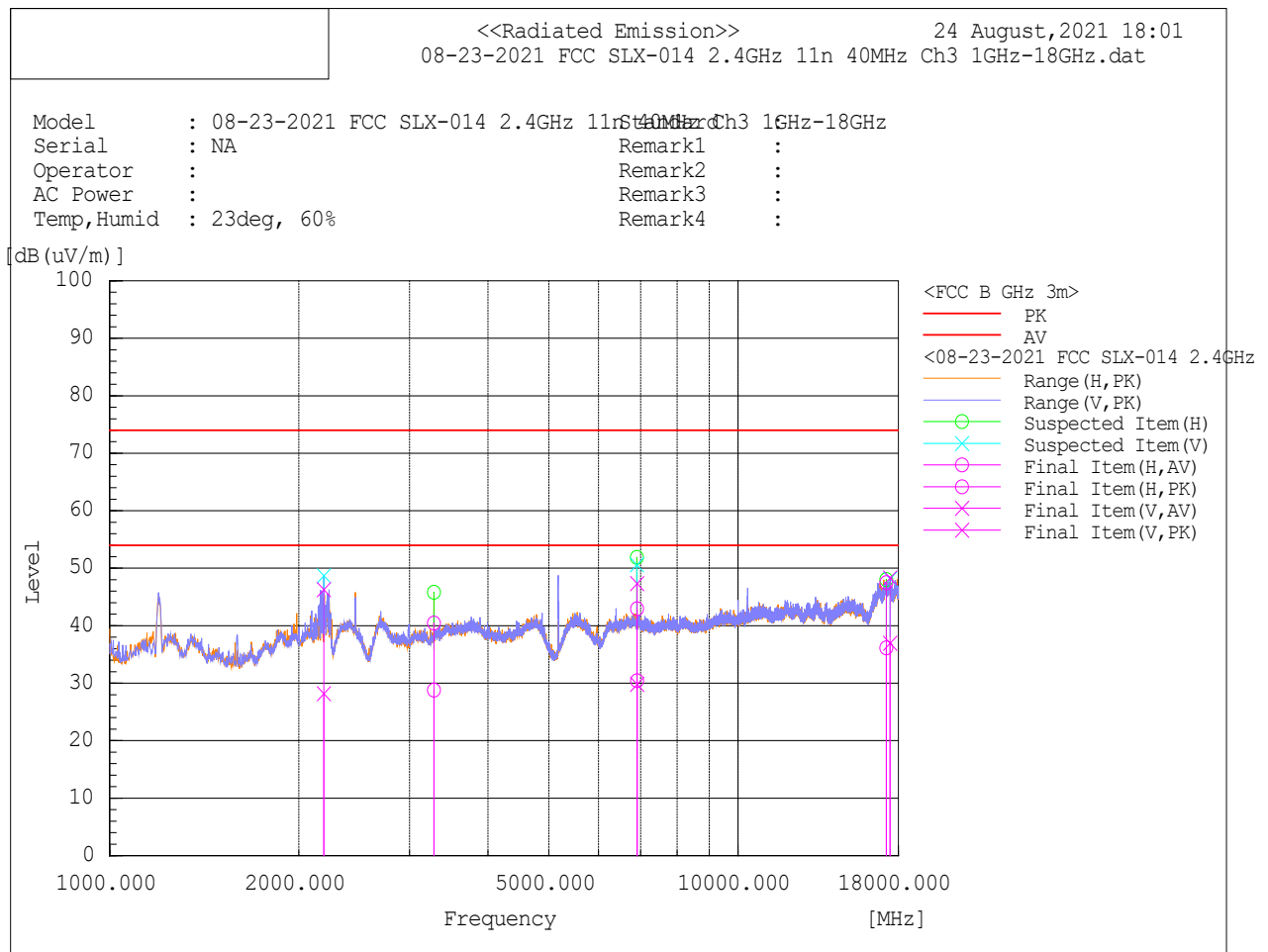


1-18GHz, 802.11n (HT40), Ch3 – 2422MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2191.491	V	40.8	58.9	-12.6	28.2	46.3	54	74	-25.8	-27.7	238	286.4	Pass
2	3282.435	H	37.7	49.4	-8.9	28.8	40.5	54	74	-25.2	-33.5	132	312	Pass
3	6906.508	V	31.1	48.6	-1.3	29.8	47.3	54	74	-24.2	-26.7	208	76.8	Pass
4	6906.89	H	31.7	44.3	-1.3	30.4	43	54	74	-23.6	-31	329	333.3	Pass
5	17222.49	H	20.6	32	15.5	36.1	47.5	54	74	-17.9	-26.5	322	275.3	Pass
6	17456.986	V	20.8	32.1	16.2	37	48.3	54	74	-17	-25.7	389	263.7	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

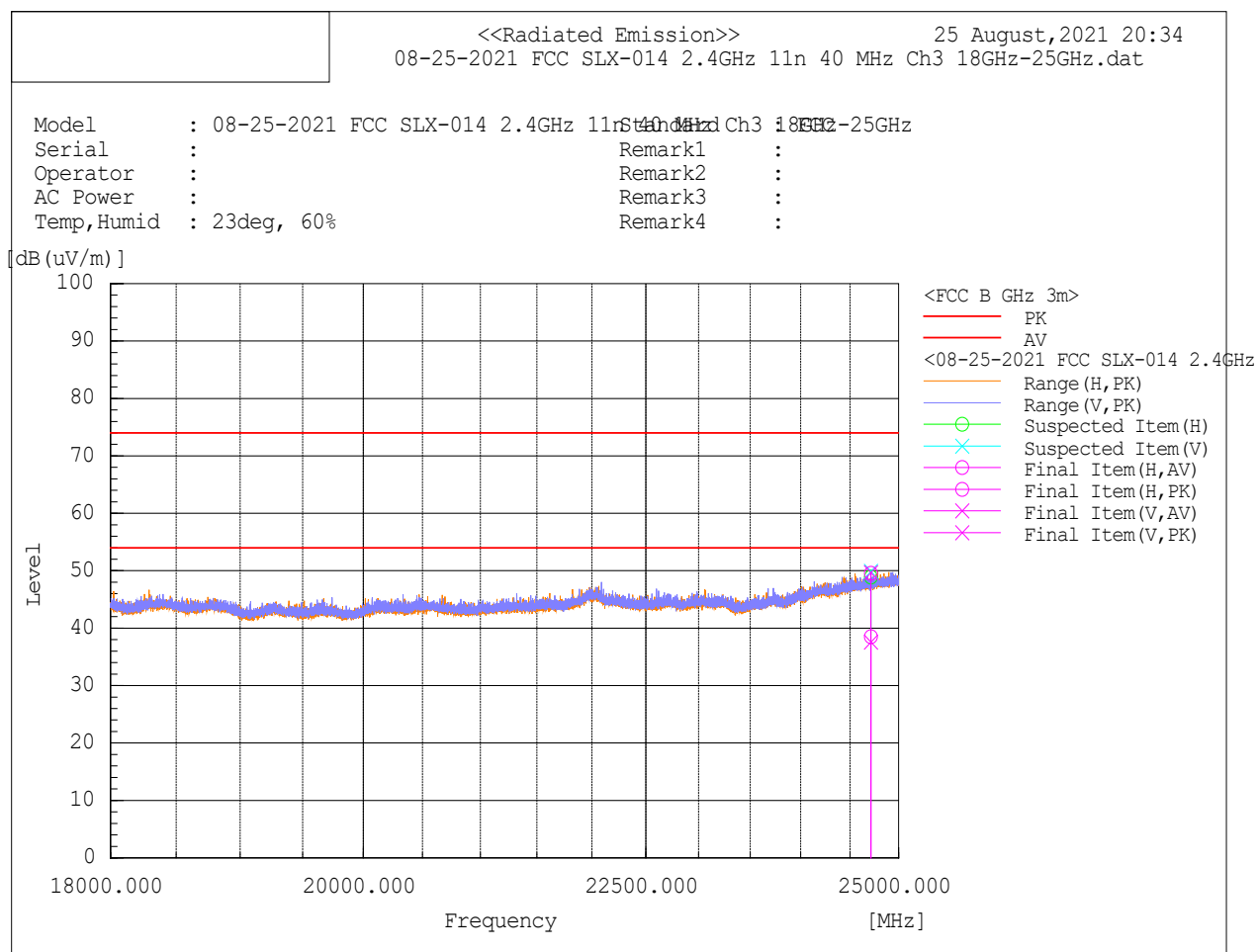


18-25GHz, 802.11n (HT40), Ch3 – 2422MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24712.314	V	20	32.1	17.6	37.6	49.7	54	74	-16.4	-24.3	389	0	Pass
2	24712.846	H	20.9	32	17.6	38.5	49.6	54	74	-15.5	-24.4	246	333.8	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

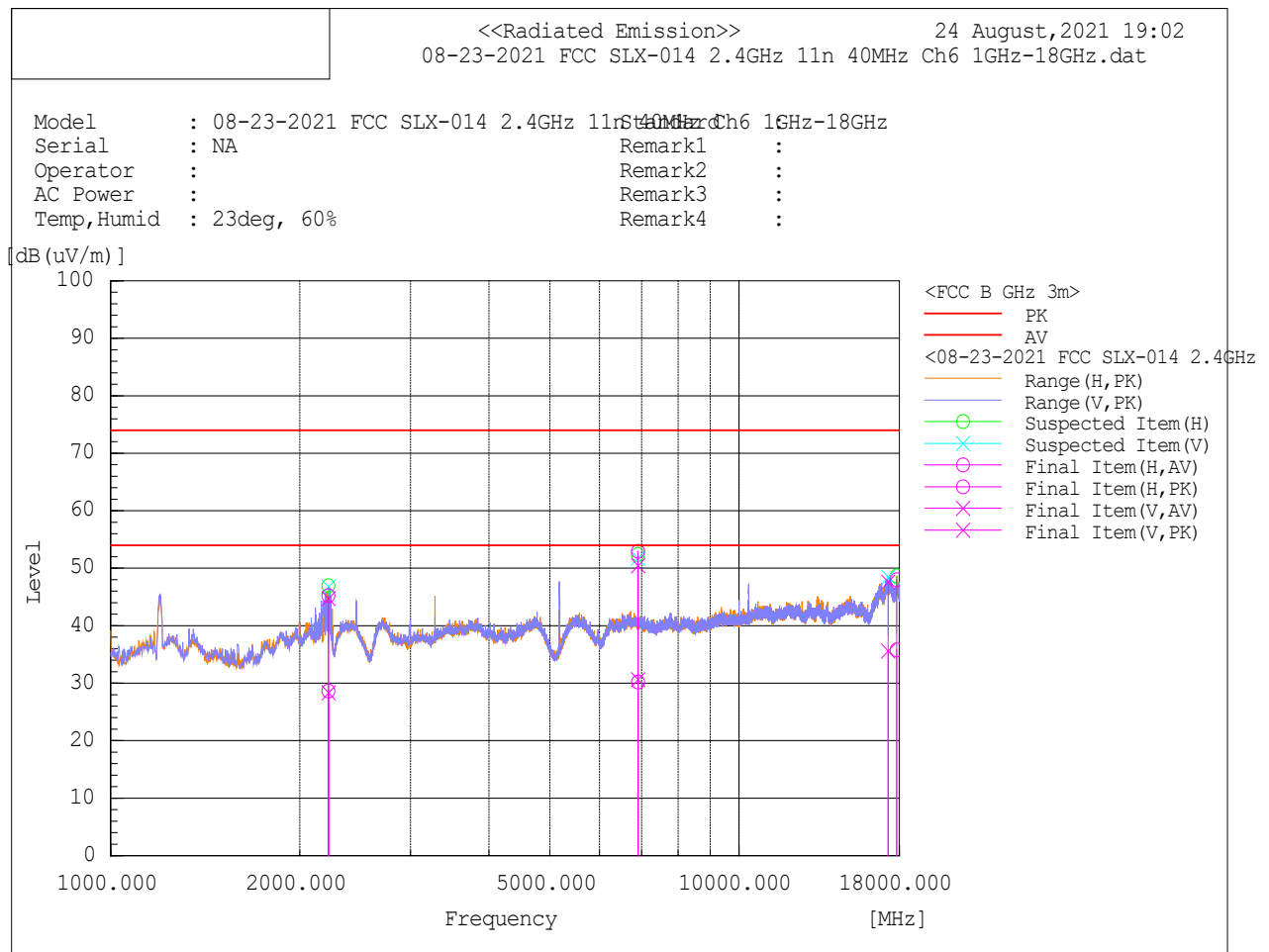


1-18GHz, 802.11n (HT40), Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2221.197	H	41.1	57.8	-12.5	28.6	45.3	54	74	-25.4	-28.7	100	194.7	Pass
2	2223.206	V	40.8	57.2	-12.5	28.3	44.7	54	74	-25.7	-29.3	389	229.3	Pass
3	6907.261	V	31.9	51.7	-1.3	30.6	50.4	54	74	-23.4	-23.6	117	353.4	Pass
4	6906.658	H	31.5	54.2	-1.3	30.2	52.9	54	74	-23.8	-21.1	103	103.7	Pass
5	17268.16	V	20.3	32.3	15.3	35.6	47.6	54	74	-18.4	-26.4	140	61.2	Pass
6	17823.976	H	19.3	31.5	16.5	35.8	48	54	74	-18.2	-26	283	253.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

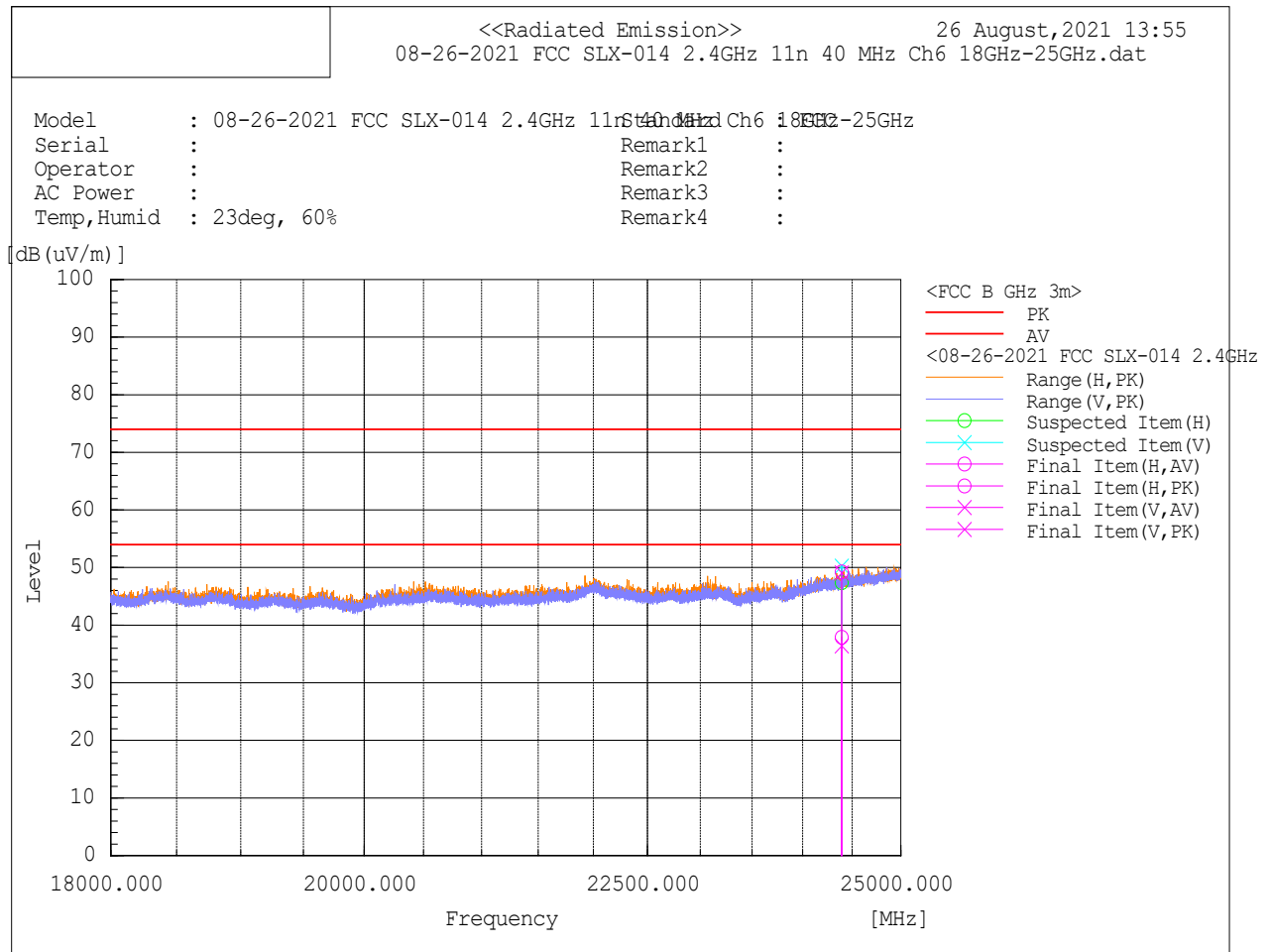


18-25GHz, 802.11n (HT40), Ch6 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24392.644	V	19.1	31.8	17.3	36.4	49.1	54	74	-17.6	-24.9	389	2	Pass
2	24392.562	H	20.6	31.9	17.3	37.9	49.2	54	74	-16.1	-24.8	207	48.5	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

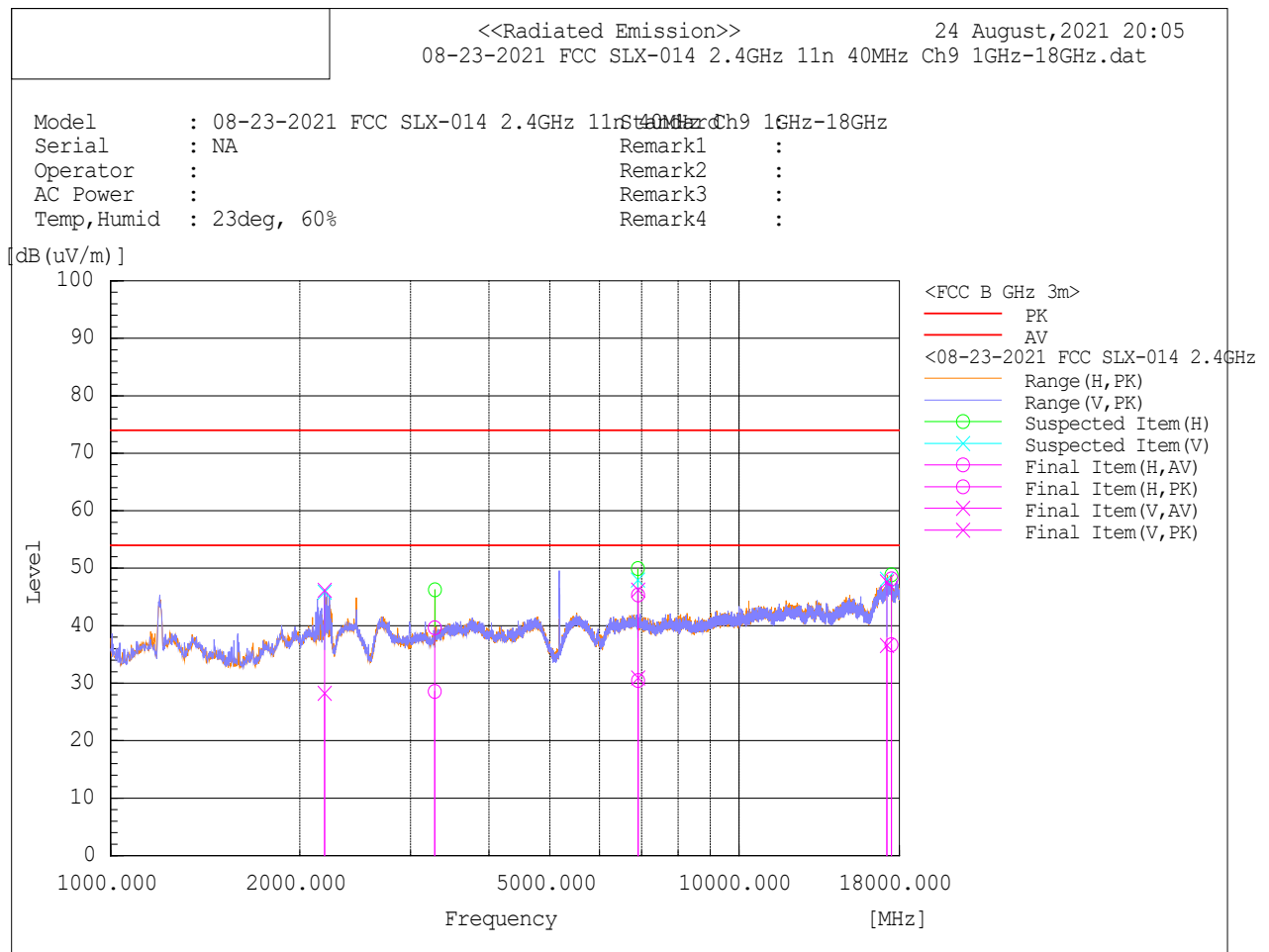


1-18GHz, 802.11n (HT40), Ch9 – 2452MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2190.089	V	40.9	58.8	-12.6	28.3	46.2	54	74	-25.7	-27.8	208	158.5	Pass
2	3280.456	H	37.5	48.5	-8.9	28.6	39.6	54	74	-25.4	-34.4	125	205.2	Pass
3	6906.648	V	32.3	47.5	-1.3	31	46.2	54	74	-23	-27.8	103	181.4	Pass
4	6906.546	H	31.8	46.7	-1.3	30.5	45.4	54	74	-23.5	-28.6	283	197.4	Pass
5	17194.798	V	21	32	15.6	36.6	47.6	54	74	-17.4	-26.4	223	284.5	Pass
6	17485.93	H	20.4	31.9	16.3	36.7	48.2	54	74	-17.3	-25.8	389	358.4	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.

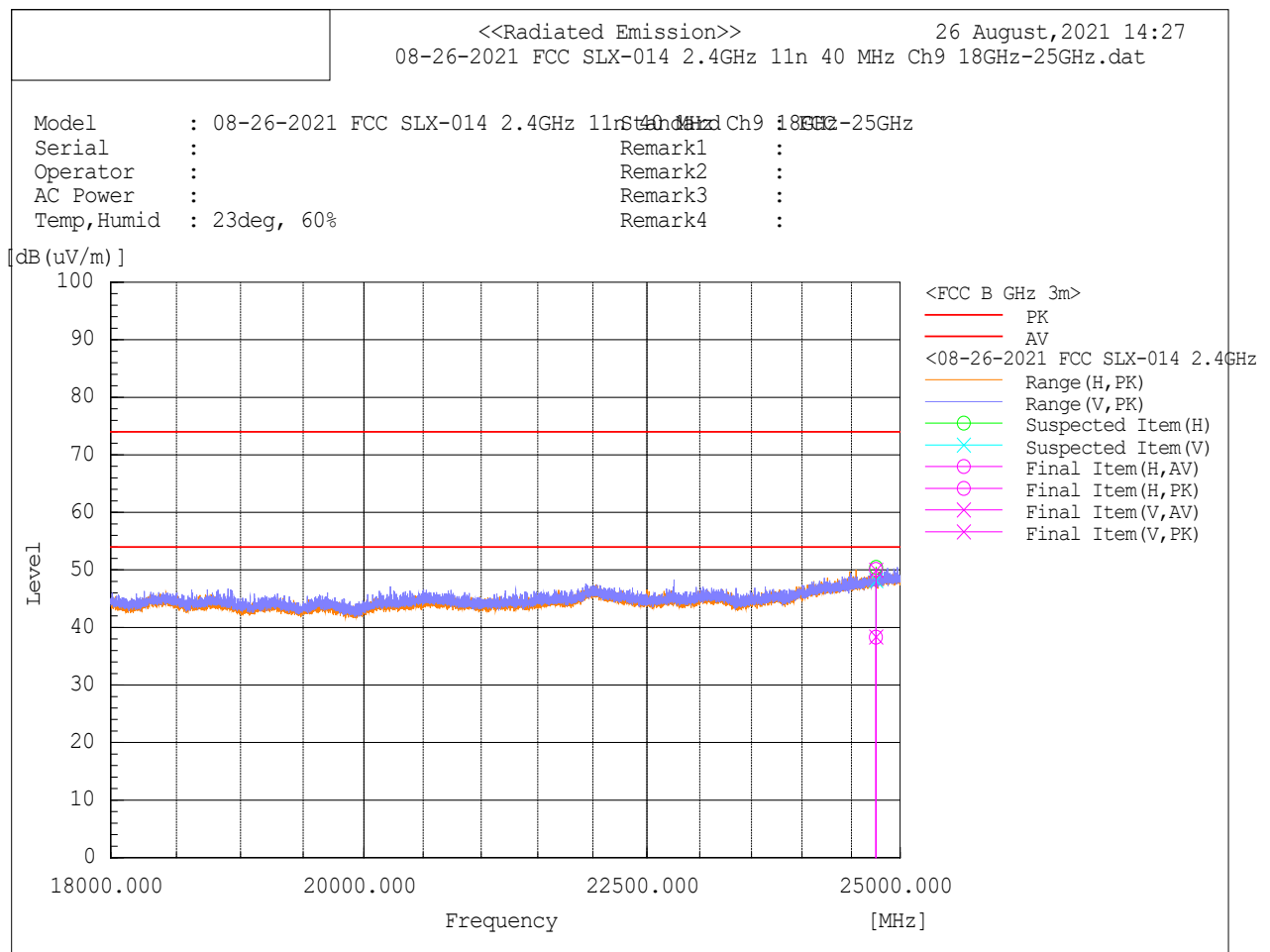


18-25GHz, 802.11n (HT40), Ch9 – 2452MHz

ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

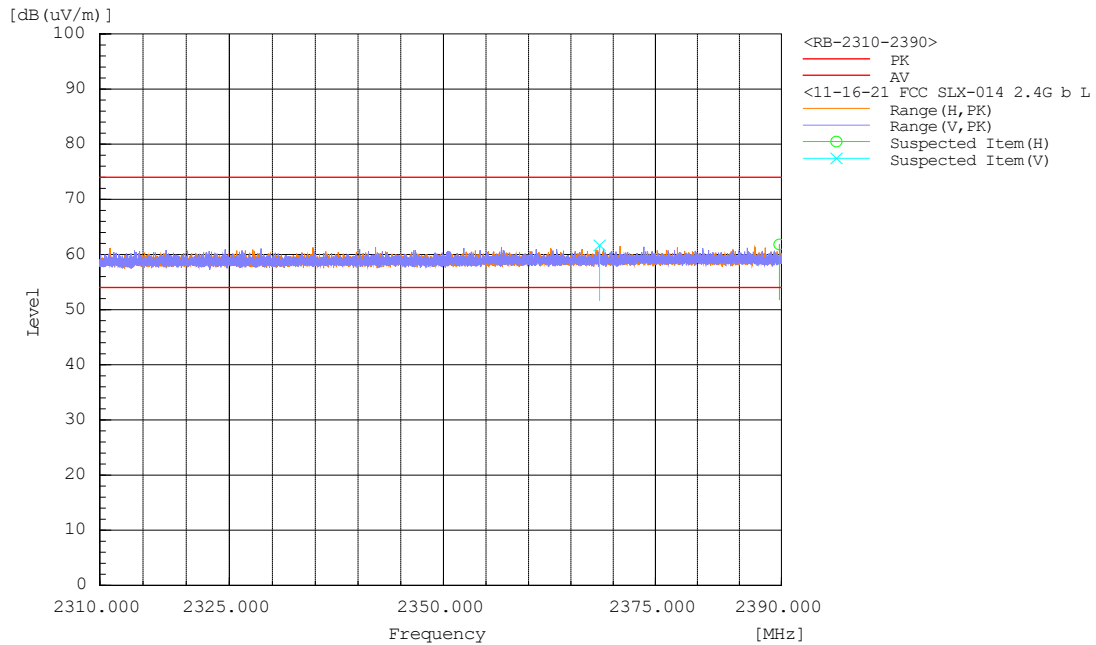
No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	24749.608	H	20.7	32.5	17.6	38.3	50.1	54	74	-15.7	-23.9	140	0	Pass
2	24750.678	V	20.7	32.2	17.7	38.4	49.9	54	74	-15.6	-24.1	103	295.2	Pass

Note: Lower of the FCC 15B limit/15.209 limit was used.



4.3.4 Test Results: Band Edge

Band Edge (802.11b low channel)



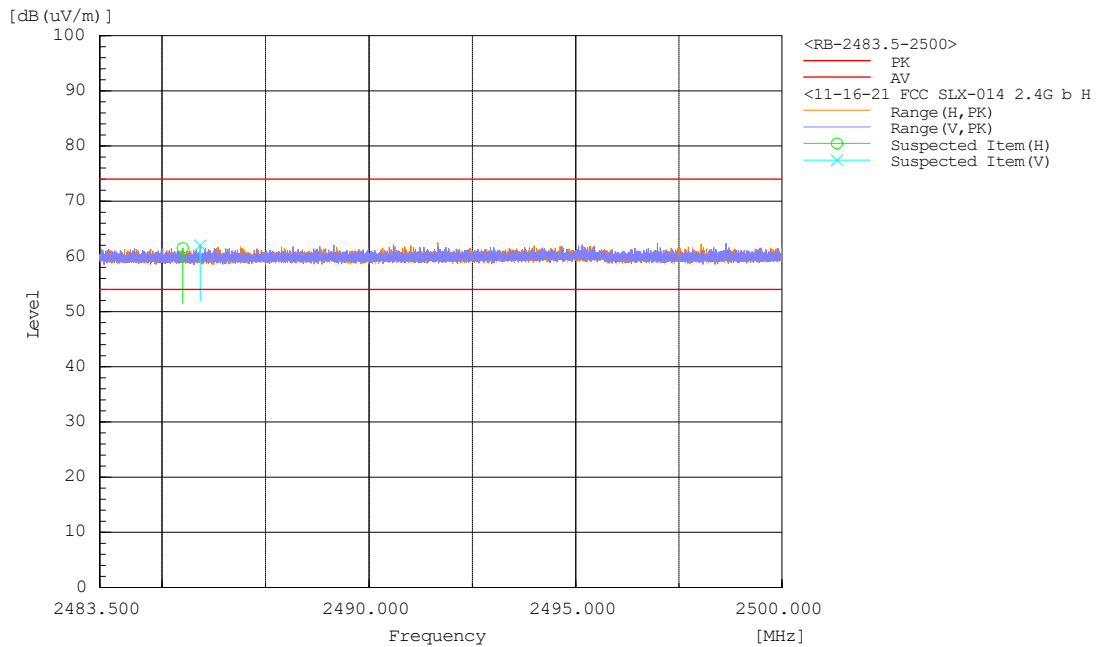
ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2368.384	V	7.9	21.4	34.9	42.8	56.3	54	74	-11.2	-17.7	237	168.2	Pass
2	2389.768	H	7.9	22.1	35	42.9	57.1	54	74	-11.1	-16.9	237	357.1	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11b high channel)



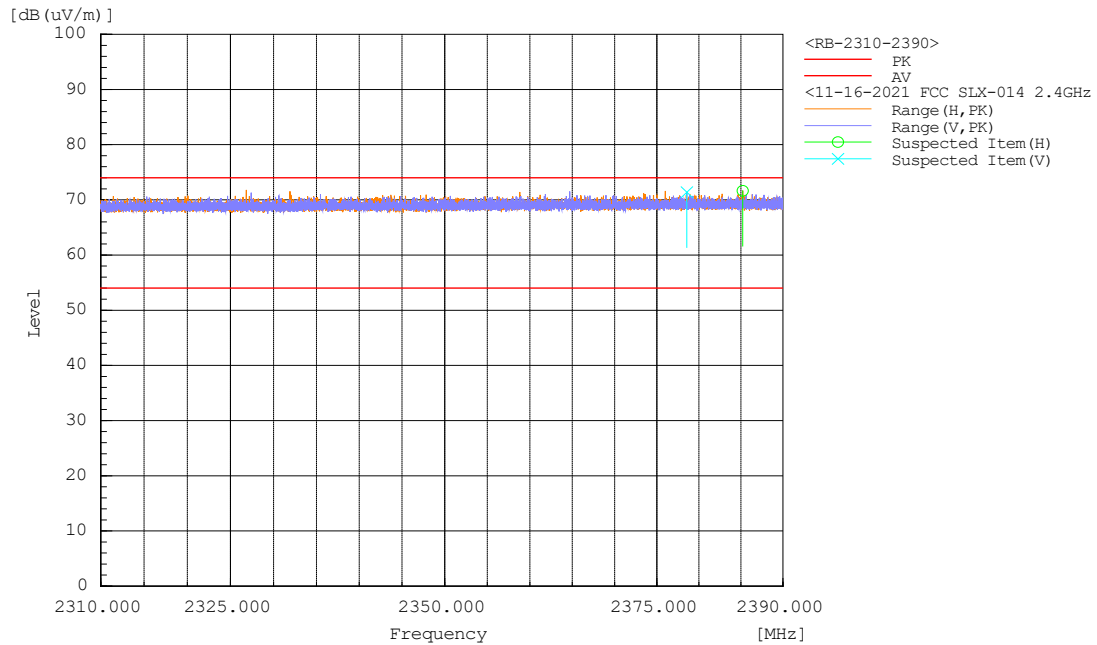
ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2485.503	H	8.4	22.3	35.4	43.8	57.7	54	74	-10.2	-16.3	153	47.2	Pass
2	2485.922	V	8.3	21.5	35.4	43.7	56.9	54	74	-10.3	-17.1	115	69.2	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11g low channel)



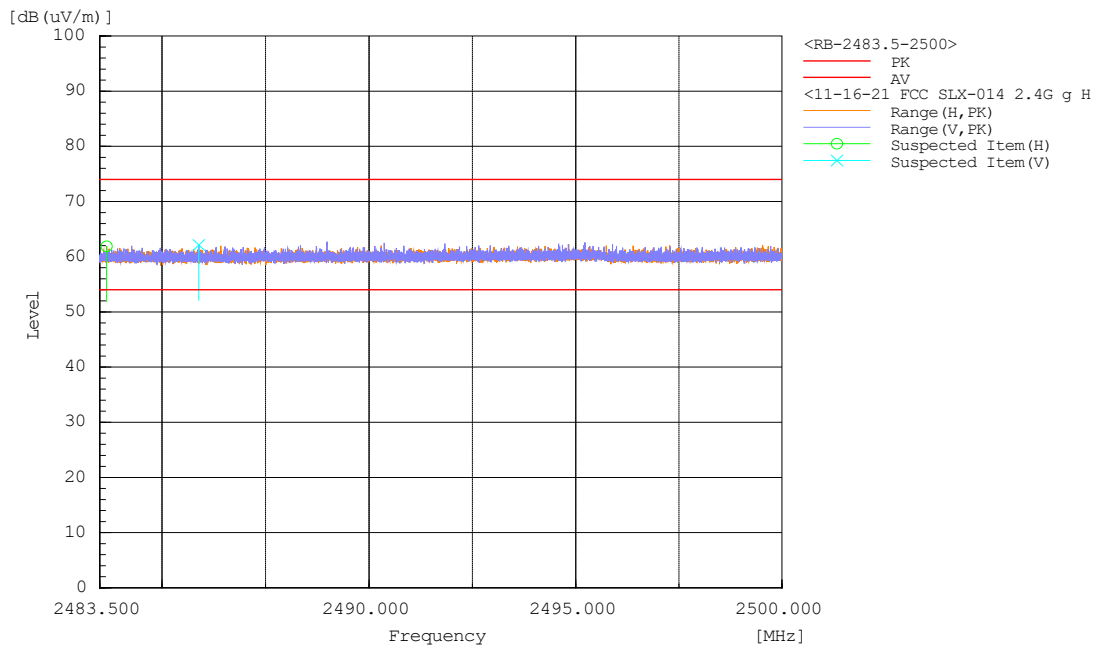
ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2378.56	V	9.1	23.5	35	44.1	58.5	54	74	-9.9	-15.5	182	136.7	Pass
2	2385.2	H	8.6	22.3	35	43.6	57.3	54	74	-10.4	-16.7	190	356.3	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11g high channel)



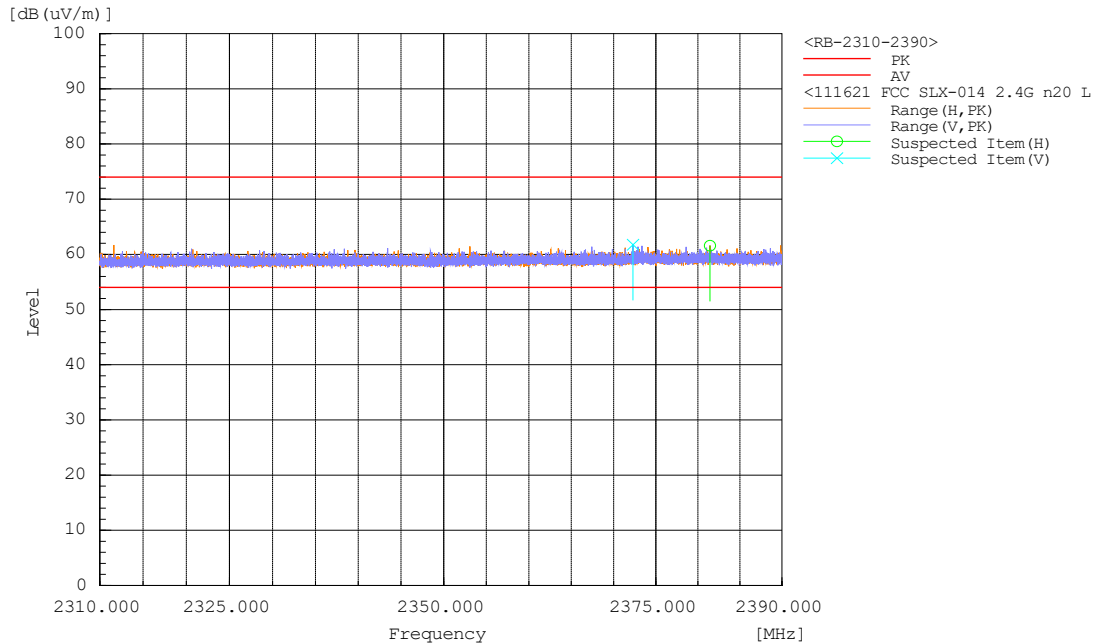
ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2483.667	H	8.1	21.4	35.4	43.5	56.8	54	74	-10.5	-17.2	379	200.6	Pass
2	2485.888	V	9.1	22.8	35.4	44.5	58.2	54	74	-9.5	-15.8	99	62.9	Pass

REMARKS:

- Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
- Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
- Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11nHT20 low channel)



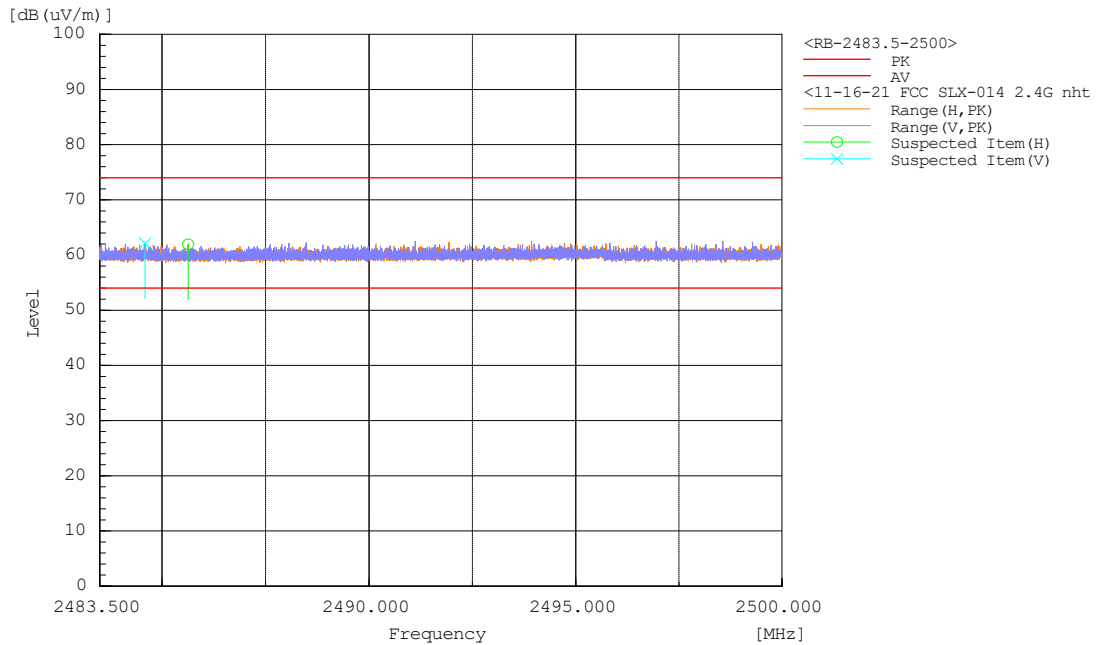
ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2372.288	V	8.4	22.4	35	43.4	57.4	54	74	-10.6	-16.6	124	170.4	Pass
2	2381.44	H	8.7	22.4	35	43.7	57.4	54	74	-10.3	-16.6	256	358.5	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11nHT20 high channel)



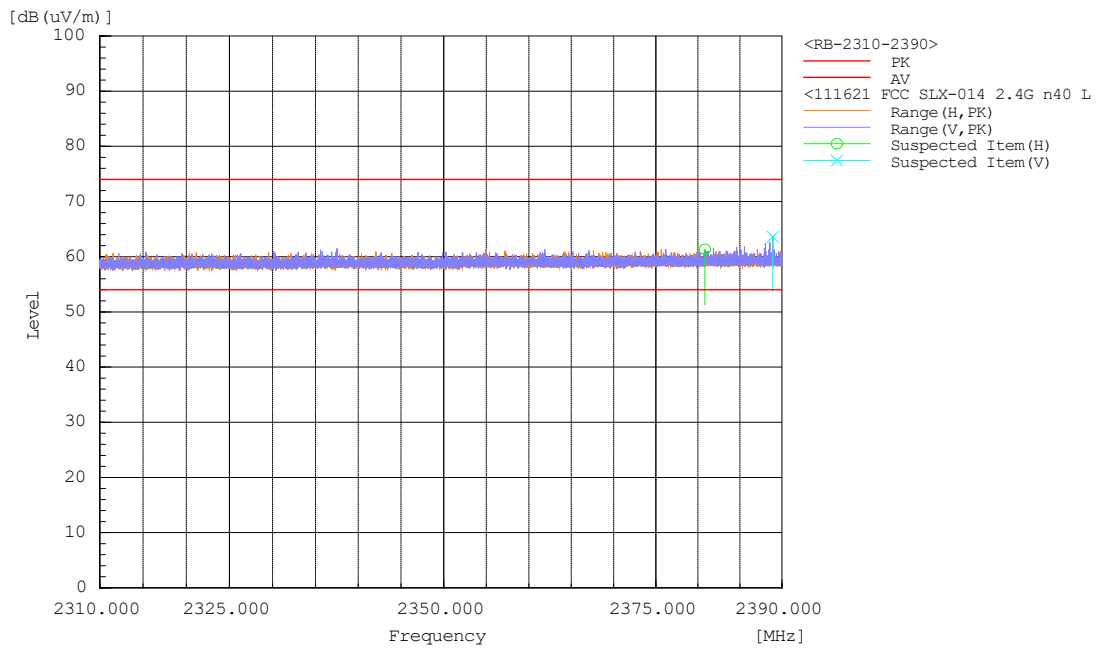
ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2484.592	V	9.6	23	35.4	45	58.4	54	74	-9	-15.6	200	96.8	Pass
2	2485.63	H	9	22.6	35.4	44.4	58	54	74	-9.6	-16	200	51.7	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11nHT40 low channel)



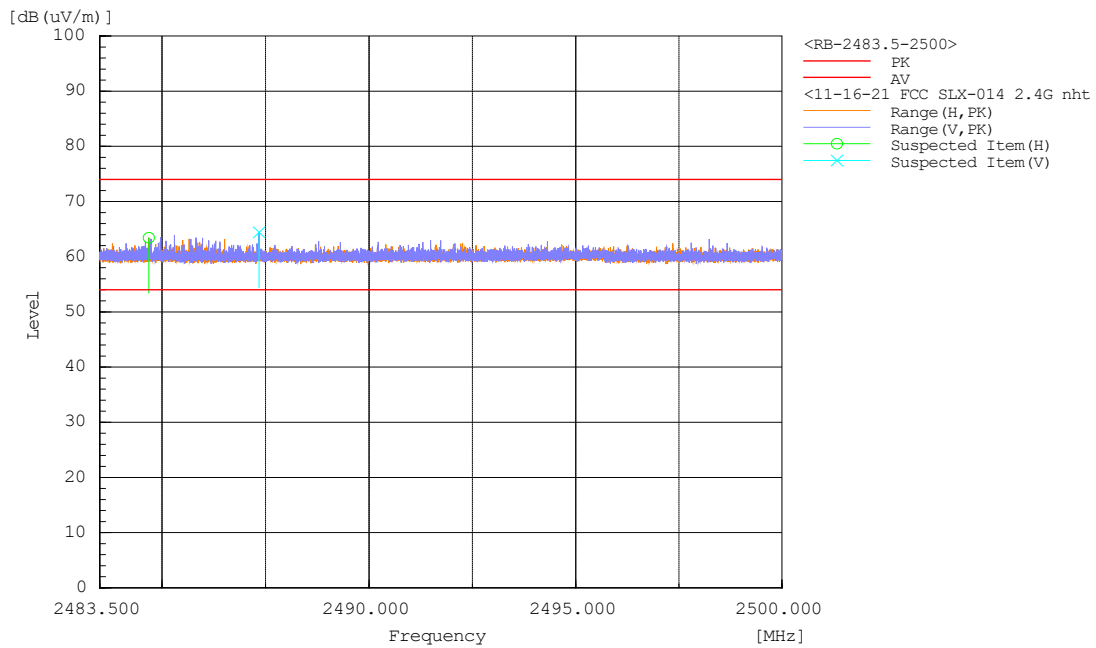
ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2380.84	H	8.7	26.4	35	43.7	61.4	54	74	-10.3	-12.6	238	359.8	Pass
2	2388.904	V	9.2	28.7	35	44.2	63.7	54	74	-9.8	-10.3	181	137.7	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge (802.11nHT40 high channel)



ANTENNA POLARITY & test distance: HORIZONTAL & VERTICAL at 3 m

No	Frequency [MHz]	Pol	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit\AV [dB(uV/m)]	Limit\PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Pass /Fail
1	2484.682	H	9.8	28.2	35.4	45.2	63.6	54	74	-8.8	-10.4	172	52.6	Pass
2	2487.341	V	10.4	28.4	35.5	45.9	63.9	54	74	-8.1	-10.1	209	86	Pass

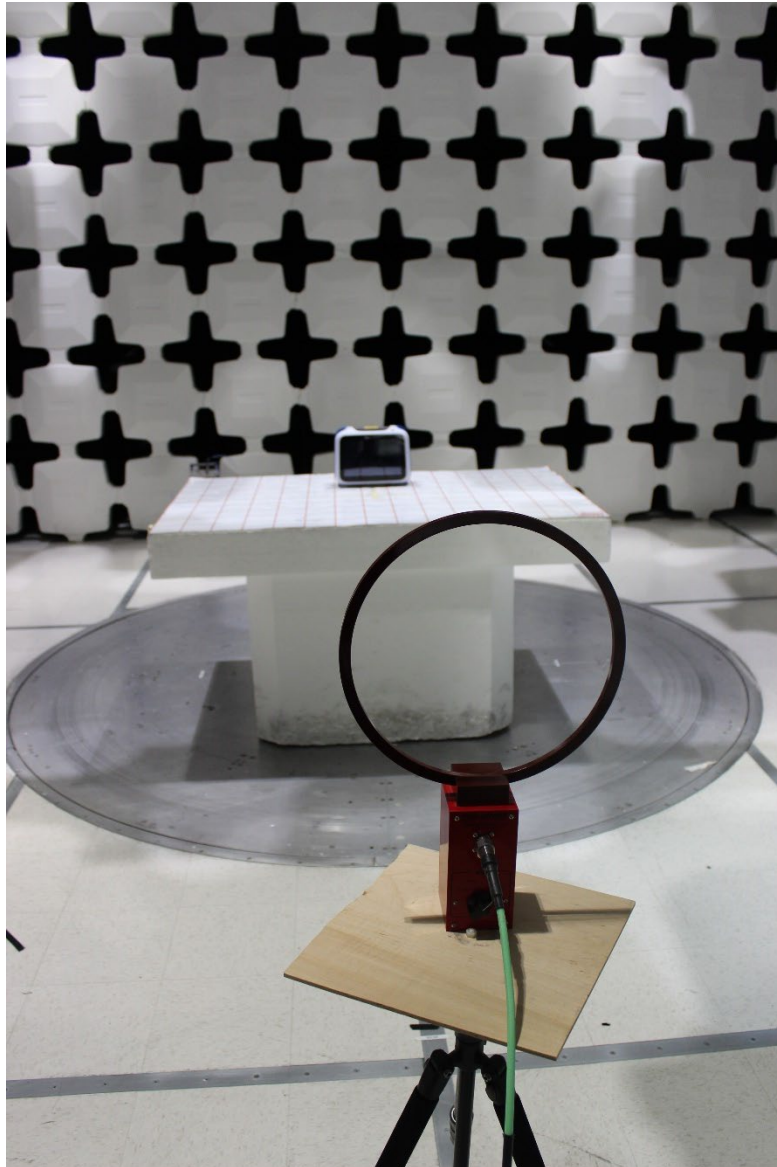
REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

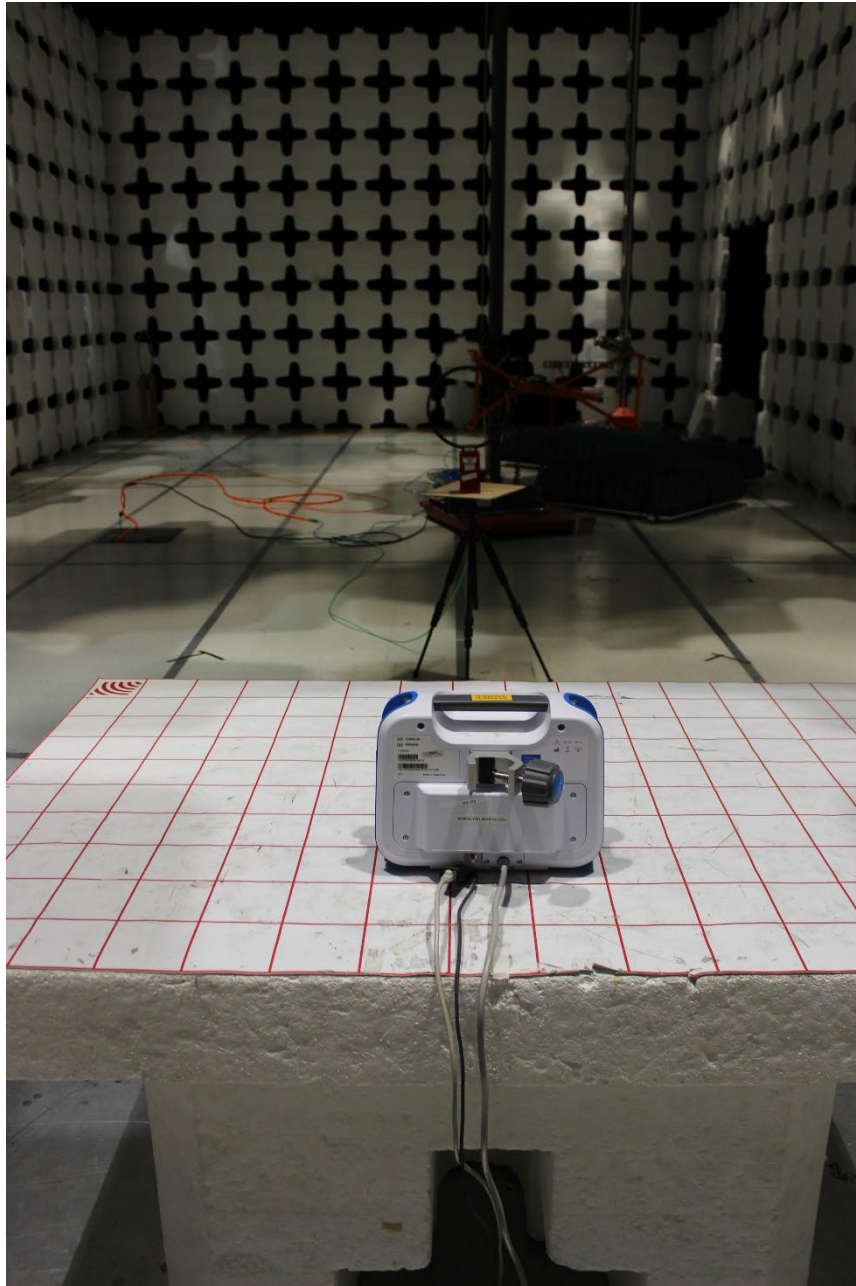
5 Pictures of Test Arrangements

5.1 Radiated Emissions 9 KHz to 30 MHz

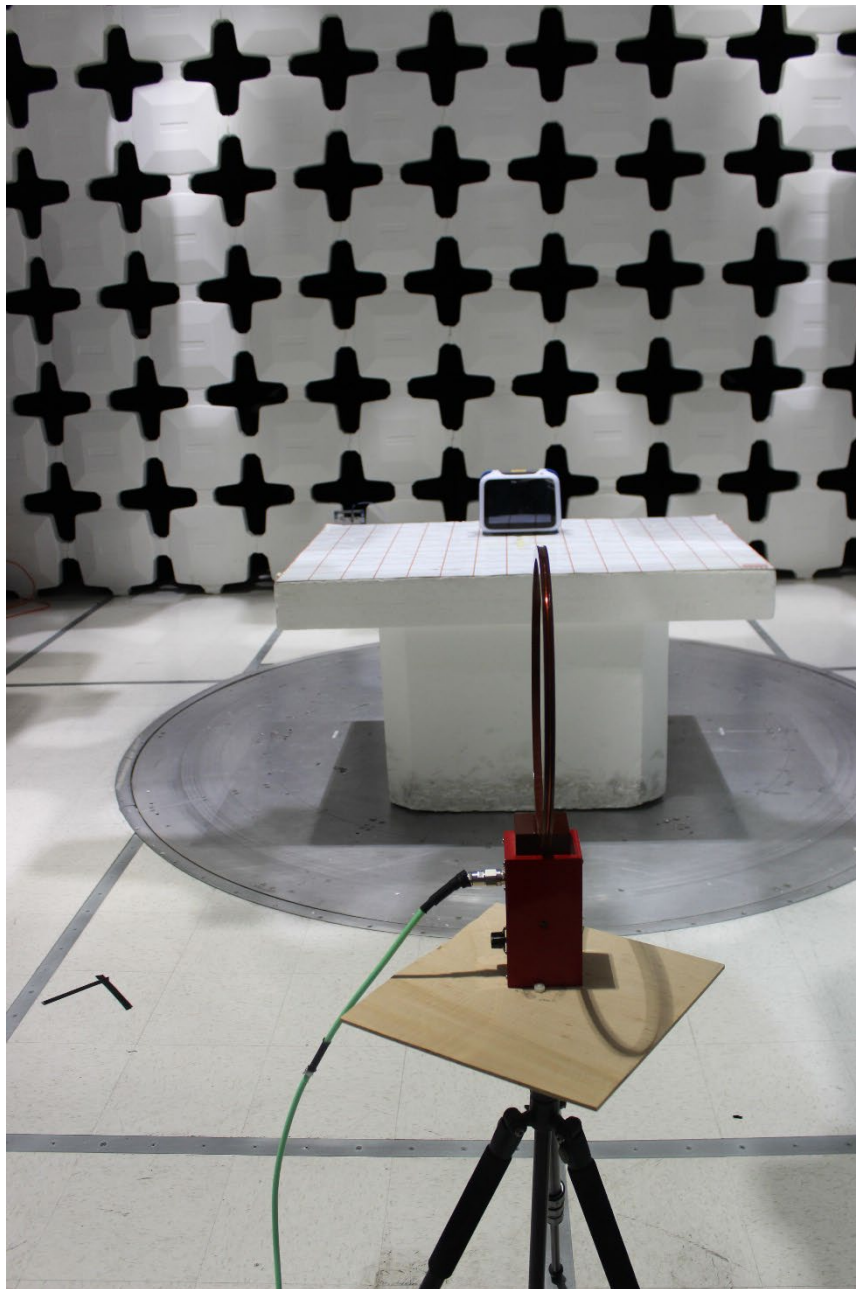
Setup 9KHz-30MHz Loop Antenna 90°



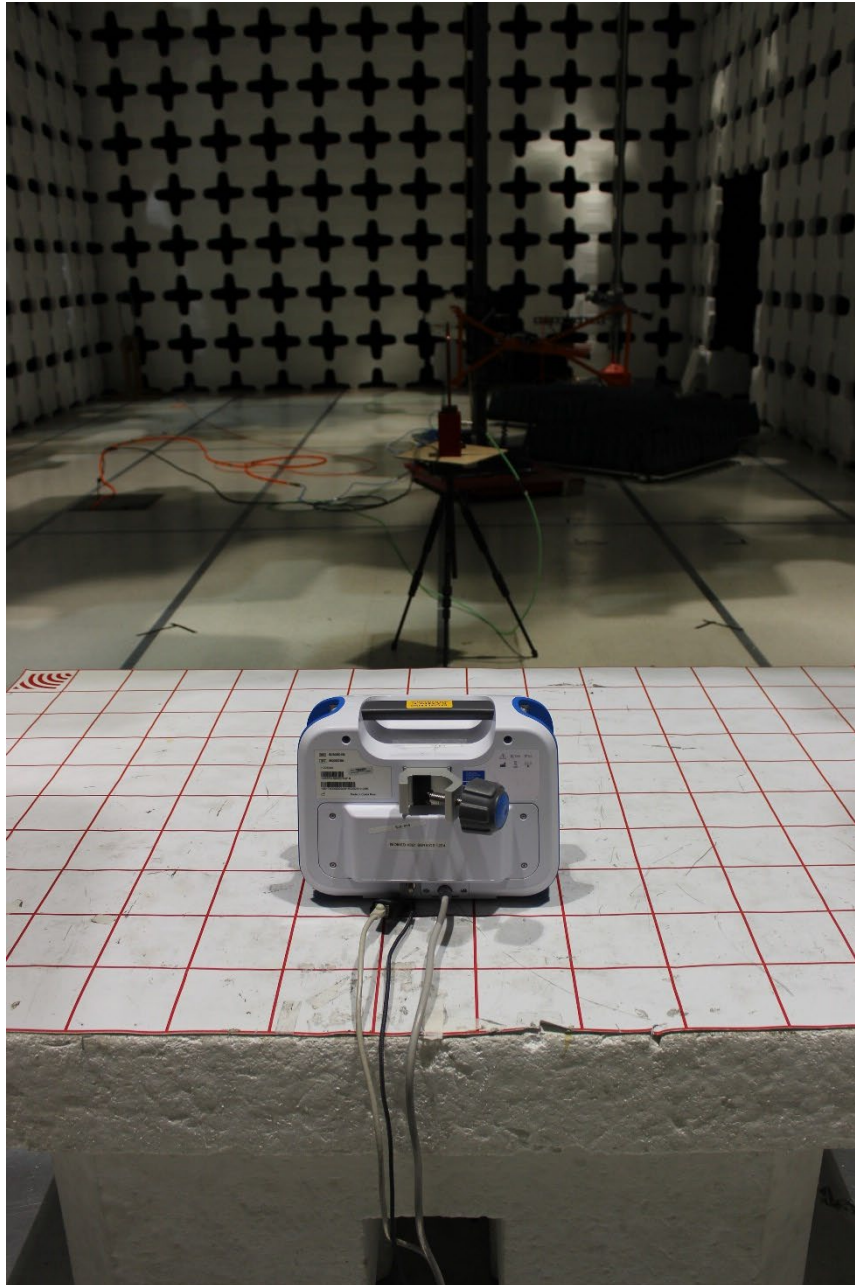
Setup 9KHz-30MHz Loop Antenna 90° Rear



Setup 9KHz-30MHz Loop Antenna 0° Front

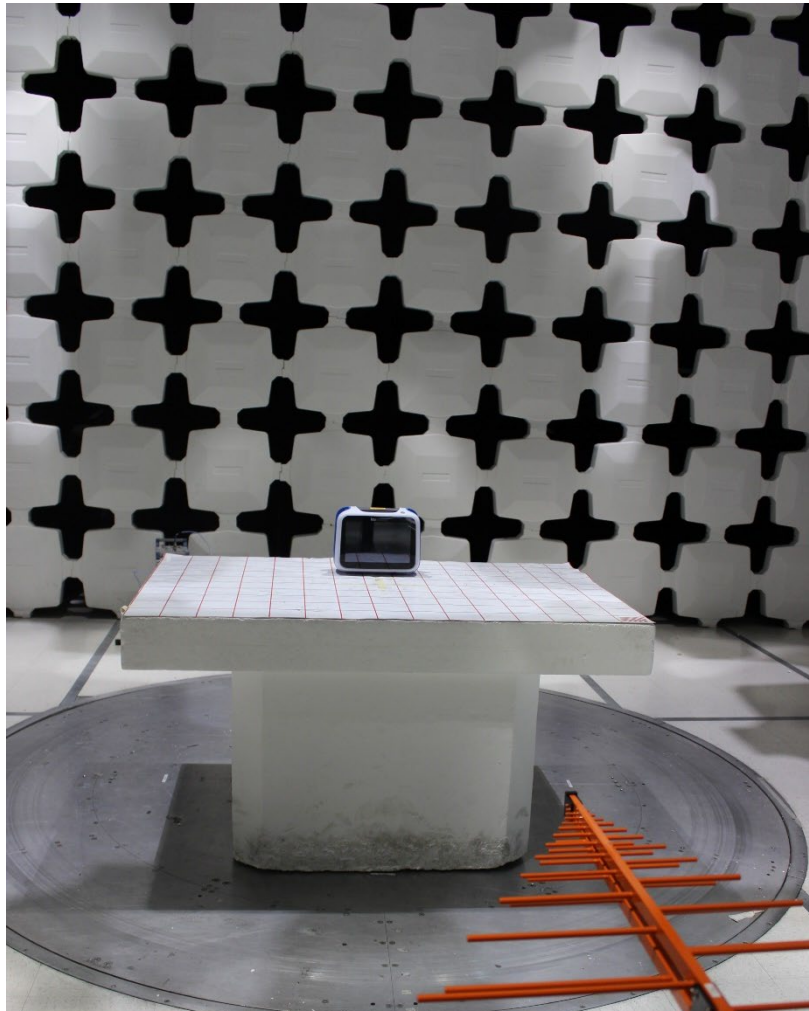


Setup 9KHz-30MHz Loop Antenna 0° Rear

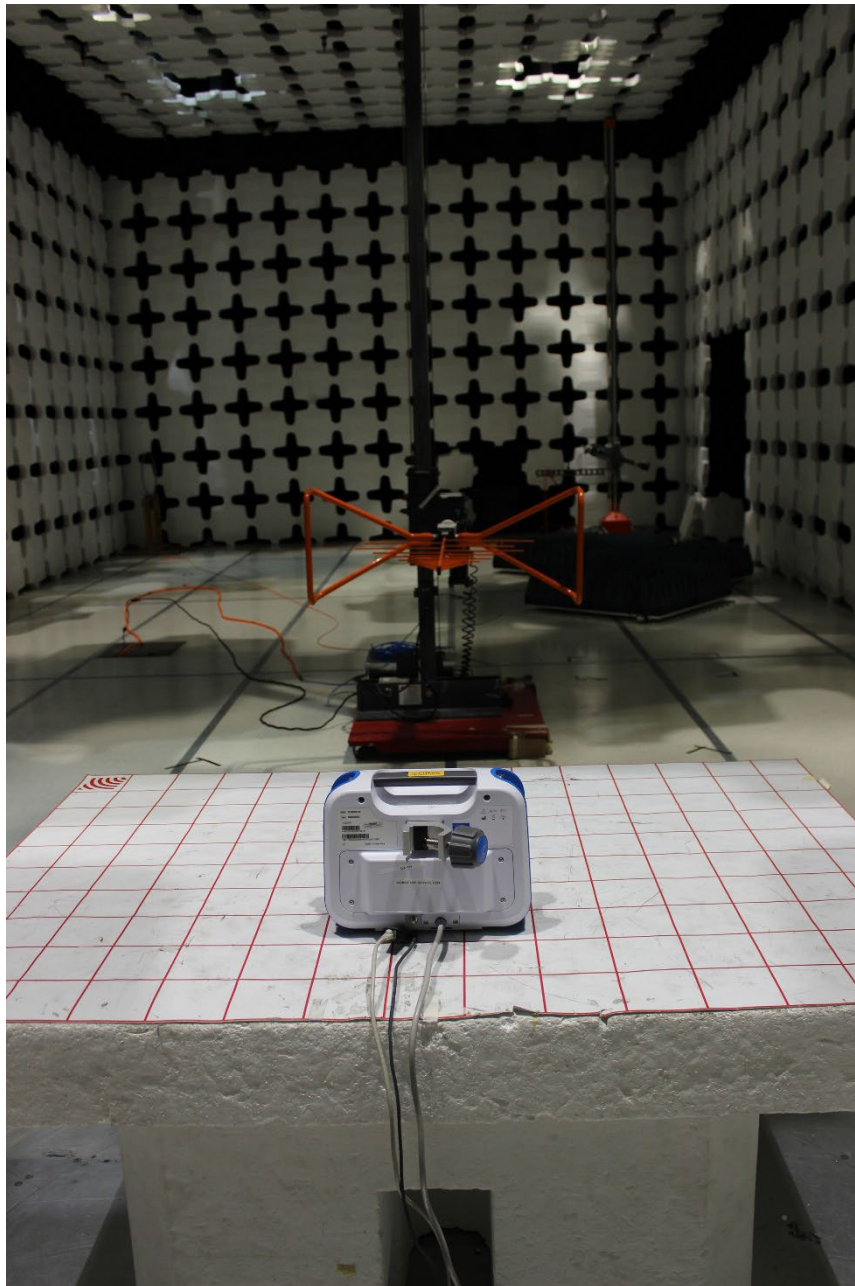


5.2 Radiated Emissions up to 1 GHz

Setup 30-1000MHz Front

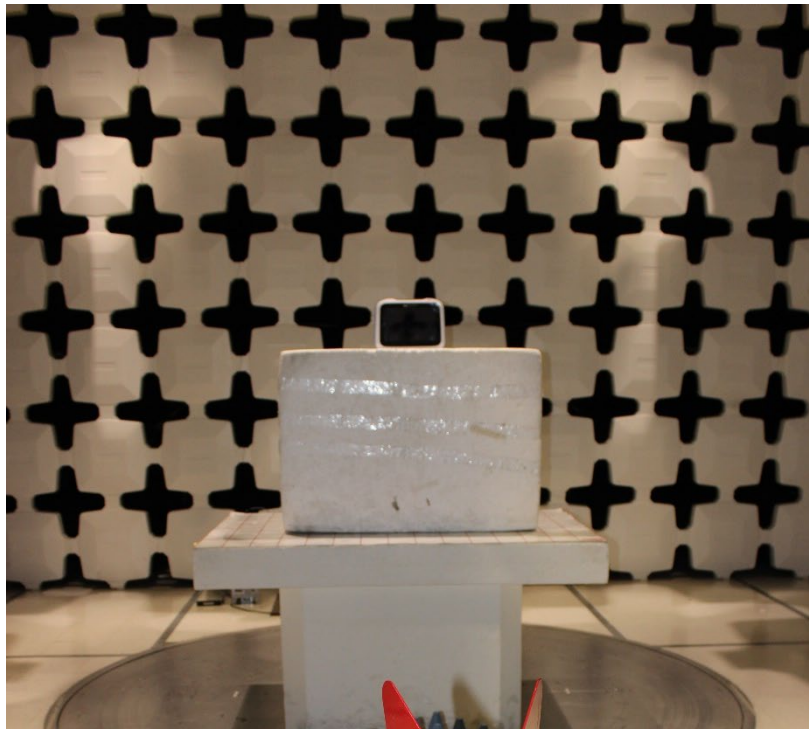


Setup 30-1000MHz Front

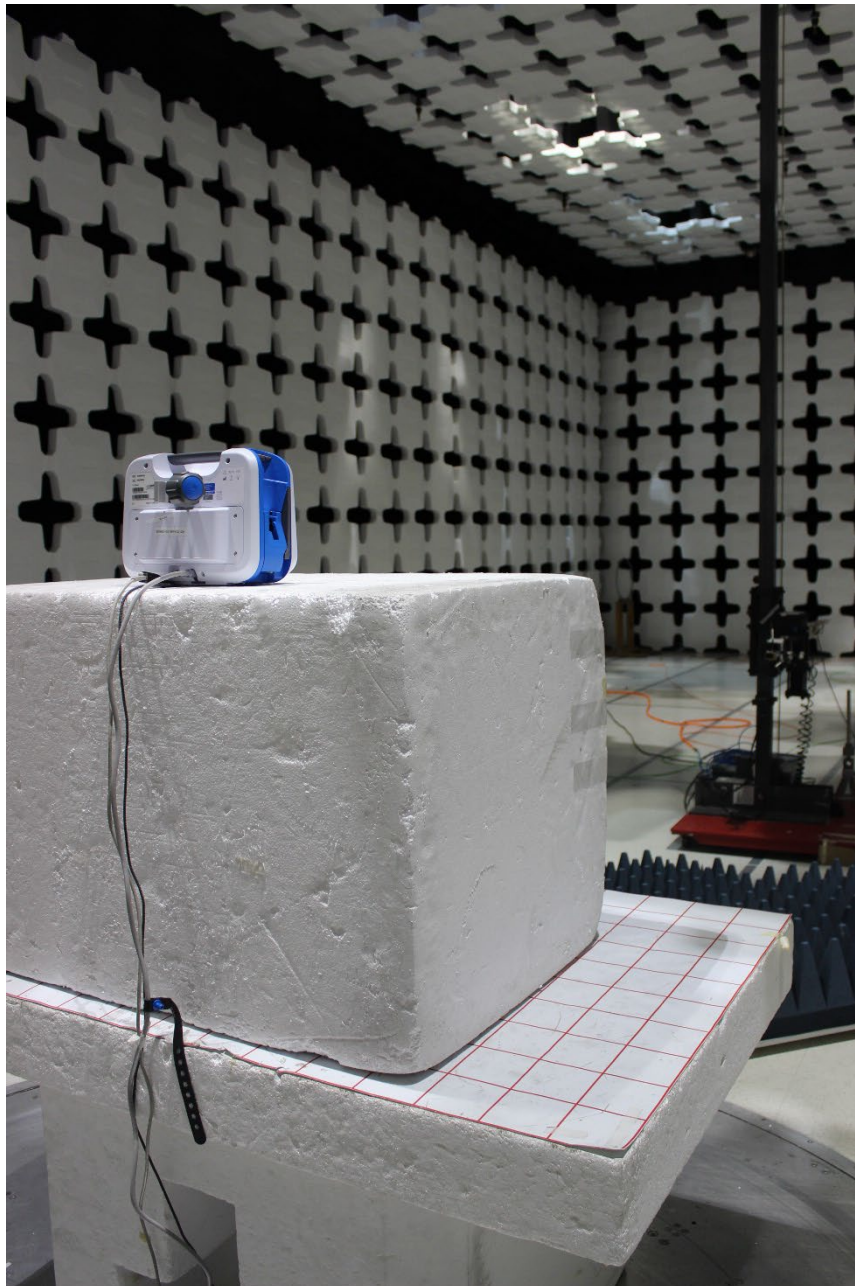


5.3 Radiated Emissions above 1 GHz

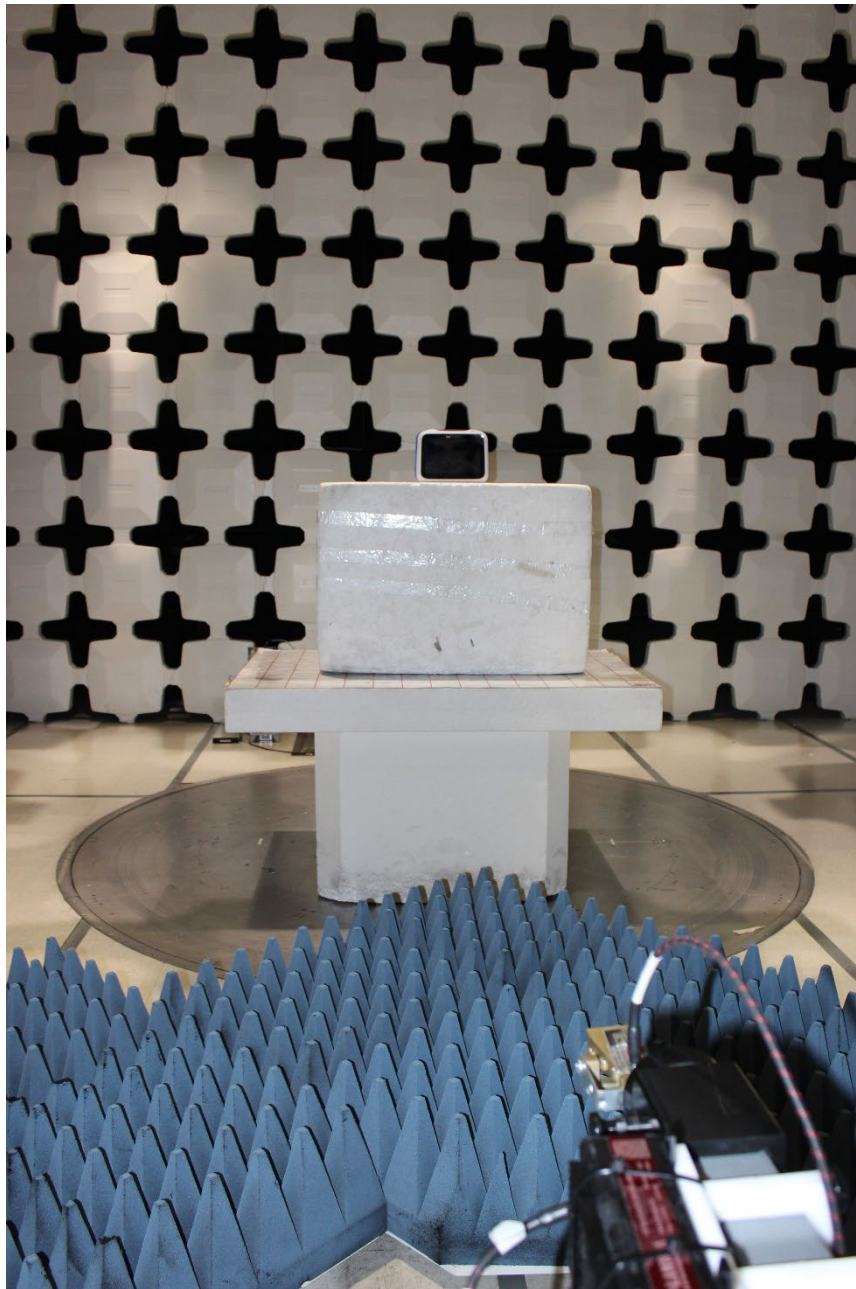
Setup 1-18 GHz Front



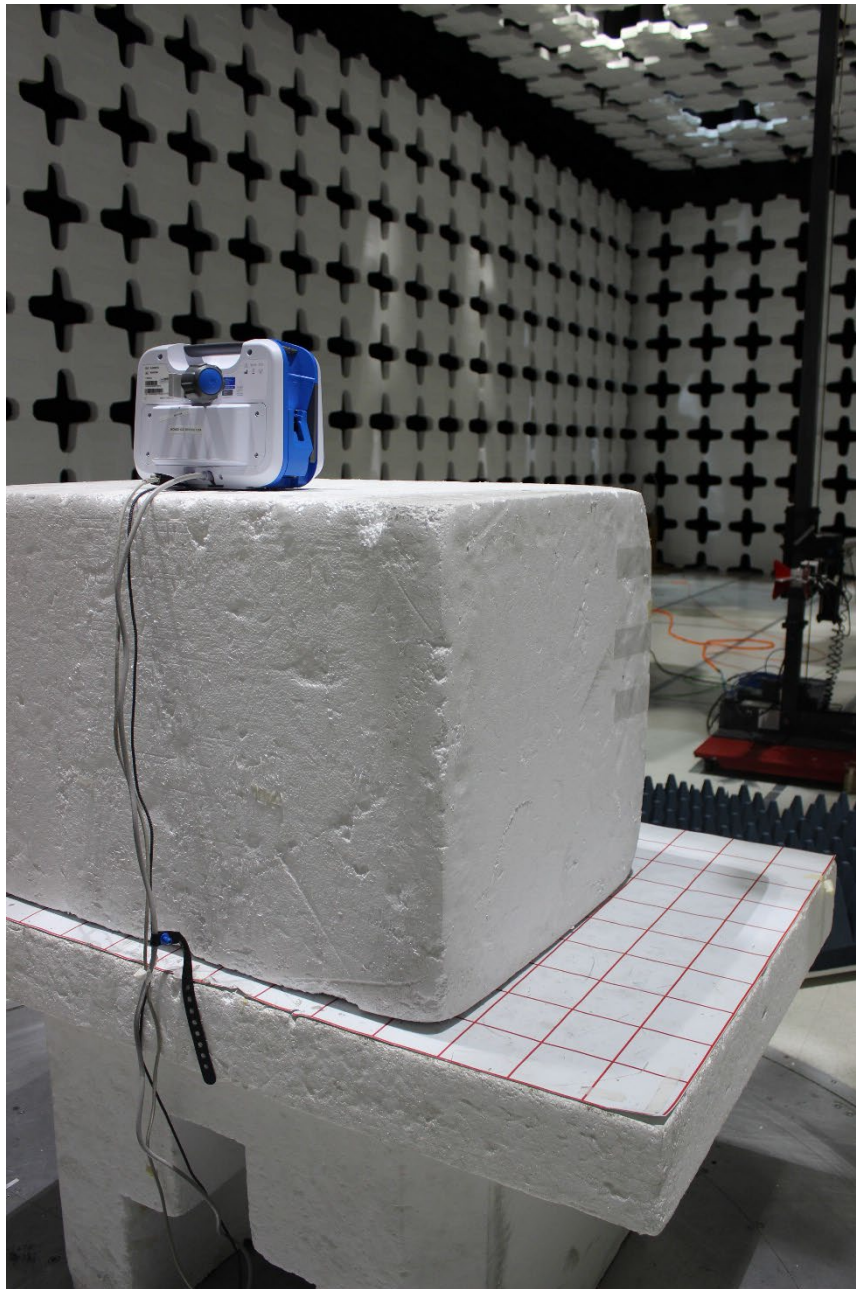
Setup 1-18 GHz Rear



Setup 18-25 GHz Front



Setup 18-25 GHz Rear



Appendix – Information on the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

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

Milpitas EMC/RF/Safety/Telecom Lab

775 Montague Expressway, Milpitas, CA 95035

Tel: +1 408 526 1188

Sunnyvale OTA/Bluetooth Lab

1293 Anvilwood Avenue, Sunnyvale, CA

94089

Tel: +1 669 600 5293

Littleton EMC/RF/Safety/Environmental Lab

1 Distribution Center Cir #1, Littleton, MA 01460

Tel: +1 978 486 8880

Irvine OTA/PTCRB/Bluetooth/V2X Lab

15 Musick, Irvine, CA 92618

Tel: +1 949 716 6512

Email: sales.eaw@us.bureauveritas.com

Web Site: www.cpsusa-bureauveritas.com

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

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