

FCC TEST REPORT

Application No: HR/2019/10024
Applicant: Huawei Technologies Co., Ltd.
Address of Applicant: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer: Huawei Technologies Co., Ltd.
Address of Manufacturer: Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
EUT Description: Smart Phone
Model No.: ELE-L29/ELE-L09
Trade Mark: HUAWEI
FCC ID: QISELE-LX9
Standards: 47 CFR FCC Part 2, Subpart J
 47 CFR FCC Part 15, Subpart C
 47 CFR FCC Part 15, Subpart E
 KDB 789033 D02 General UNII Test Procedures New Rules v02
 FCC KDB 558074 D01 DTS Meas Guidance v05
 KDB 662911 D01 Multiple Transmitter Output v02r01
Test Method: KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
 KDB 905462 D03 Client Without DFS New Rules v01r02
 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices
Date of Receipt: 2019/1/18
Date of Test: 2019/1/18 to 2019/2/26
Date of Issue: 2019/2/26

Test Result:	PASS *
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. * In the configuration tested, the EUT complied with the standards specified above.

Derek Yang
Wireless Laboratory Manager



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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2019/2/19		Original

Authorized for issue by:			
Tested By	<i>Mike Hu</i>	2019/2/19	
	<hr/>	Date	
	(Mike Hu) /Project Engineer		
Checked By	<i>David Chen</i>	2019/2/19	
	<hr/>	Date	
	(David Chen) /Reviewer		



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2 Test Summary

Test Item	Band	FCC Rule	Requirements	Test Result	Verdict
Unwanted Emissions that fall Outside of the Restricted Bands(Radiated)	5150-5250	15.407(b)(1) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).	Clause 4.4	Pass
	5250-5350	15.407(b)(2) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.25-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		
	5470-5725	15.407(b)(3) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.47-5.725 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		
	5725-5850	15.407(b)(4) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP) F≥1GHz & out-restricted:(QP) a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges; b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges; c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges. F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		



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Test Item	Band	FCC Rule	Requirements	Test Result	Verdict
AC Power Line Conducted Emissions	5150-5250 5250-5350 5470-5725 5725-5850	15.207	---	Clause 4.2	Pass
Unwanted Emissions in the Restricted Bands (Radiated)	5150-5250 5250-5350 5470-5725 5725-5850	15.209	---	Clause 4.3	Pass

The difference between model ELE-L04 and model ELE -L29 is show in the below table:

	Model	ELE-L04	ELE-L29
Licensed Frequency	LTE BAND	FCC Band: B2/B4/B5/B7/B12/B17/B26/B38/ B40(2305~2315MHz/2350~2360MHz)/B41 (2535~2655MHz) /B66	FCC Band: B2/B4/B5/B7/B12/B17/B26/B38/ B40(2305~2315MHz/2350~2360MHz)/B41 (2535~2655MHz)
	UMTS BAND	FCC Band: B2/B4/B5	FCC Band: B2/B4/B5
	GSM	FCC Band: B2/B5	FCC Band: B2/B5
	IC	the same	the same
	Antenna	the same	the same
	NFC	the same	the same
Unlicensed Frequency	Bluetooth	the same	the same
	2.4G Wi-Fi	the same	the same
	IC	the same	the same
	Antenna	the same	the same
Hardware	Ram / Rom	the same	the same
	Camera	the same	the same
	PCB	the same	the same
	USB Port	the same	the same
	SIM	one	two
	Hardware version	HL1ELLEEM	HL1ELLEEM
RF	RF circuit	The hardware channel of LTE B2/4/7(include CA band) is different	The hardware channel of LTE B2/4/7(include CA band) is different
Appearance	Dimension	the same	the same
	Color	different	different
Accessory	Battery	the same	the same
	External Charger	the same	the same
	USB label	the same	the same
	Earphone	the same	the same



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The mobile phone ELE-L29 and ELE-L09 are LTE/UMTS/GSM mobile phone with Bluetooth. The differences between ELE-L29 and ELE-L09 are showed in the following table. ELE-L09 delete one SIM by software. Other parts of the mobile phone are the same, including the appearance, the antenna, Chipset, Bluetooth mode, Wifi mode, Adapter, Battery, and so on.

	ELE-L29	ELE-L09
GSM four bands	B2/B3/B5/B8	B2/B3/B5/B8
WCDMA bands	B1/2/4/5/6/8/19	B1/2/4/5/6/8/19
LTE bands	FDD LTE: B1/2/3/4/5/6/7/8/9/12/17/18/19/20/ B26/28/32 TDD LTE: B34/B38/39/40/41(120M,2545- 2665)	FDD LTE: B1/2/3/4/5/6/7/8/9/12/17/18/19/20/ B26/28/32 TDD LTE: B34/B38/39/40/41(120M,2545- 2665)
SIM card	Two	One
NFC	the same	the same
External camera	the same	the same
internal camera	the same	the same
FLASH	the same	the same
Mainboard	the same	the same
PCB layout	the same	the same
Appearance	the same	the same
Bluetooth mode	the same	the same
WLAN mode	the same	the same
BT/ WLAN antenna	the same	the same
GSM/ WCDMA /LTE antenna	the same	The same
Adapter	the same	the same
Battery	the same	the same
Chipset	the same	the same
Memory	the same	the same
RF Parameter	The same RF Parameter in the same band	The same RF Parameter in the same band
Dimension	the same	the same
Main Frequency NV	The same NV in the same band	The same NV in the same band

Remark:

Only the worst case RSE data was retested with the wireless charging case and the data displayed in this report, other data can refer to the original report (Report No.: HR/2019/1002403)

Wireless charging case:

Wireless charging case	C-ELE Wireless charging case
Manufacturer	Huawei Technologies Co., Ltd.
Wireless charging power	10W max
Connector rating	5A max
Rated operating voltage	9V
Charging efficiency	>75%
Operating temperature	-10 °C~40 °C
Storage temperature	-40 °C~70°C



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3 General Information

3.1 Client Information

Applicant:	Huawei Technologies Co., Ltd.
Address of Applicant:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer:	Huawei Technologies Co., Ltd.
Address of Manufacturer:	Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

3.2 Test Location

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057
Telephone:	+86 (0) 755 2601 2053
Fax:	+86 (0) 755 2671 0594
E-mail:	ee.shenzhen@sgs.com

3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



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3.4 General Description of EUT

EUT Description::	Smart Phone
Model No.:	ELE-L29/ELE-L09
Trade Mark:	HUAWEI
Hardware Version:	HL1ELLEM
Software Version:	5.0.1.34 (SP1C792E8R1P7)
IEEE 802.11 WLAN Mode Supported	<input checked="" type="checkbox"/> 802.11a (20 MHz channel bandwidth) ; <input checked="" type="checkbox"/> 802.11n (20 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11n (40 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11ac (20 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11ac (40 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11ac (80 MHz channel bandwidth) ; <input checked="" type="checkbox"/> 802.11ac (160 MHz channel bandwidth)
Operation Frequency:	IEEE 802.11a/ n(HT20/40)/ ac(HT20/40/80/160): 5150MHz to 5250MHz IEEE 802.11a/ n(HT20/40)/ ac(HT20/40/80/160): 5250MHz to 5350MHz IEEE 802.11a/ n(HT20/40)/ ac(HT20/40/80/160): 5470MHz to 5725MHz IEEE 802.11a/ n(HT20/40)/ ac(HT20/40/80): 5725MHz to 5850MHz
Type of Modulation:	OFDM
DFS mode:	<input type="checkbox"/> Master <input type="checkbox"/> Slave with radar detection <input checked="" type="checkbox"/> Slave without radar detection
Sample Type:	<input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated
Antenna Ports	<input checked="" type="checkbox"/> Ant 1, <input checked="" type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
Smart System	<input checked="" type="checkbox"/> SISO (for 802.11a/n/ac), <input checked="" type="checkbox"/> MIMO (for 802.11n/ac), <input type="checkbox"/> Diversity (for 802.11a) : Tx & Rx
Antenna Gain:	ANT1:-2.12dBi, ANT2:-2.01dBi
Power Supply	<input checked="" type="checkbox"/> AC/DC Adapter; <input type="checkbox"/> PoE.; <input type="checkbox"/> Other:
EUT Power Supply:	Battery Model: HB436380ECW Rated capacity: 3550mAh Nominal Voltage: +3.85V Charging Voltage: +4.43V
AC adaptor:	Model: HW-050450B00 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A Output: 5V 2A OR 4.5V 5A OR 5V 4.5A Model: HW-050450E00 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A Output: 5V 2A OR 4.5V 5A OR 5V 4.5A Model: HW-050450U00 Manufacturer: Huawei Technologies Co., Ltd.



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	<p>Input: 100V-240V~50/60Hz, 0.75A</p> <p>Output: 5V 2A OR 4.5V 5A OR 5V 4.5A</p> <p>Model: HW-050450A00</p> <p>Manufacturer: Huawei Technologies Co., Ltd.</p> <p>Input: 100V-240V~50/60Hz, 0.75A</p> <p>Output: 5V 2A OR 4.5V 5A OR 5V 4.5A</p> <p>Model: HW-050450E01</p> <p>Manufacturer: Huawei Technologies Co., Ltd.</p> <p>Input: 100V-240V~50/60Hz, 0.75A</p> <p>Output: 5V 2A OR 9V 2A</p> <p>Model: HW-050450A01</p> <p>Manufacturer: Huawei Technologies Co., Ltd.</p> <p>Input: 100V-240V~50/60Hz, 0.75A</p> <p>Output: 5V 2A OR 4.5V 5A OR 5V 4.5A</p>
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Remark:

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency Range of Operation Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre

For UNII Band I:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5180
	The Middle channel	5200
	The Highest channel	5240
IEEE 802.11n/ac 40MHz	The Lowest channel	5190
	The Highest channel	5230
IEEE 802.11ac 80MHz	The Middle channel	5210

For UNII Band II-A:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5260
	The Middle channel	5280
	The Highest channel	5320
IEEE 802.11n/ac 40MHz	The Lowest channel	5270



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	The Highest channel	5310
IEEE 802.11ac 80MHz	The Middle channel	5290
IEEE 802.11ac 160MHz	The Middle channel	5250

For UNII Band II-C:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5500
	The Middle channel	5580
	The Highest channel	5700
IEEE 802.11n/ac 40MHz	The Lowest channel	5510
	The Middle channel	5500
	The Highest channel	5670
IEEE 802.11ac 80MHz	The Lowest channel	5500
	The Highest channel	5580
IEEE 802.11ac 160MHz	The Middle channel	5570

For UNII Band III:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5745
	The Middle channel	5785
	The Highest channel	5825
IEEE 802.11n/ac 40MHz	The Lowest channel	5755
	The Highest channel	5795
IEEE 802.11ac 80MHz	The Middle channel	5775

3.5 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	101.32 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.



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4 Test results and Measurement Data

4.1 Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	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 Procedure:	<ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 		



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<p>Test Setup:</p>	
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.</p>
<p>Final Test Mode:</p>	<p>Through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>

Measurement Data

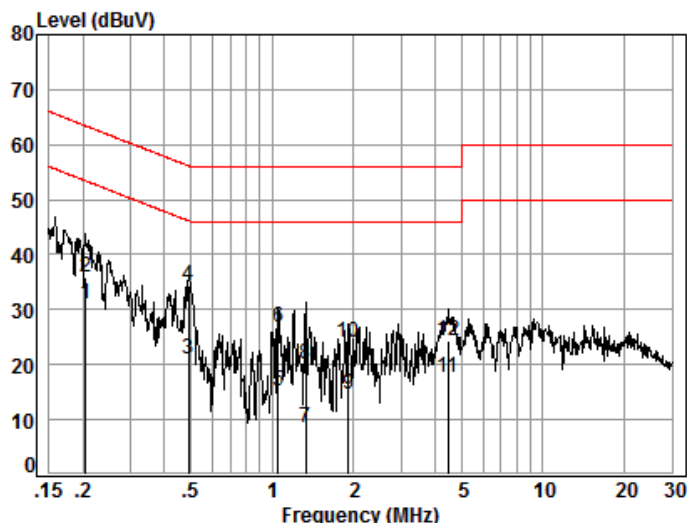
An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



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Wireless charging case Live Line:



Site : Shielding Room

Condition: Line

Job No. : 10958

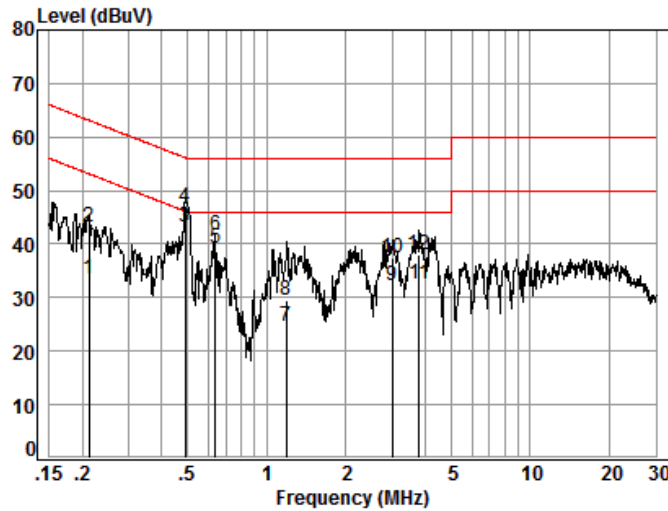
Test mode: a

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.20	0.02	9.66	21.38	31.06	53.45	-22.39	Average
2	0.20	0.02	9.66	26.26	35.94	63.45	-27.51	QP
3	0.49	0.06	9.67	11.31	21.04	46.14	-25.10	Average
4	0.49	0.06	9.67	24.77	34.50	56.14	-21.64	QP
5	1.05	0.09	9.74	5.44	15.27	46.00	-30.73	Average
6	1.05	0.09	9.74	16.89	26.72	56.00	-29.28	QP
7	1.33	0.12	9.73	-1.28	8.57	46.00	-37.43	Average
8	1.33	0.12	9.73	10.22	20.07	56.00	-35.93	QP
9	1.92	0.16	9.72	4.64	14.52	46.00	-31.48	Average
10	1.92	0.16	9.72	14.10	23.98	56.00	-32.02	QP
11	4.48	0.16	9.73	7.82	17.71	46.00	-28.29	Average
12	4.48	0.16	9.73	14.30	24.19	56.00	-31.81	QP



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Wireless charging case Neutral Line:



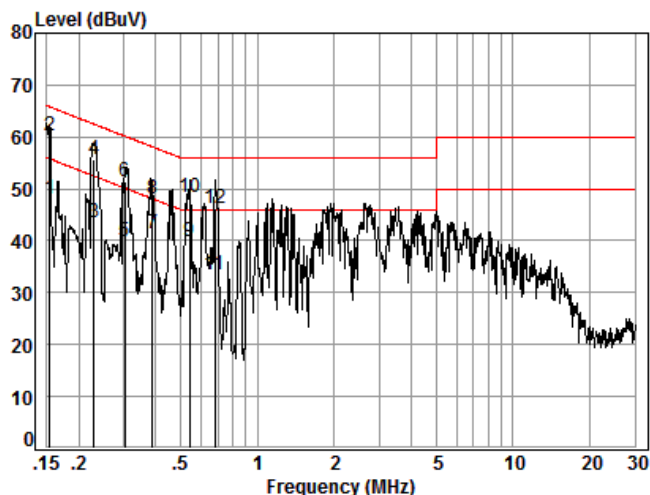
Site : Shielding Room
Condition: Neutral
Job No. : 10958
Test mode: a

	Freq	Cable Loss	LISN Factor	Read Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.21	0.02	9.64	23.80	33.46	53.14	-19.68 Average
2	0.21	0.02	9.64	33.64	43.30	63.14	-19.84 QP
3	0.49	0.06	9.64	33.60	43.30	46.14	-2.84 Average
4	0.49	0.06	9.64	37.00	46.70	56.14	-9.44 QP
5	0.64	0.07	9.64	29.59	39.30	46.00	-6.70 Average
6	0.64	0.07	9.64	31.95	41.66	56.00	-14.34 QP
7	1.19	0.11	9.70	14.83	24.64	46.00	-21.36 Average
8	1.19	0.11	9.70	19.59	29.40	56.00	-26.60 QP
9	2.99	0.16	9.68	22.28	32.12	46.00	-13.88 Average
10	2.99	0.16	9.68	27.46	37.30	56.00	-18.70 QP
11	3.80	0.16	9.69	22.62	32.47	46.00	-13.53 Average
12	3.80	0.16	9.69	28.11	37.96	56.00	-18.04 QP



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Wireless charging case + USB Cable charging Live Line:



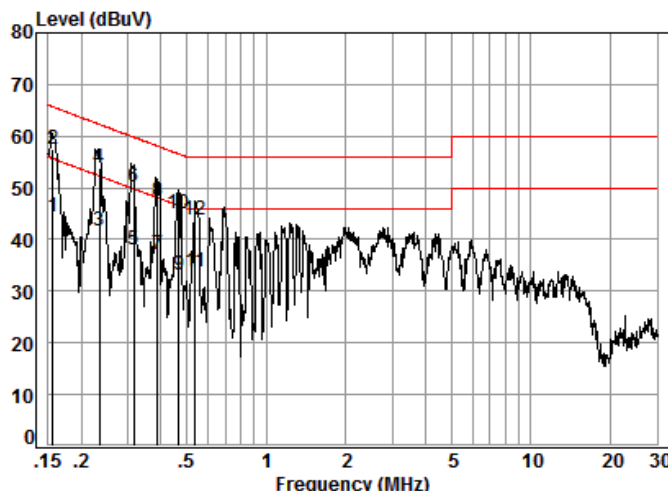
Site : Shielding Room
 Condition: Line
 Job No. : 10958
 Test mode: b

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.15	0.01	9.66	38.49	48.16	55.78	-7.62 Average
2	0.15	0.01	9.66	50.49	60.16	65.78	-5.62 QP
3	0.23	0.03	9.67	33.72	43.42	52.48	-9.06 Average
4	0.23	0.03	9.67	46.08	55.78	62.48	-6.70 QP
5	0.30	0.04	9.67	30.22	39.93	50.15	-10.22 Average
6	0.30	0.04	9.67	41.75	51.46	60.15	-8.69 QP
7	0.39	0.05	9.67	31.79	41.51	48.12	-6.61 Average
8	0.39	0.05	9.67	38.23	47.95	58.12	-10.17 QP
9	0.54	0.06	9.67	30.09	39.82	46.00	-6.18 Average
10	0.54	0.06	9.67	38.59	48.32	56.00	-7.68 QP
11	0.68	0.07	9.68	23.67	33.42	46.00	-12.58 Average
12	0.68	0.07	9.68	36.46	46.21	56.00	-9.79 QP



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Wireless charging case + USB Cable charging Neutral Line:



Site : Shielding Room
 Condition: Neutral
 Job No. : 10958
 Test mode: b

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.63	34.90	44.54	55.69	-11.15	Average
2	0.16	0.01	9.63	47.86	57.50	65.69	-8.19	QP
3	0.23	0.03	9.64	31.86	41.53	52.30	-10.77	Average
4	0.23	0.03	9.64	44.19	53.86	62.30	-8.44	QP
5	0.31	0.04	9.64	28.25	37.93	49.84	-11.91	Average
6	0.31	0.04	9.64	40.46	50.14	59.84	-9.70	QP
7	0.39	0.05	9.65	27.34	37.04	48.08	-11.04	Average
8	0.39	0.05	9.65	37.63	47.33	58.08	-10.75	QP
9	0.47	0.06	9.64	23.45	33.15	46.58	-13.43	Average
10	0.47	0.06	9.64	35.30	45.00	56.58	-11.58	QP
11	0.54	0.06	9.64	23.94	33.64	46.00	-12.36	Average
12	0.54	0.06	9.64	34.24	43.94	56.00	-12.06	QP

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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4.2 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)
Test Method:	ANSI C63.10: 2013
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)
Test Setup:	

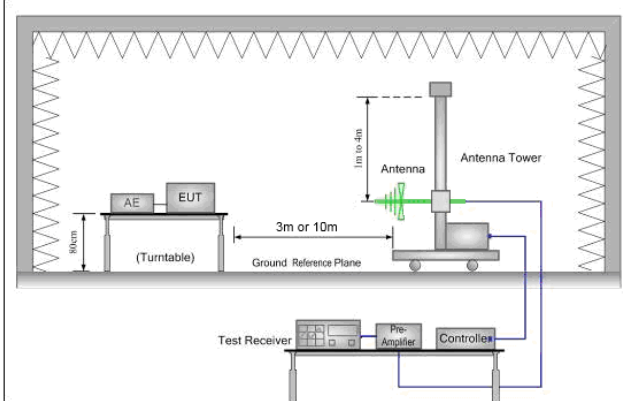


Figure 1. 30MHz to 1GHz

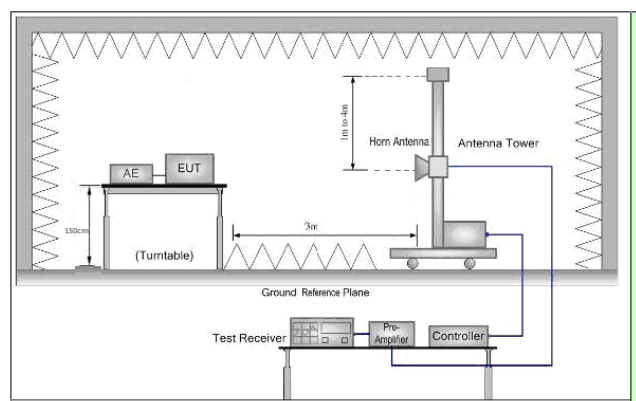


Figure 2. Above 1 GHz

Test Procedure:

- For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- Test the EUT in the outermost channels.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.



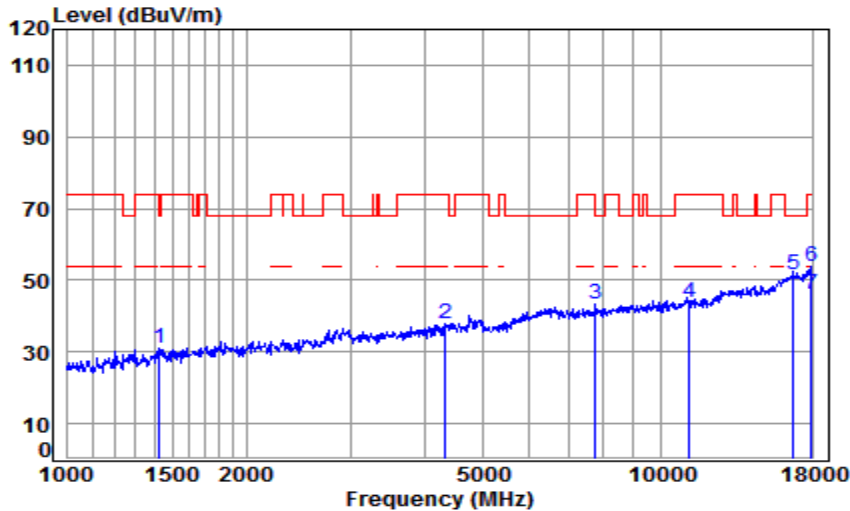
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	i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; MCS0 of rate is the worst case of 802.11n(HT20); MCS0 of rate is the worst case of 802.11n(HT40); MCSAC0 of rate is the worst case of 802.11ac(HT20); MCSAC0 of rate is the worst case of 802.11ac(HT40); MCSAC0 of rate is the worst case of 802.11ac(HT80); MCSAC0 of rate is the worst case of 802.11ac(HT160) For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass



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4.2.1 Transmitter emission above 1GHz (CDD & MIMO) Wireless charging case + USB Cable charging
4.2.1.1 11A20_CDD_116_Vertical



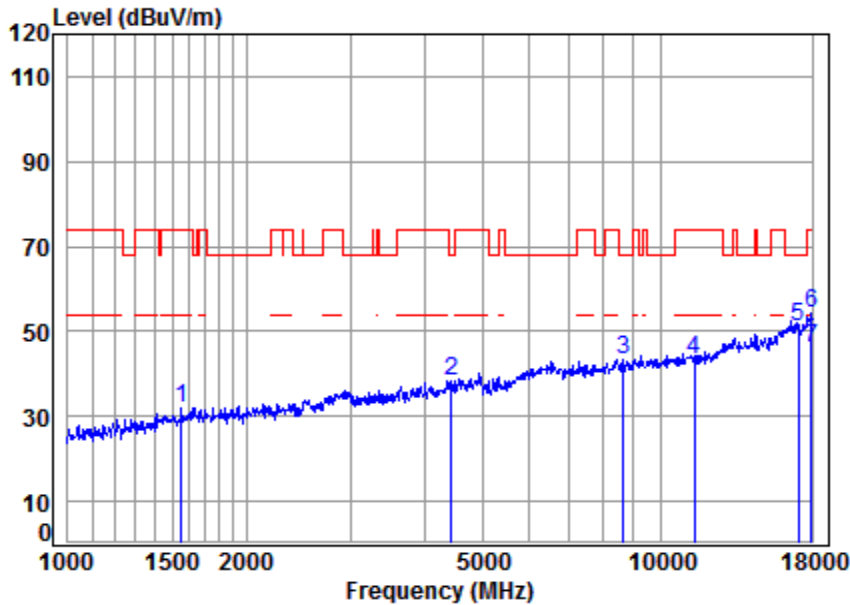
Site : chamber
Condition: 3m VERTICAL
Job No : 10985CR
Mode : 5580 TX RSE
Note : 5G WIFI 11A

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1426.916	5.24	25.53	40.66	41.03	31.14	74.00	-42.86	peak
2	4341.886	7.38	33.33	43.14	40.30	37.87	74.00	-36.13	peak
3	7762.260	9.97	36.51	41.46	38.14	43.16	68.20	-25.04	peak
4	11160.000	11.80	37.83	38.34	32.32	43.61	74.00	-30.39	peak
5	16740.000	15.57	42.39	40.40	33.82	51.38	68.20	-16.82	peak
6	17948.050	16.08	43.44	40.21	34.71	54.02	74.00	-19.98	Peak
7	17948.050	16.08	43.44	40.21	26.61	45.92	54.00	-8.08	Average



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4.2.1.2 11A20_CDD_140_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 10985CR
Mode : 5700 TX RSE
Note : 5G WIFI 11A

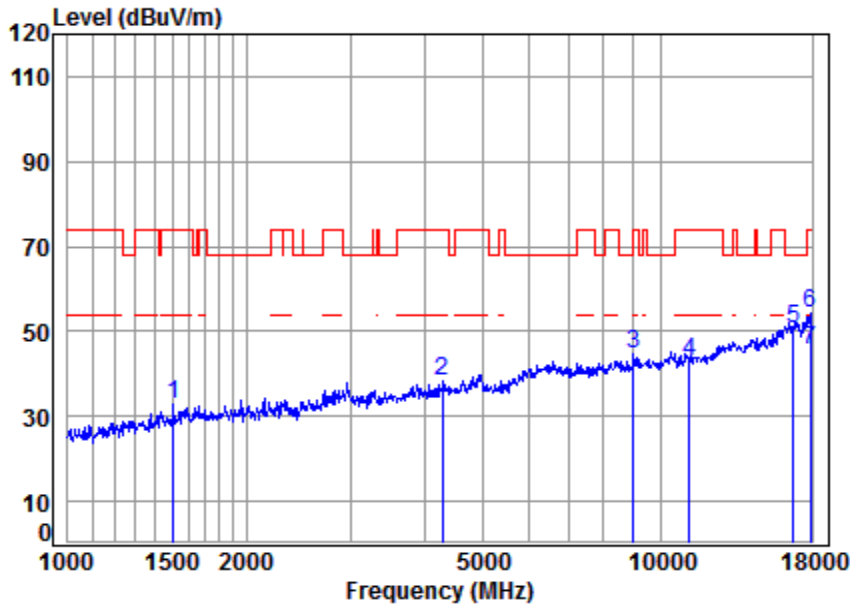
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1556.169	5.41	26.06	40.74	41.10	31.83	74.00	-42.17	peak
2	4430.628	7.48	33.48	43.23	40.49	38.22	68.20	-29.98	peak
3	8638.399	10.31	37.06	40.10	36.20	43.47	68.20	-24.73	peak
4	11400.000	12.04	37.88	38.45	31.91	43.38	74.00	-30.62	peak
5	17100.000	16.49	42.66	40.34	32.19	51.00	68.20	-17.20	peak
6	17948.050	16.08	43.44	40.21	35.14	54.45	74.00	-19.55	Peak
7	17948.050	16.08	43.44	40.21	26.64	45.95	54.00	-8.05	Average



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4.2.1.3 11A20_CDD_116 _ Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10985CR
 Mode : 5580TX RSE
 Note : 5G WIFI 11A

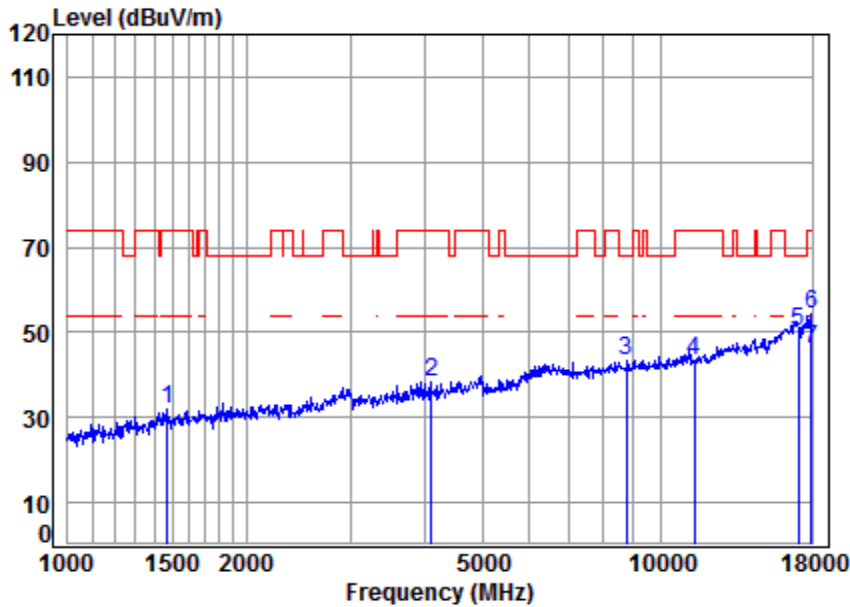
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1507.470	5.47	25.83	40.71	42.14	32.73	74.00	-41.27 peak
2	4291.977	7.33	33.24	43.08	40.63	38.12	74.00	-35.88 peak
3	8995.123	10.40	37.20	39.46	36.63	44.77	68.20	-23.43 peak
4	11160.000	11.80	37.83	38.34	31.58	42.87	74.00	-31.13 peak
5	16740.000	15.57	42.39	40.40	33.08	50.64	68.20	-17.56 peak
6	17896.250	16.02	43.38	40.22	34.89	54.07	74.00	-19.93 Peak
7	17896.250	16.02	43.38	40.22	26.67	45.85	54.00	-8.15 Average



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4.2.1.4 11A20_CDD_140 _ Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10985CR
 Mode : 5700 TX RSE
 Note : 5G WIFI 11A

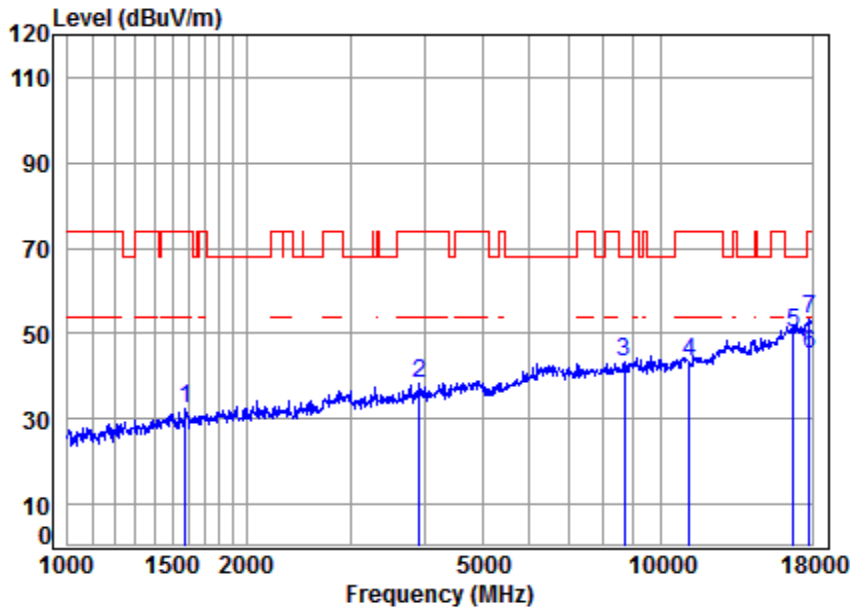
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1473.013	5.39	25.70	40.69	41.76	32.16	74.00	-41.84	peak
2	4098.010	7.10	32.88	42.87	41.28	38.39	74.00	-35.61	peak
3	8764.146	10.34	37.11	39.87	35.67	43.25	68.20	-24.95	peak
4	11400.000	12.04	37.88	38.45	31.88	43.35	74.00	-30.65	peak
5	17100.000	16.49	42.66	40.34	31.57	50.38	68.20	-17.82	peak
6	17948.050	16.08	43.44	40.21	35.01	54.32	74.00	-19.68	Peak
7	17948.050	16.08	43.44	40.21	26.81	46.12	54.00	-7.88	Average



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4.2.1.5 11N20_MIMO_116_Vertical



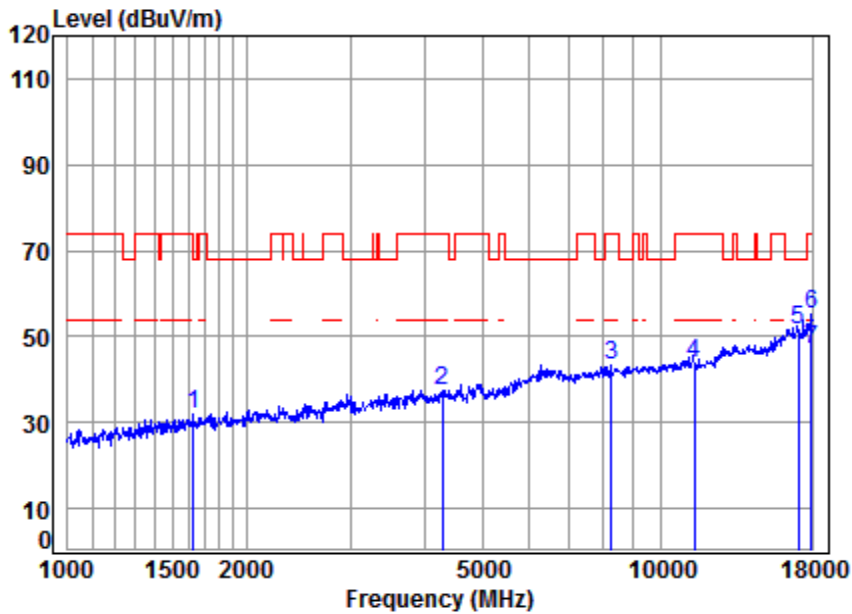
Site : chamber
 Condition: 3m VERTICAL
 Job No : 10985CR
 Mode : 5580 TX RSE
 Note : 5G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	
1	1578.822	5.38	26.16	40.76	41.40	74.00	-41.82	peak
2	3924.135	6.91	32.56	42.66	41.70	74.00	-35.49	peak
3	8688.480	10.32	37.08	40.01	35.75	68.20	-25.06	peak
4	11160.000	11.80	37.83	38.34	32.24	74.00	-30.47	peak
5	16740.000	15.57	42.39	40.40	32.61	68.20	-18.03	peak
6	17793.090	15.91	43.25	40.23	26.19	54.00	-8.88	Average
7	17793.090	15.91	43.25	40.23	34.45	74.00	-20.62	Peak



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4.2.1.6 11N20_MIMO_140_Vertical



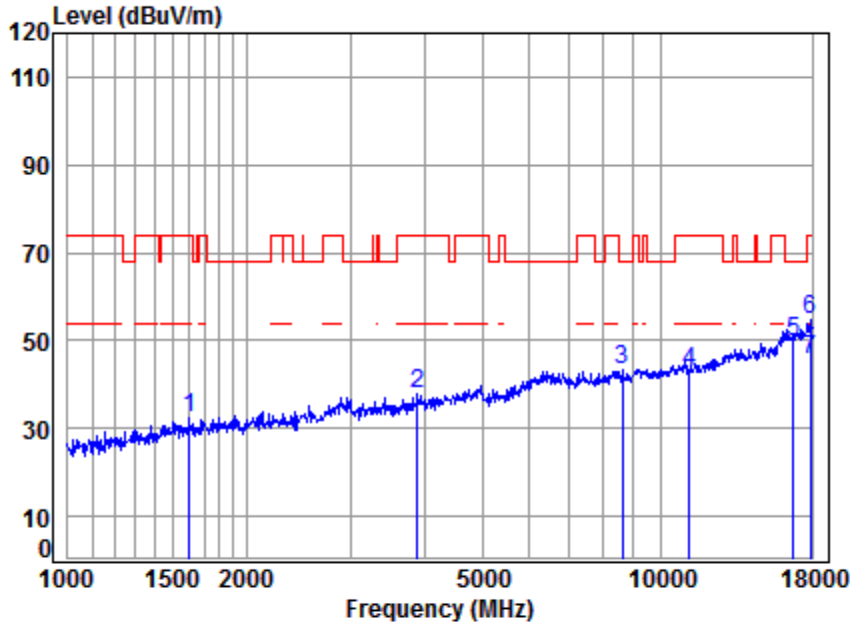
Site : chamber
Condition: 3m VERTICAL
Job No : 10985CR
Mode : 5700 TX RSE
Note : 5G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1629.825	5.31	26.38	40.79	41.14	32.04	68.20	-36.16 peak
2	4279.589	7.31	33.22	43.07	40.06	37.52	74.00	-36.48 peak
3	8248.005	10.11	36.85	40.82	37.33	43.47	74.00	-30.53 peak
4	11400.000	12.04	37.88	38.45	32.36	43.83	74.00	-30.17 peak
5	17100.000	16.49	42.66	40.34	32.66	51.47	68.20	-16.73 peak
6	17948.050	16.08	43.44	40.21	36.08	55.39	74.00	-18.61 Peak
7	17948.050	16.08	43.44	40.21	27.58	46.89	54.00	-7.11 Average



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4.2.1.7 11N20_MIMO_116 _ Horizontal



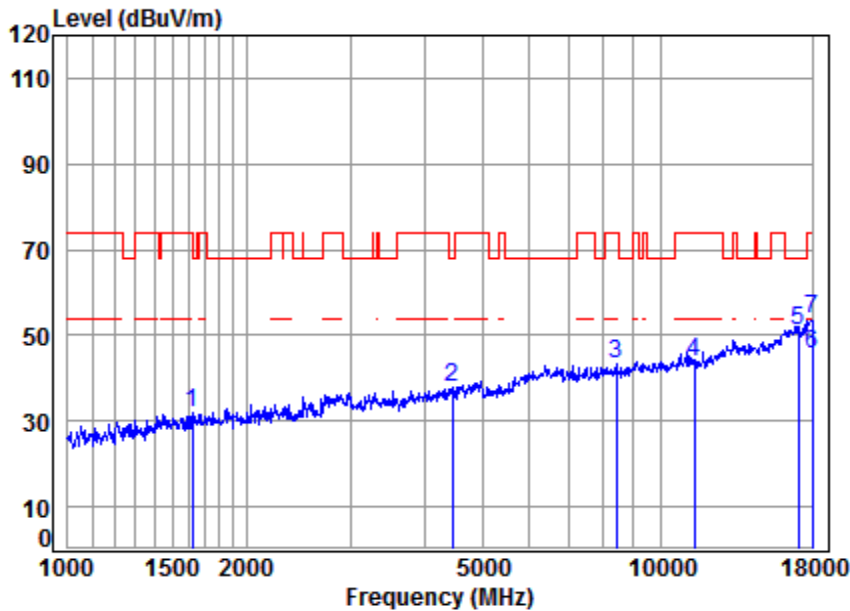
Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10985CR
 Mode : 5580 TX RSE
 Note : 5G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.35	26.26	40.77	41.60	32.44	74.00	-41.56	peak
2	6.87	32.49	42.62	40.98	37.72	74.00	-36.28	peak
3	10.30	37.05	40.14	36.29	43.50	68.20	-24.70	peak
4	11.80	37.83	38.34	31.66	42.95	74.00	-31.05	peak
5	15.57	42.39	40.40	32.02	49.58	68.20	-18.62	peak
6	16.02	43.38	40.22	35.39	54.57	74.00	-19.43	Peak
7	17896.250	43.38	40.22	26.66	45.84	54.00	-8.16	Average



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4.2.1.8 11N20_MIMO_140_Horizontal



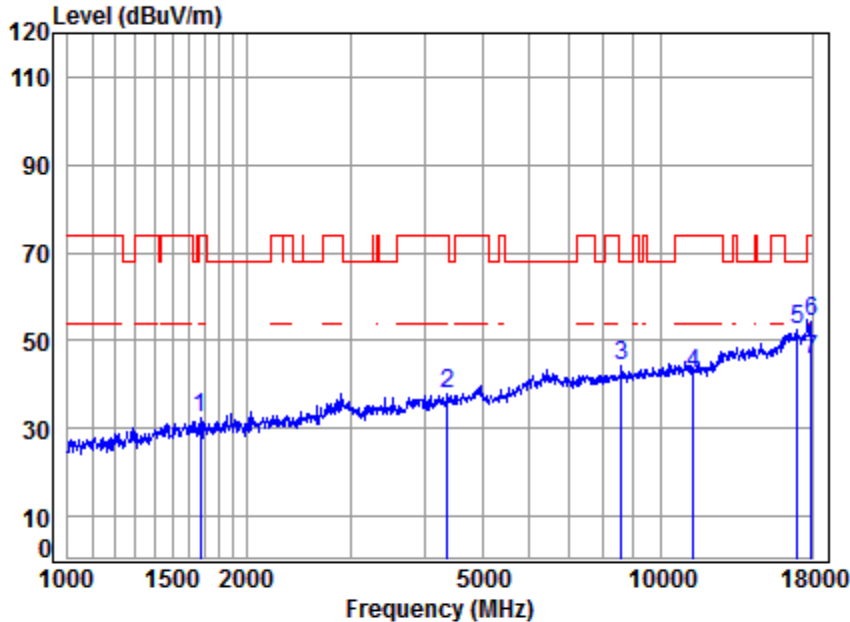
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10985CR
Mode : 5700 TX RSE
Note : 5G WIFI 11N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1620.431	5.32	26.34	40.78	41.09	31.97	74.00	-42.03 peak
2	4456.315	7.51	33.53	43.26	39.94	37.72	68.20	-30.48 peak
3	8416.584	10.22	36.95	40.50	36.75	43.42	74.00	-30.58 peak
4	11400.000	12.04	37.88	38.45	32.41	43.88	74.00	-30.12 peak
5	17100.000	16.49	42.66	40.34	32.16	50.97	68.20	-17.23 peak
6	18000.000	16.13	43.50	40.20	26.08	45.51	54.00	-8.49 Average
7	18000.000	16.13	43.50	40.20	34.18	53.61	74.00	-20.39 Peak



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4.2.1.9 11N40_MIMO_134_Vertical



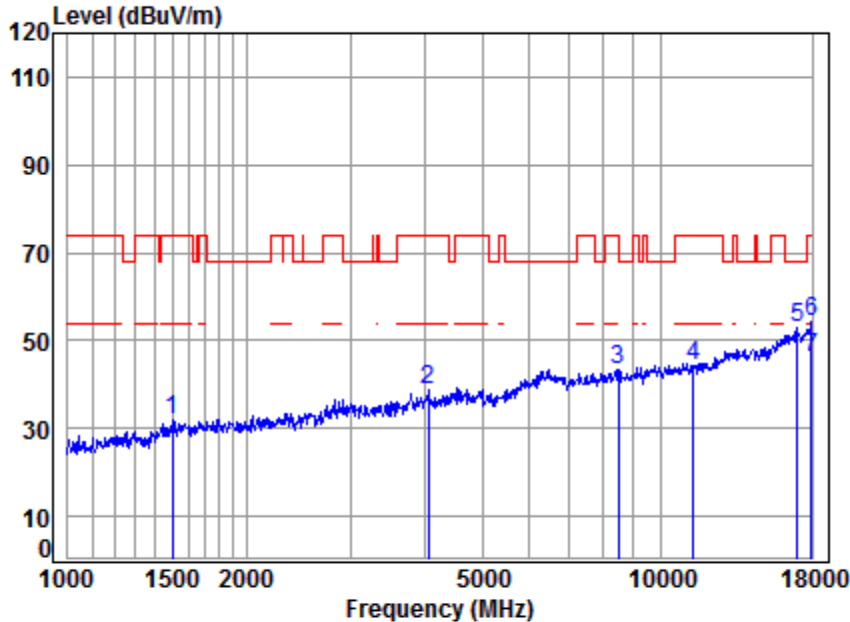
Site : chamber
 Condition: 3m VERTICAL
 Job No : 10985CR
 Mode : 5670 TX RSE
 Note : 5G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.26	26.56	40.82	41.47	32.47	74.00	-41.53	peak
2	7.41	33.37	43.16	40.05	37.67	74.00	-36.33	peak
3	10.29	37.04	40.19	36.94	44.08	68.20	-24.12	peak
4	11.98	37.87	38.42	30.96	42.39	74.00	-31.61	peak
5	16.69	42.61	40.36	33.31	52.25	68.20	-15.95	peak
6	16.08	43.44	40.21	34.76	54.07	74.00	-19.93	Peak
7	16.08	43.44	40.21	26.51	45.82	54.00	-8.18	Average



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4.2.1.10 11N40_MIMO_134 _ Horizontal



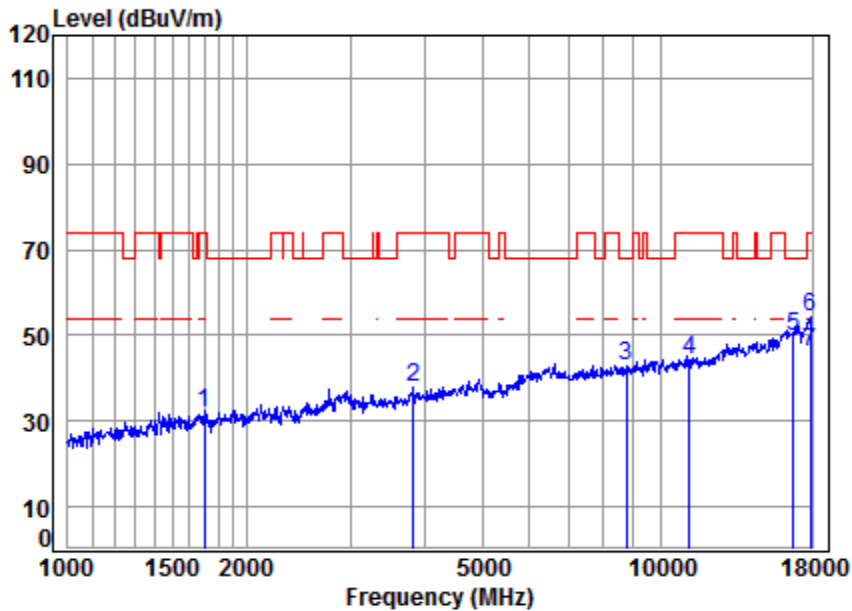
Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10985CR
 Mode : 5670 TX RSE
 Note : 5G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1498.781	5.48	25.80	40.71	41.53	32.10	74.00	-41.90 peak
2	4062.629	7.06	32.82	42.82	41.84	38.90	74.00	-35.10 peak
3	8489.882	10.26	36.99	40.37	36.37	43.25	74.00	-30.75 peak
4	11340.000	11.98	37.87	38.42	32.93	44.36	74.00	-29.64 peak
5	17010.000	16.69	42.61	40.36	34.13	53.07	68.20	-15.13 peak
6	17948.050	16.08	43.44	40.21	35.15	54.46	74.00	-19.54 Peak
7	17948.050	16.08	43.44	40.21	26.79	46.10	54.00	-7.90 Average



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4.2.1.11 11AC20_MIMO_116_Vertical



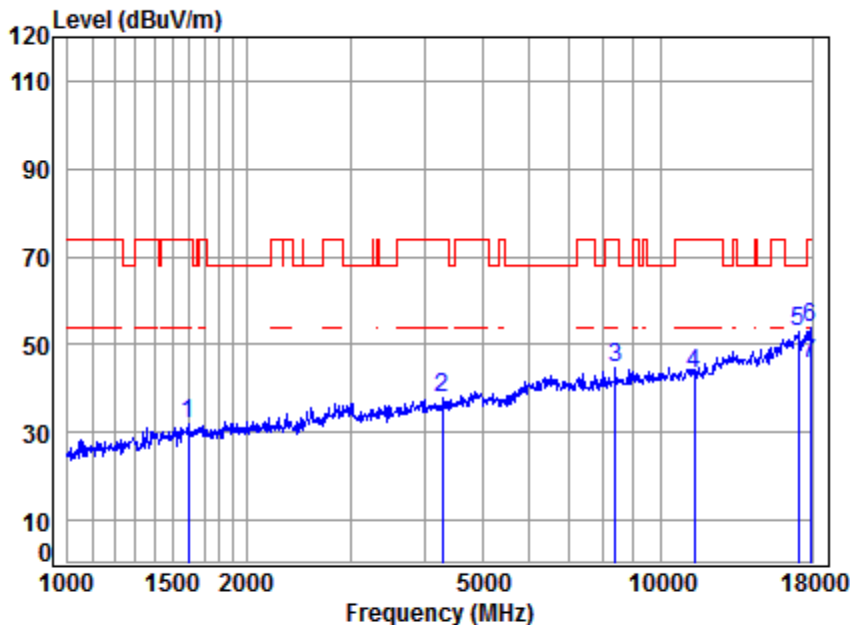
Site : chamber
 Condition: 3m VERTICAL
 Job No : 10985CR
 Mode : 5580 TX RSE
 Note : 5G WIFI 11AC20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1697.129	5.23	26.66	40.83	41.00	74.00	-41.94	peak
2	3834.438	6.82	32.38	42.55	41.07	74.00	-36.28	peak
3	8738.852	10.33	37.10	39.91	35.49	68.20	-25.19	peak
4	11160.000	11.80	37.83	38.34	33.18	74.00	-29.53	peak
5	16740.000	15.57	42.39	40.40	32.38	68.20	-18.26	peak
6	17896.250	16.02	43.38	40.22	35.08	74.00	-19.74	Peak
7	17896.250	16.02	43.38	40.22	26.86	54.00	-7.96	Average



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4.2.1.12 11AC20_MIMO_140_Vertical



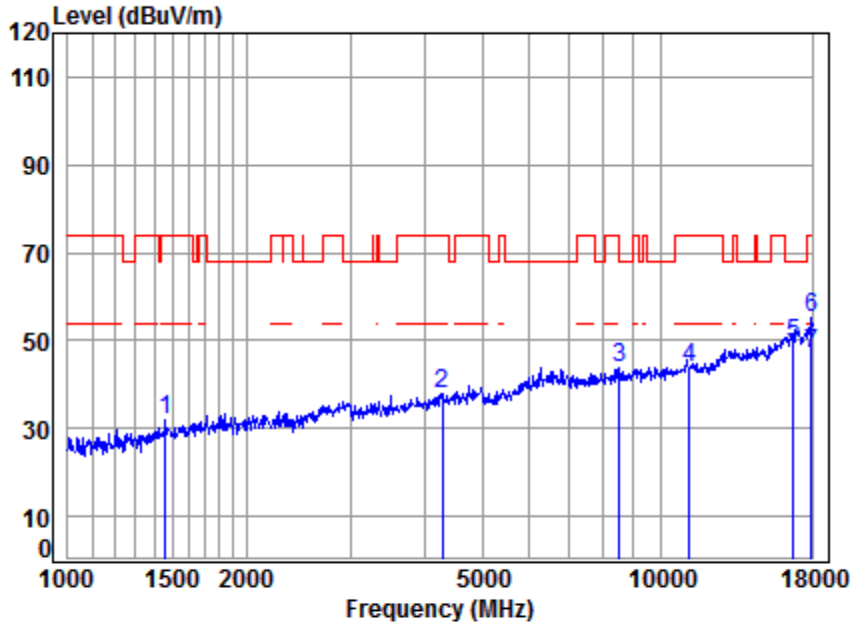
Site : chamber
Condition: 3m VERTICAL
Job No : 10985CR
Mode : 5700 TX RSE
Note : 5G WIFI 11AC20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1597.181	5.35	26.24	40.77	41.15	31.97	74.00	-42.03 peak
2	4291.977	7.33	33.24	43.08	40.31	37.80	74.00	-36.20 peak
3	8392.292	10.20	36.94	40.55	38.16	44.75	74.00	-29.25 peak
4	11400.000	12.04	37.88	38.45	32.07	43.54	74.00	-30.46 peak
5	17100.000	16.49	42.66	40.34	33.96	52.77	68.20	-15.43 peak
6	17896.250	16.02	43.38	40.22	34.72	53.90	74.00	-20.10 Peak
7	17896.250	16.02	43.38	40.22	26.27	45.45	54.00	-8.55 Average



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4.2.1.13 11AC20_MIMO_116 _ Horizontal



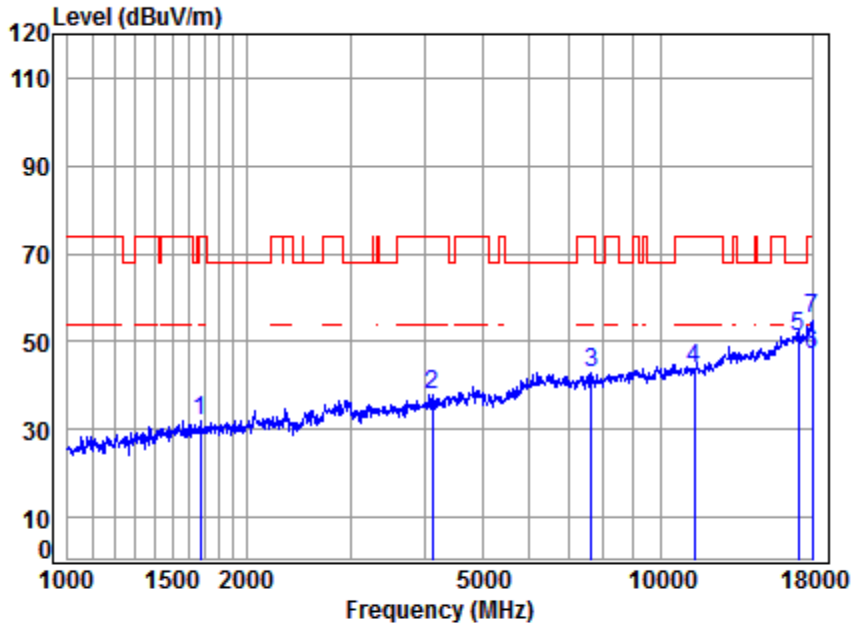
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10985CR
Mode : 5580 TX RSE
Note : 5G WIFI 11AC20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1460.295	5.35	25.65	40.68	41.76	32.08	74.00	-41.92	peak
2	4291.977	7.33	33.24	43.08	40.45	37.94	74.00	-36.06	peak
3	8514.456	10.27	37.01	40.32	36.74	43.70	68.20	-24.50	peak
4	11160.000	11.80	37.83	38.34	32.73	44.02	74.00	-29.98	peak
5	16740.000	15.57	42.39	40.40	31.83	49.39	68.20	-18.81	peak
6	17948.050	16.08	43.44	40.21	35.96	55.27	74.00	-18.73	Peak
7	17948.050	16.08	43.44	40.21	27.60	46.91	54.00	-7.09	Average



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4.2.1.14 11AC20_MIMO_140 _ Horizontal



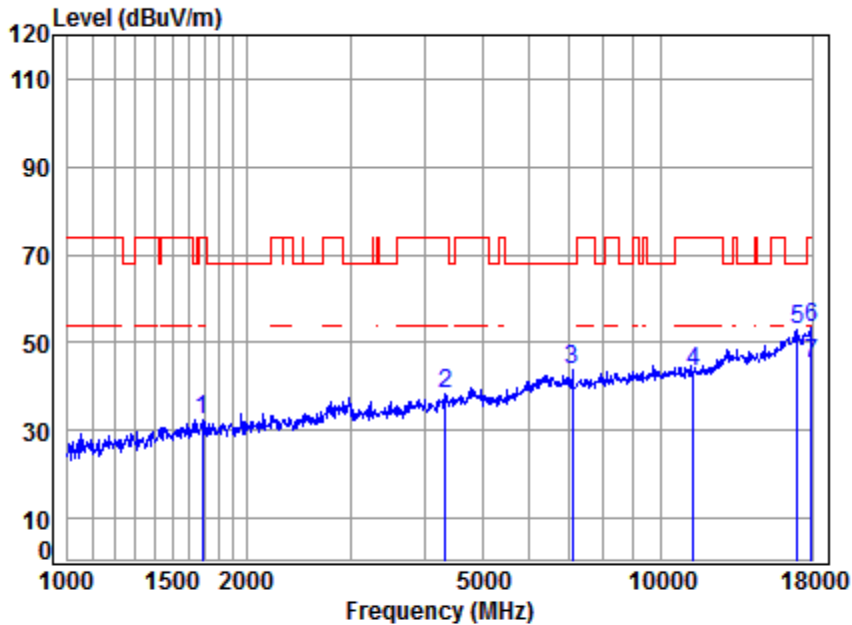
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10985CR
Mode : 5700 TX RSE
Note : 5G WIFI 11AC20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1672.779	5.26	26.56	40.82	40.91	31.91	74.00	-42.09 peak
2	4121.768	7.13	32.93	42.89	40.50	37.67	74.00	-36.33 peak
3	7628.806	9.99	36.41	41.55	38.14	42.99	74.00	-31.01 peak
4	11400.000	12.04	37.88	38.45	32.41	43.88	74.00	-30.12 peak
5	17100.000	16.49	42.66	40.34	32.38	51.19	68.20	-17.01 peak
6	18000.000	16.13	43.50	40.20	27.40	46.83	54.00	-7.17 Average
7	18000.000	16.13	43.50	40.20	35.78	55.21	74.00	-18.79 Peak



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4.2.1.15 11AC40_MIMO_134_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 10985CR
Mode : 5670 TX RSE
Note : 5G WIFI 11AC40

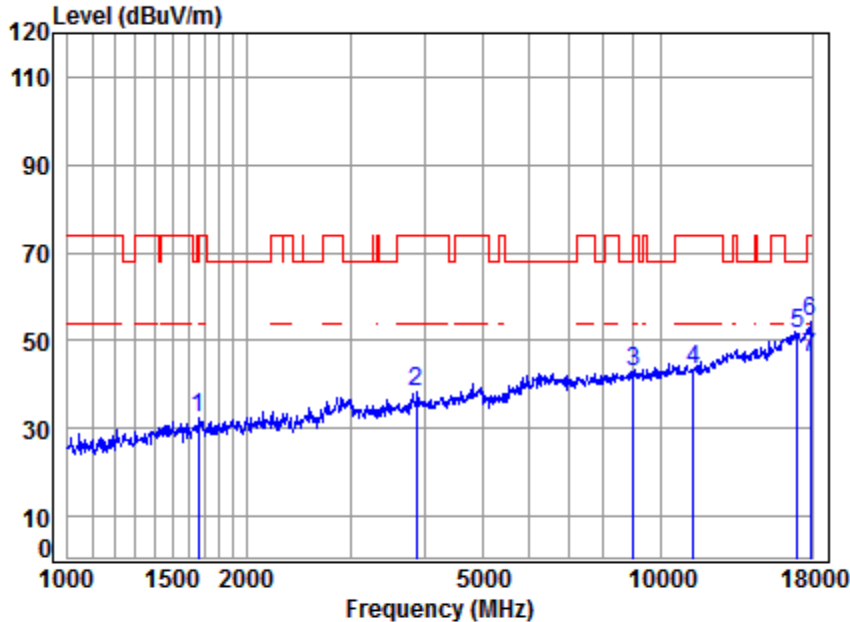
	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1687.347	5.24	26.62	40.82	41.18	32.22	74.00	-41.78	peak
2	4341.886	7.38	33.33	43.14	40.64	38.21	74.00	-35.79	peak
3	7096.999	10.10	35.98	41.94	39.83	43.97	68.20	-24.23	peak
4	11340.000	11.98	37.87	38.42	31.88	43.31	74.00	-30.69	peak
5	17010.000	16.69	42.61	40.36	33.92	52.86	68.20	-15.34	peak
6	17948.050	16.08	43.44	40.21	34.21	53.52	74.00	-20.48	Peak
7	17948.050	16.08	43.44	40.21	26.04	45.35	54.00	-8.65	Average



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4.2.1.16 11AC40_MIMO_134_Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10985CR
 Mode : 5670 TX RSE
 Note : 5G WIFI 11AC40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.27	26.52	40.81	41.35	32.33	74.00	-41.67	peak
2	6.86	32.47	42.61	41.40	38.12	74.00	-35.88	peak
3	10.40	37.20	39.46	34.80	42.94	68.20	-25.26	peak
4	11.98	37.87	38.42	32.03	43.46	74.00	-30.54	peak
5	16.69	42.61	40.36	32.82	51.76	68.20	-16.44	peak
6	16.02	43.38	40.22	35.17	54.35	74.00	-19.65	Peak
7	16.02	43.38	40.22	27.11	46.29	54.00	-7.71	Average

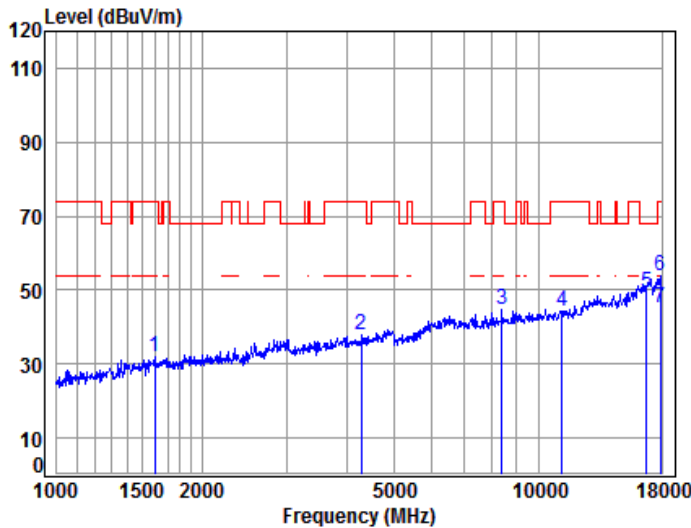


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2121

4.2.2 Transmitter emission above 1GHz (CDD & MIMO) Wireless charging case

4.2.2.1 11A20_CDD_116_Verical



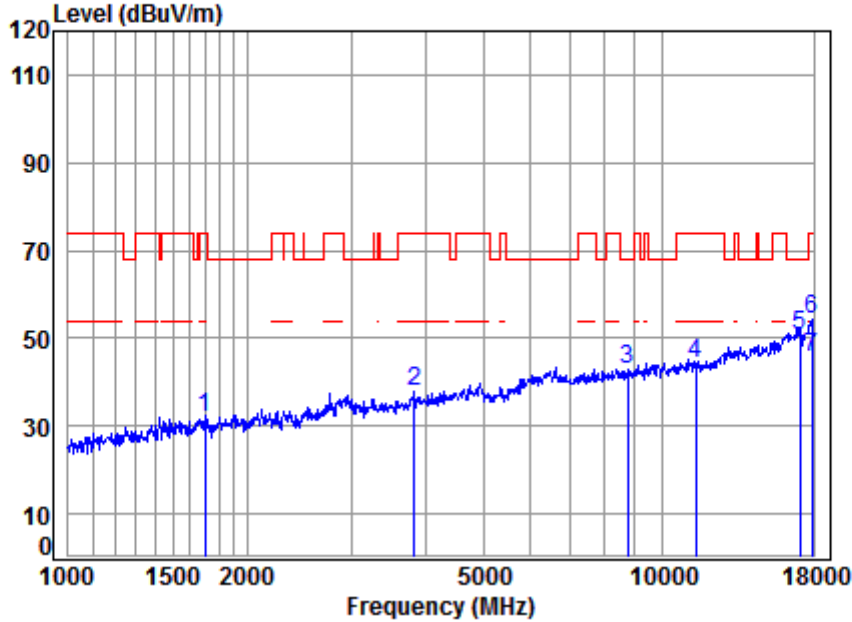
Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5580 TX RSE
 Note : 5G WIFI 11A

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1597.181	5.35	26.24	40.77	41.15	31.97	74.00	-42.03 peak
2	4291.977	7.33	33.24	43.08	40.31	37.80	74.00	-36.20 peak
3	8392.292	10.20	36.94	40.55	38.16	44.75	74.00	-29.25 peak
4	11160.000	11.80	37.83	38.34	32.94	44.23	74.00	-29.77 peak
5	16740.000	15.57	42.39	40.40	31.80	49.36	68.20	-18.84 peak
6	17896.250	16.02	43.38	40.22	34.72	53.90	74.00	-20.10 Peak
7	17896.250	16.02	43.38	40.22	25.86	45.04	54.00	-8.96 Average



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4.2.2.2 11A20_CDD_140_Vertical



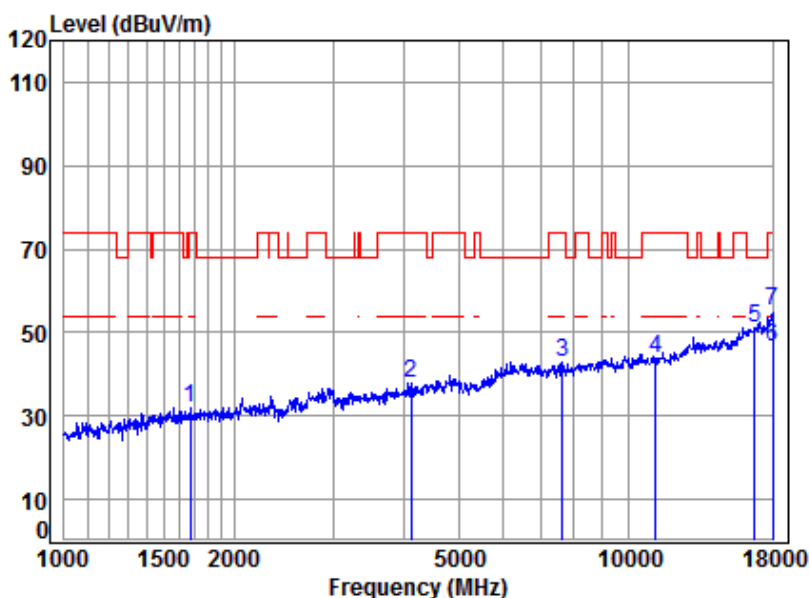
Site : chamber
Condition: 3m VERTICAL
Job No : 10024
Mode : 5700 TX RSE
Note : 5G WIFI 11A

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1697.129	5.23	26.66	40.83	41.00	32.06	74.00	-41.94 peak
2	3834.438	6.82	32.38	42.55	41.07	37.72	74.00	-36.28 peak
3	8738.852	10.33	37.10	39.91	35.49	43.01	68.20	-25.19 peak
4	11400.000	12.04	37.88	38.45	32.67	44.14	74.00	-29.86 peak
5	17100.000	16.49	42.66	40.34	31.77	50.58	68.20	-17.62 peak
6	17896.250	16.02	43.38	40.22	35.08	54.26	74.00	-19.74 Peak
7	17896.250	16.02	43.38	40.22	26.62	45.80	54.00	-8.20 Average



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4.2.2.3 11A20_CDD_116 _ Horizontal

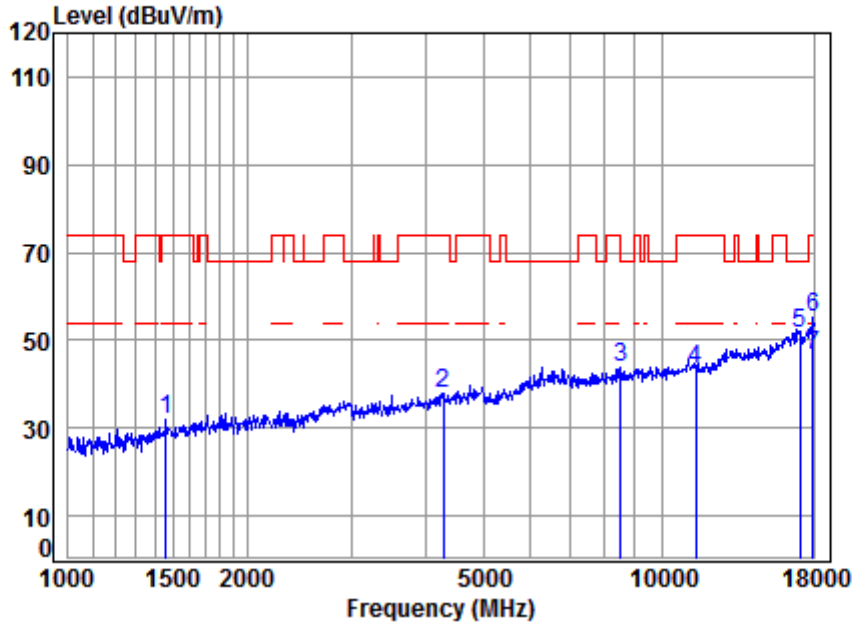


Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10024
 Mode : 5580 TX RSE
 Note : 5G WIFI 11A

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1672.779	5.26	26.56	40.82	40.91	31.91	74.00	-42.09 peak
2	4121.768	7.13	32.93	42.89	40.50	37.67	74.00	-36.33 peak
3	7628.806	9.99	36.41	41.55	38.14	42.99	74.00	-31.01 peak
4	11160.000	11.80	37.83	38.34	32.37	43.66	74.00	-30.34 peak
5	16740.000	15.57	42.39	40.40	33.45	51.01	68.20	-17.19 peak
6	18000.000	16.13	43.50	40.20	27.03	46.46	54.00	-7.54 Average
7	18000.000	16.13	43.50	40.20	35.78	55.21	74.00	-18.79 Peak



4.2.2.4 11A20_CDD_140 _ Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10024
 Mode : 5700 TX RSE
 Note : 5G WIFI 11A

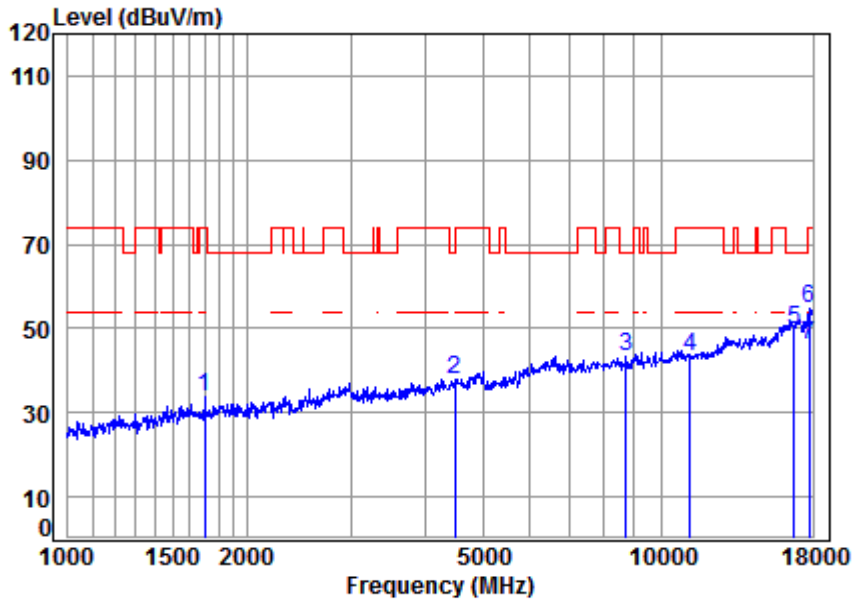
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1460.295	5.35	25.65	40.68	41.76	32.08	74.00	-41.92 peak
2	4291.977	7.33	33.24	43.08	40.45	37.94	74.00	-36.06 peak
3	8514.456	10.27	37.01	40.32	36.74	43.70	68.20	-24.50 peak
4	11400.000	12.04	37.88	38.45	31.93	43.40	74.00	-30.60 peak
5	17100.000	16.49	42.66	40.34	32.56	51.37	68.20	-16.83 peak
6	17948.050	16.08	43.44	40.21	35.96	55.27	74.00	-18.73 Peak
7	17948.050	16.08	43.44	40.21	27.40	46.71	54.00	-7.29 Average



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4.2.2.5 11N20_MIMO_116_Vertical



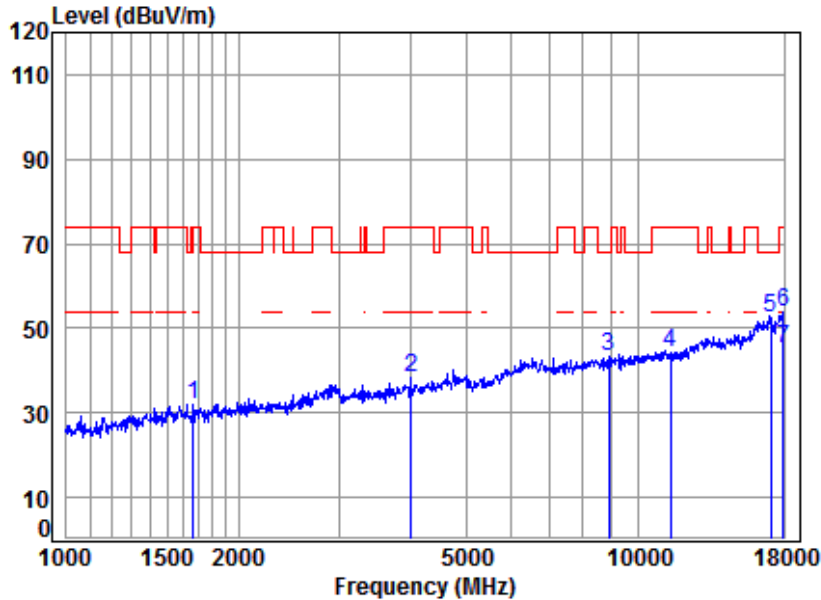
Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5580 TX RSE
 Note : 5G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.23	26.68	40.83	42.54	33.62	74.00	-40.38	peak
2	7.54	33.57	43.29	40.06	37.88	68.20	-30.32	peak
3	10.33	37.09	39.96	35.90	43.36	68.20	-24.84	peak
4	11.80	37.83	38.34	32.19	43.48	74.00	-30.52	peak
5	15.57	42.39	40.40	32.16	49.72	68.20	-18.48	peak
6	15.86	43.19	40.24	35.73	54.54	74.00	-19.46	Peak
7	15.86	43.19	40.24	27.11	45.92	54.00	-8.08	Average



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4.2.2.6 11N20_MIMO_140_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5700 TX RSE
 Note : 5G WIFI 11N20

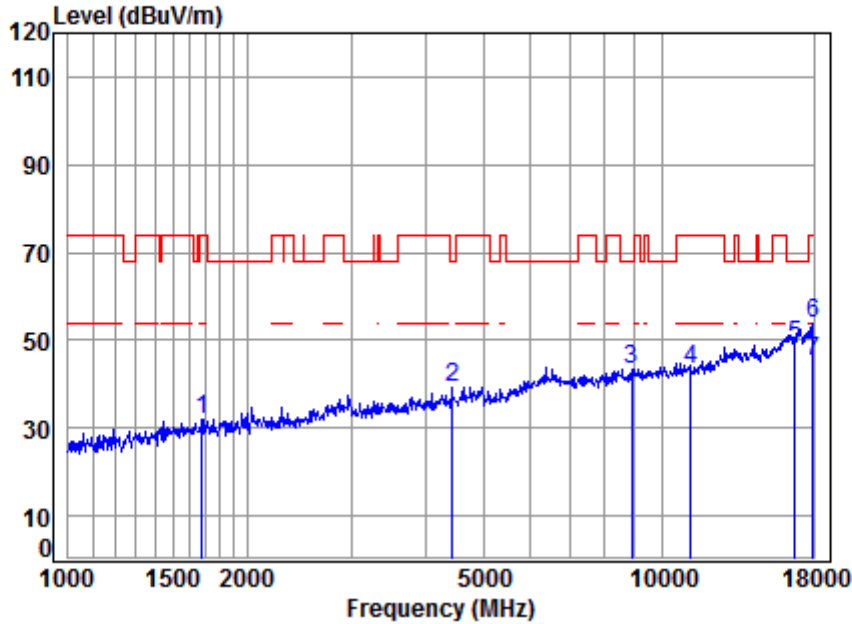
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1667.951	5.27	26.54	40.81	40.97	31.97	74.00	-42.03 peak
2	4004.339	6.99	32.71	42.76	41.47	38.41	74.00	-35.59 peak
3	8891.725	10.37	37.16	39.64	35.24	43.13	68.20	-25.07 peak
4	11400.000	12.04	37.88	38.45	32.59	44.06	74.00	-29.94 peak
5	17100.000	16.49	42.66	40.34	33.83	52.64	68.20	-15.56 peak
6	17948.050	16.08	43.44	40.21	34.35	53.66	74.00	-20.34 Peak
7	17948.050	16.08	43.44	40.21	25.93	45.24	54.00	-8.76 Average



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4.2.2.7 11N20_MIMO_116 _ Horizontal



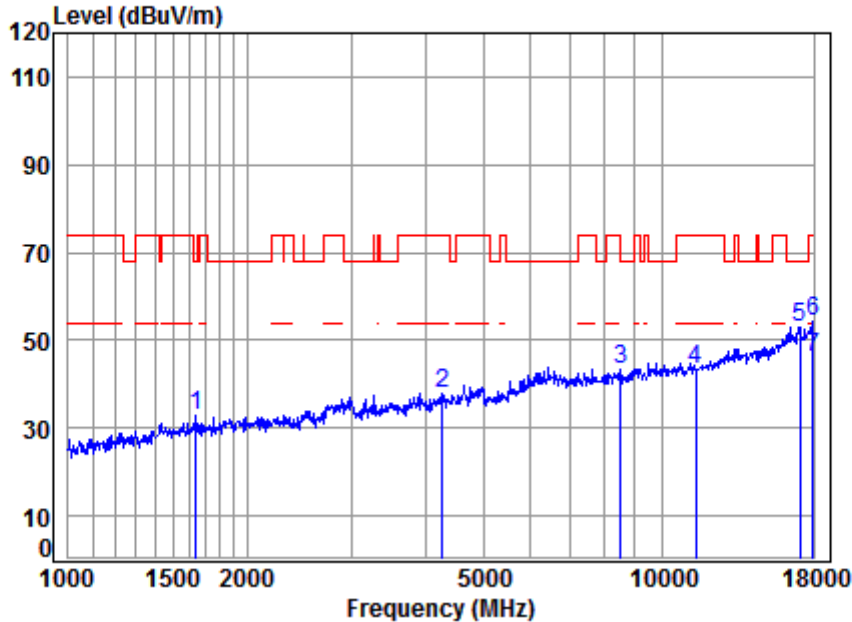
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5580 TX RSE
Note : 5G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	5.25	26.58	40.82	41.15	32.16	74.00	-41.84 peak
2	4430.628	7.48	33.48	43.23	41.39	39.12	68.20	-29.08 peak
3	8891.725	10.37	37.16	39.64	35.66	43.55	68.20	-24.65 peak
4	11160.000	11.80	37.83	38.34	32.01	43.30	74.00	-30.70 peak
5	16740.000	15.57	42.39	40.40	31.47	49.03	68.20	-19.17 peak
6	17948.050	16.08	43.44	40.21	34.35	53.66	74.00	-20.34 Peak
7	17948.050	16.08	43.44	40.21	25.86	45.17	54.00	-8.83 Average



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4.2.2.8 11N20_MIMO_140 _ Horizontal



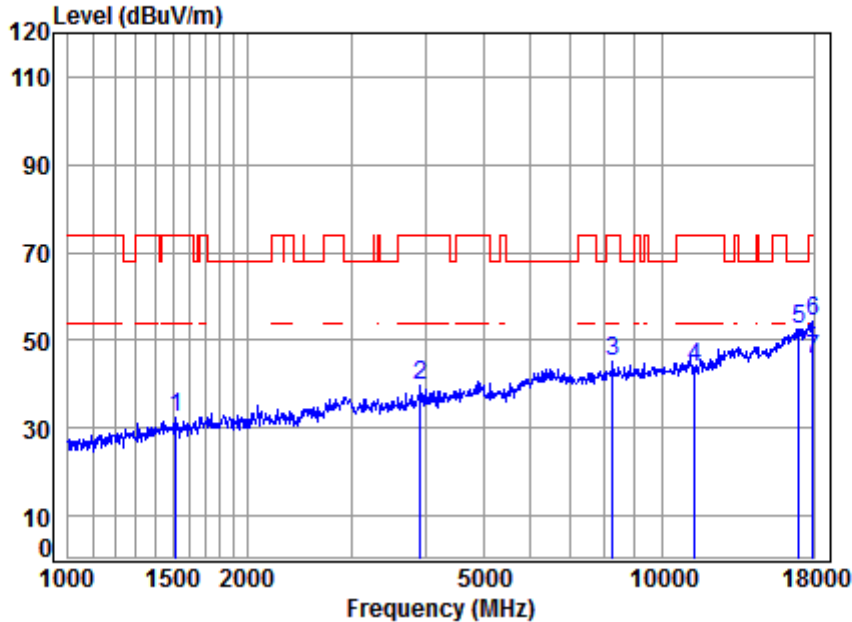
Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10024
 Mode : 5700 TX RSE
 Note : 5G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.30	26.44	40.80	41.80	32.74	68.20	-35.46	peak
2	7.30	33.19	43.06	40.23	37.66	74.00	-36.34	peak
3	10.27	37.01	40.32	36.48	43.44	68.20	-24.76	peak
4	12.04	37.88	38.45	31.83	43.30	74.00	-30.70	peak
5	16.49	42.66	40.34	34.03	52.84	68.20	-15.36	peak
6	16.08	43.44	40.21	35.02	54.33	74.00	-19.67	Peak
7	16.08	43.44	40.21	26.64	45.95	54.00	-8.05	Average



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4.2.2.9 11N40_MIMO_134_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5670 TX RSE
 Note : 5G WIFI 11N40

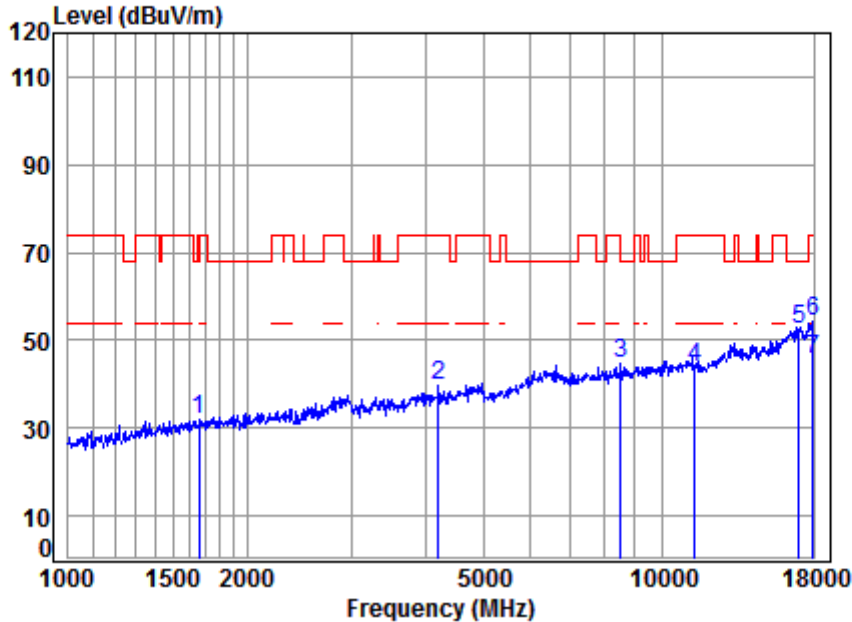
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.45	25.89	40.72	41.96	32.58	74.00	-41.42	peak
2	6.89	32.53	42.65	42.74	39.51	74.00	-34.49	peak
3	10.13	36.87	40.78	38.84	45.06	74.00	-28.94	peak
4	11.98	37.87	38.42	32.51	43.94	74.00	-30.06	peak
5	16.69	42.61	40.36	33.70	52.64	68.20	-15.56	peak
6	16.08	43.44	40.21	34.87	54.18	74.00	-19.82	Peak
7	16.08	43.44	40.21	26.15	45.46	54.00	-8.54	Average



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4.2.2.10 11N40_MIMO_134 _ Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10024
 Mode : 5670 TX RSE
 Note : 5G WIFI 11N40

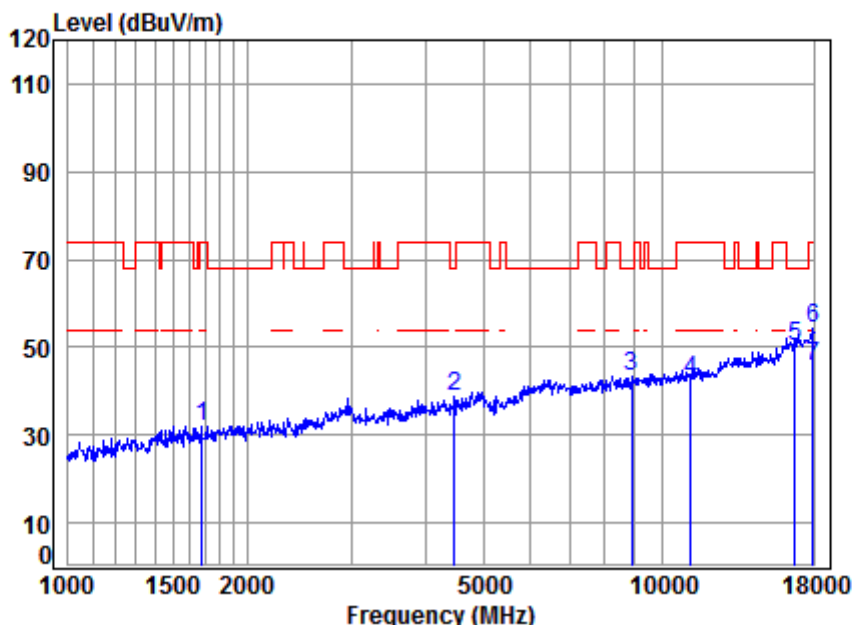
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.27	26.52	40.81	40.84	31.82	74.00	-42.18	peak
2	7.23	33.08	42.99	42.17	39.49	74.00	-34.51	peak
3	10.27	37.01	40.32	37.86	44.82	68.20	-23.38	peak
4	11.98	37.87	38.42	32.53	43.96	74.00	-30.04	peak
5	16.69	42.61	40.36	33.70	52.64	68.20	-15.56	peak
6	16.08	43.44	40.21	35.09	54.40	74.00	-19.60	Peak
7	16.08	43.44	40.21	26.45	45.76	54.00	-8.24	Average



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4.2.2.11 11AC20_MIMO_116_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5580 TX RSE
 Note : 5G WIFI 11AC20

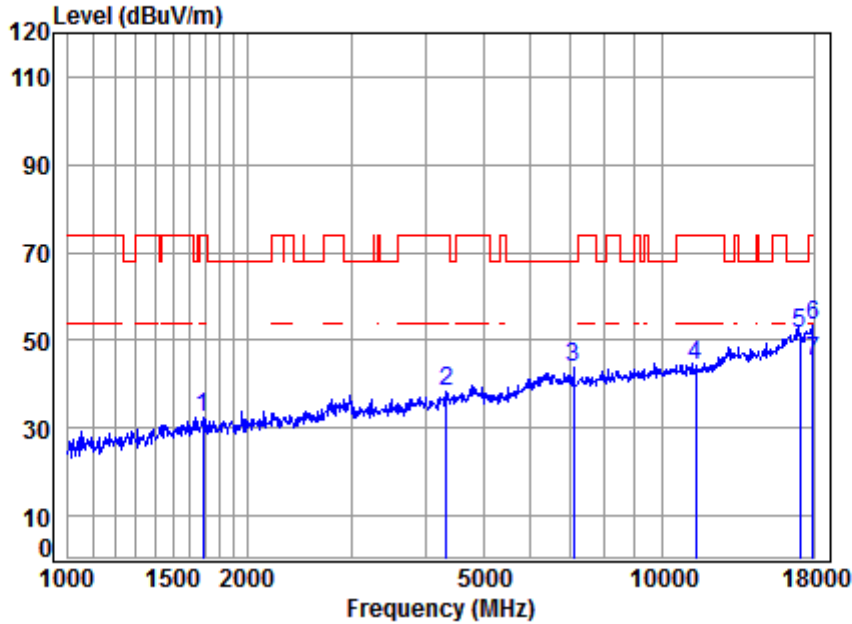
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	5.25	26.58	40.82	41.09	32.10	74.00	-41.90 peak
2	4469.214	7.53	33.55	43.27	40.88	38.69	68.20	-29.51 peak
3	8891.725	10.37	37.16	39.64	35.39	43.28	68.20	-24.92 peak
4	11160.000	11.80	37.83	38.34	31.03	42.32	74.00	-31.68 peak
5	16740.000	15.57	42.39	40.40	32.81	50.37	68.20	-17.83 peak
6	17948.050	16.08	43.44	40.21	35.08	54.39	74.00	-19.61 Peak
7	17948.050	16.08	43.44	40.21	26.44	45.75	54.00	-8.25 Average



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4.2.2.12 11AC20_MIMO_140_Vertical



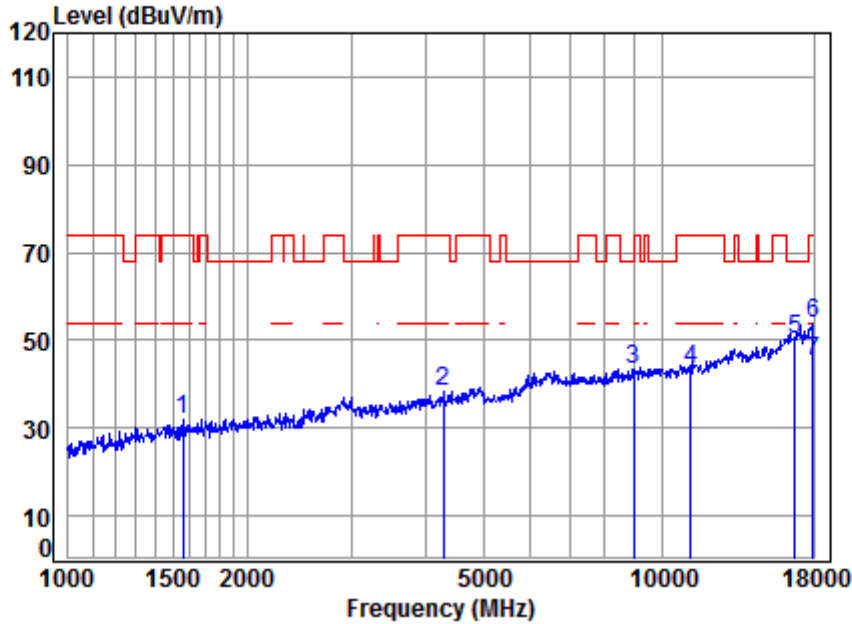
Site : chamber
Condition: 3m VERTICAL
Job No : 10024
Mode : 5700 TX RSE
Note : 5G WIFI 11AC20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.24	26.62	40.82	41.18	32.22	74.00	-41.78	peak
2	7.38	33.33	43.14	40.64	38.21	74.00	-35.79	peak
3	10.10	35.98	41.94	39.83	43.97	68.20	-24.23	peak
4	12.04	37.88	38.45	32.99	44.46	74.00	-29.54	peak
5	16.49	42.66	40.34	32.65	51.46	68.20	-16.74	peak
6	16.08	43.44	40.21	34.21	53.52	74.00	-20.48	Peak
7	16.08	43.44	40.21	25.97	45.28	54.00	-8.72	Average



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4.2.2.13 11AC20_MIMO_116 _ Horizontal



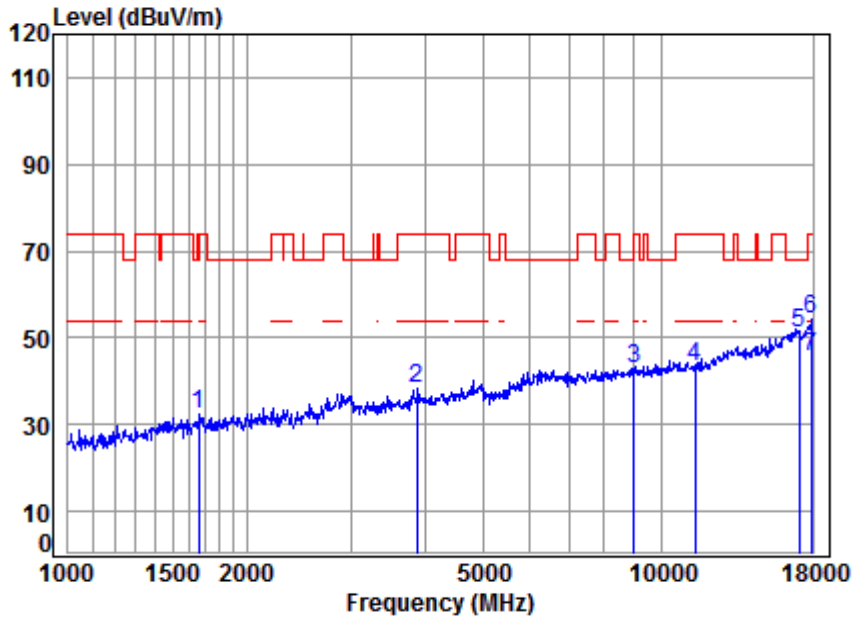
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5580 TX RSE
Note : 5G WIFI 11AC20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.40	26.08	40.75	41.15	31.88	74.00	-42.12	peak
2	7.33	33.24	43.08	40.98	38.47	74.00	-35.53	peak
3	10.39	37.19	39.51	35.48	43.55	68.20	-24.65	peak
4	11.80	37.83	38.34	32.07	43.36	74.00	-30.64	peak
5	15.57	42.39	40.40	32.81	50.37	68.20	-17.83	peak
6	16.08	43.44	40.21	34.74	54.05	74.00	-19.95	Peak
7	16.08	43.44	40.21	26.00	45.31	54.00	-8.69	Average



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4.2.2.14 11AC20_MIMO_140 _ Horizontal

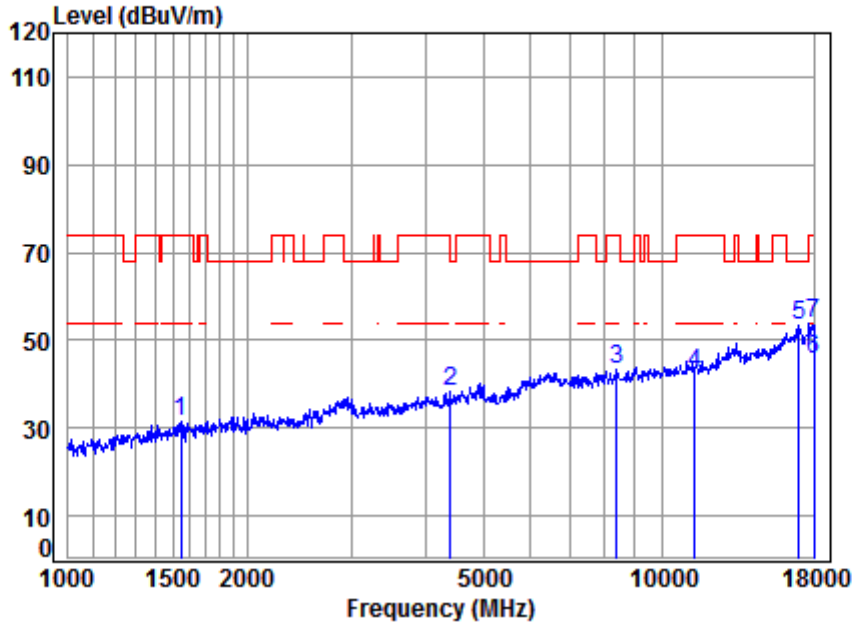


Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5700 TX RSE
Note : 5G WIFI 11AC20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1663.137	5.27	26.52	40.81	41.35	32.33	74.00	-41.67	peak
2	3879.027	6.86	32.47	42.61	41.40	38.12	74.00	-35.88	peak
3	8995.123	10.40	37.20	39.46	34.80	42.94	68.20	-25.26	peak
4	11400.000	12.04	37.88	38.45	31.76	43.23	74.00	-30.77	peak
5	17100.000	16.49	42.66	40.34	32.26	51.07	68.20	-17.13	peak
6	17896.250	16.02	43.38	40.22	35.17	54.35	74.00	-19.65	Peak
7	17896.250	16.02	43.38	40.22	26.60	45.78	54.00	-8.22	Average



4.2.2.15 11AC40_MIMO_134_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5670 TX RSE
 Note : 5G WIFI 11AC40

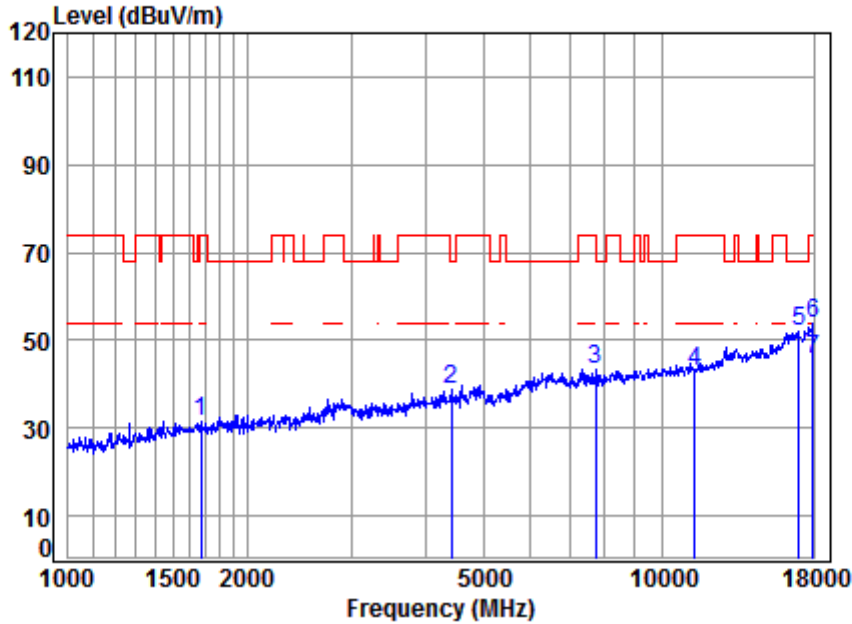
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5.42	26.02	40.74	40.98	31.68	74.00	-42.32	peak
2	7.46	33.44	43.20	40.44	38.14	68.20	-30.06	peak
3	10.20	36.94	40.55	36.83	43.42	74.00	-30.58	peak
4	11.98	37.87	38.42	31.13	42.56	74.00	-31.44	peak
5	16.69	42.61	40.36	34.36	53.30	68.20	-14.90	peak
6	16.13	43.50	40.20	26.04	45.47	54.00	-8.53	Average
7	16.13	43.50	40.20	34.25	53.68	74.00	-20.32	Peak



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4.2.2.16 11AC40_MIMO_134_Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5670 TX RSE
Note : 5G WIFI 11AC40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1672.779	5.26	26.56	40.82	40.55	31.55	74.00	-42.45 peak
2	4417.841	7.47	33.46	43.22	41.17	38.88	68.20	-29.32 peak
3	7739.857	9.98	36.50	41.48	38.38	43.38	74.00	-30.62 peak
4	11340.000	11.98	37.87	38.42	31.66	43.09	74.00	-30.91 peak
5	17010.000	16.69	42.61	40.36	33.09	52.03	68.20	-16.17 peak
6	17948.050	16.08	43.44	40.21	34.40	53.71	74.00	-20.29 Peak
7	17948.050	16.08	43.44	40.21	26.24	45.55	54.00	-8.45 Average



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Remark:

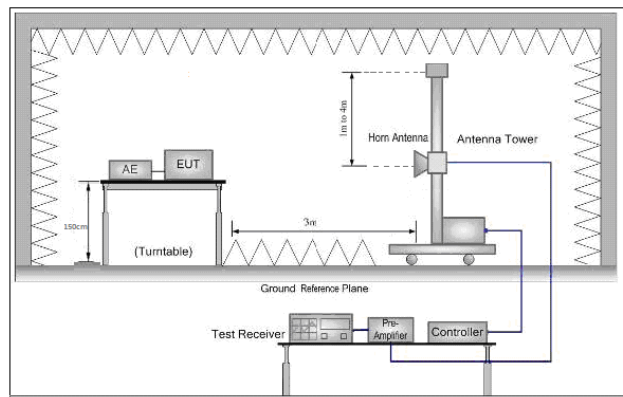
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 40GHz, The disturbance between 9KHz to 30MHz and 18GHz to 40GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
- 4) All modes have been tested, but only the worst case data displayed in this report.



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4.3 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:			



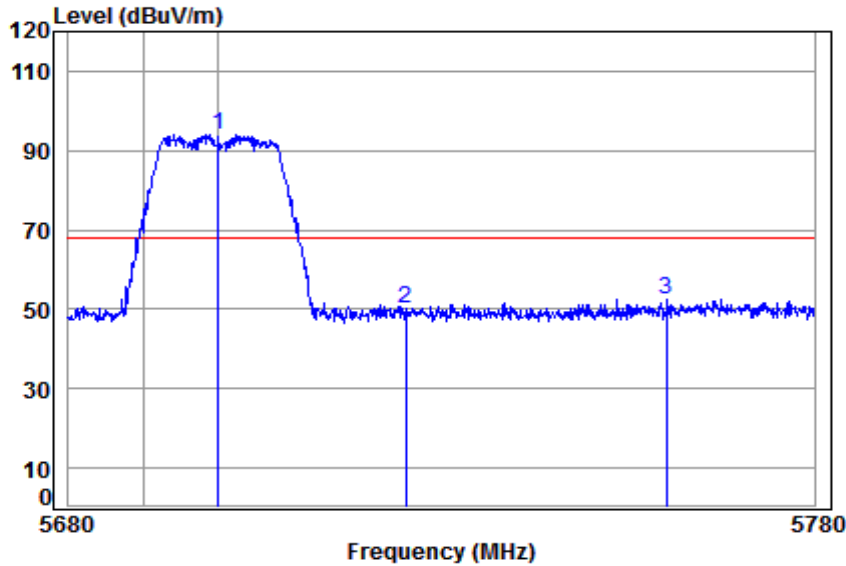
<p>Test Procedure:</p>	<ol style="list-style-type: none"> a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel g. Test the EUT in the outermost channels. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. i. Repeat above procedures until all frequencies measured was complete.
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates.</p>
<p>Final Test Mode:</p>	<p>Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; MCS0 of rate is the worst case of 802.11n(HT20); MCS0 of rate is the worst case of 802.11n(HT40); MCSAC0 of rate is the worst case of 802.11ac(HT20); MCSAC0 of rate is the worst case of 802.11ac(HT40); MCSAC0 of rate is the worst case of 802.11ac(HT80); MCSAC0 of rate is the worst case of 802.11ac(HT160) Only the worst case is recorded in the report.</p>
<p>Instruments Used:</p>	<p>Refer to section 6 for details</p>
<p>Test Results:</p>	<p>Pass</p>



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4.3.1 Test plots (CDD & MIMO) Wireless charging case + USB Cable charging

4.3.1.1 11A20_CDD_140 _ Horizontal

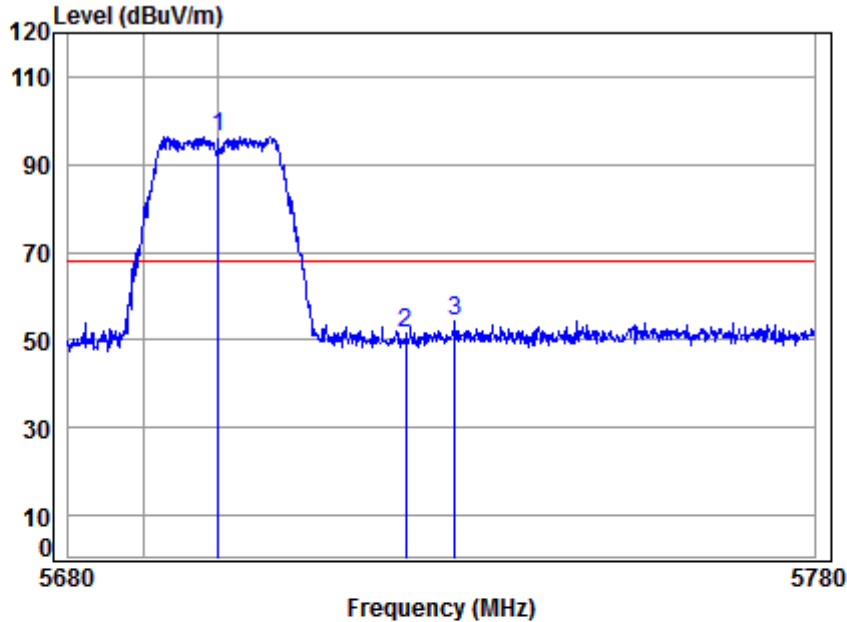


Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10958CR
 Mode : 5700 Band edge
 : 5G WIFI 11A

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.56	34.81	43.10	92.76	94.03	68.20	25.83	peak
2	9.64	34.83	43.08	48.86	50.25	68.20	-17.95	peak
3	9.76	34.87	43.05	50.71	52.29	68.20	-15.91	peak



4.3.1.2 11A20_CDD_140 _ Vertical



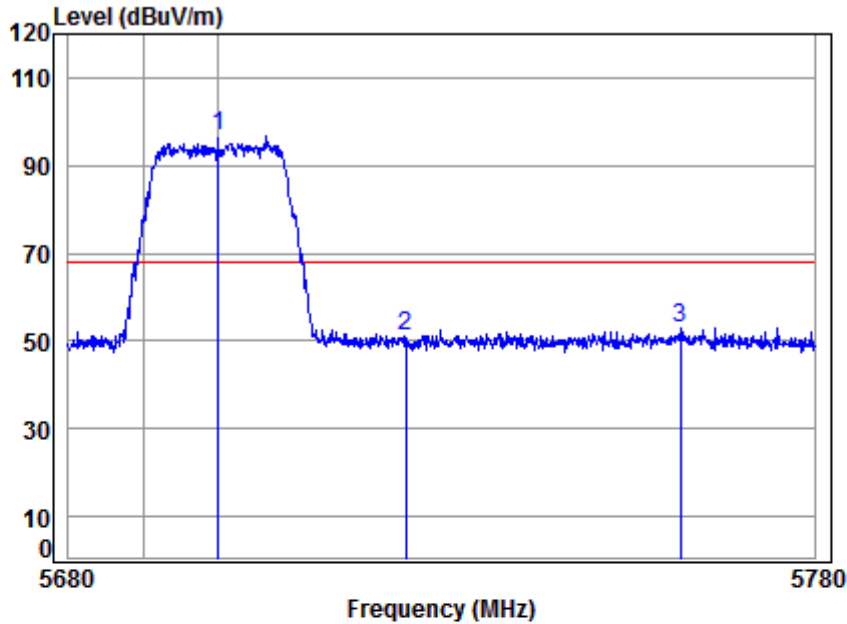
Site : chamber
Condition: 3m VERTICAL
Job No : 10958CR
Mode : 5700 Band edge
: 5G WIFI 11A

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.56	34.81	43.10	95.11	96.38	68.20	28.18	peak
2	9.64	34.83	43.08	49.98	51.37	68.20	-16.83	peak
3	9.67	34.84	43.07	52.79	54.23	68.20	-13.97	peak



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4.3.1.3 11N20_MIMO_140 _ Horizontal

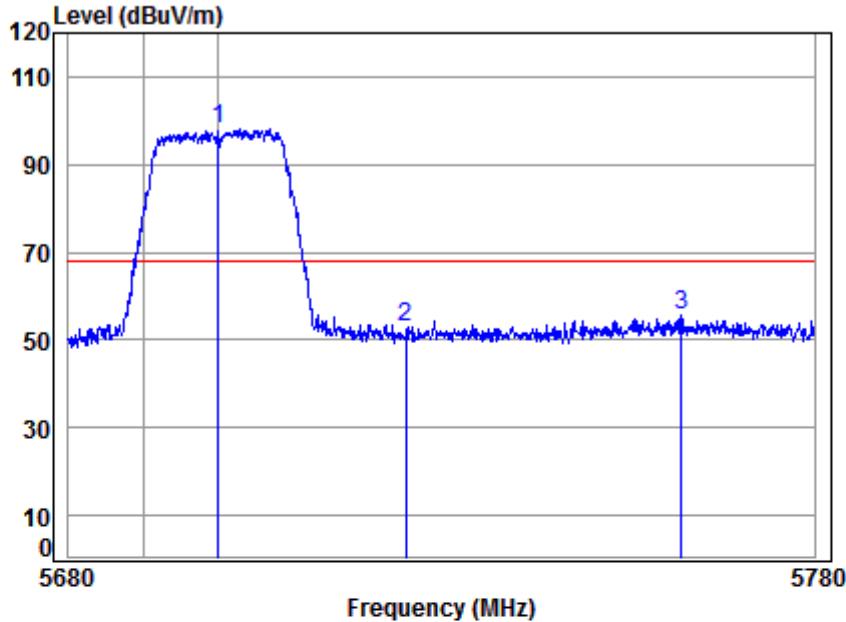


Site : chamber
Condition: 3m HORIZONTAL
Job No : 10958CR
Mode : 5700 Band edge
: 5G WIFI 11N20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	95.38	96.65	68.20	28.45	peak
2 5725.000	9.64	34.83	43.08	49.83	51.22	68.20	-16.98	peak
3 5761.871	9.77	34.87	43.05	51.55	53.14	68.20	-15.06	peak



4.3.1.4 11N20_MIMO_140_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10958CR
 Mode : 5700 Band edge
 : 5G WIFI 11N20

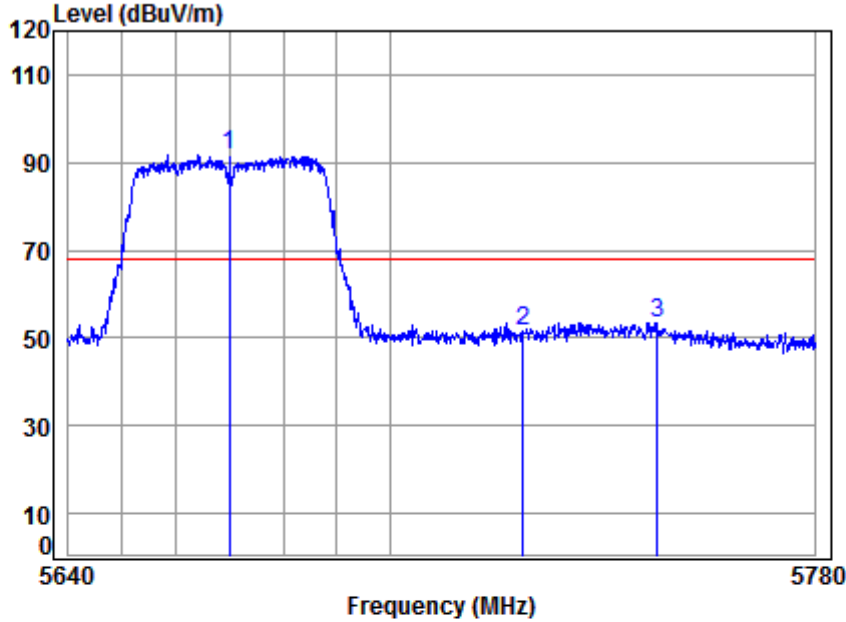
	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	96.63	97.90	68.20	29.70	peak
2 5725.000	9.64	34.83	43.08	51.57	52.96	68.20	-15.24	peak
3 5762.072	9.77	34.87	43.05	53.89	55.48	68.20	-12.72	peak



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4.3.1.5 11N40_MIMO_134 _ Horizontal



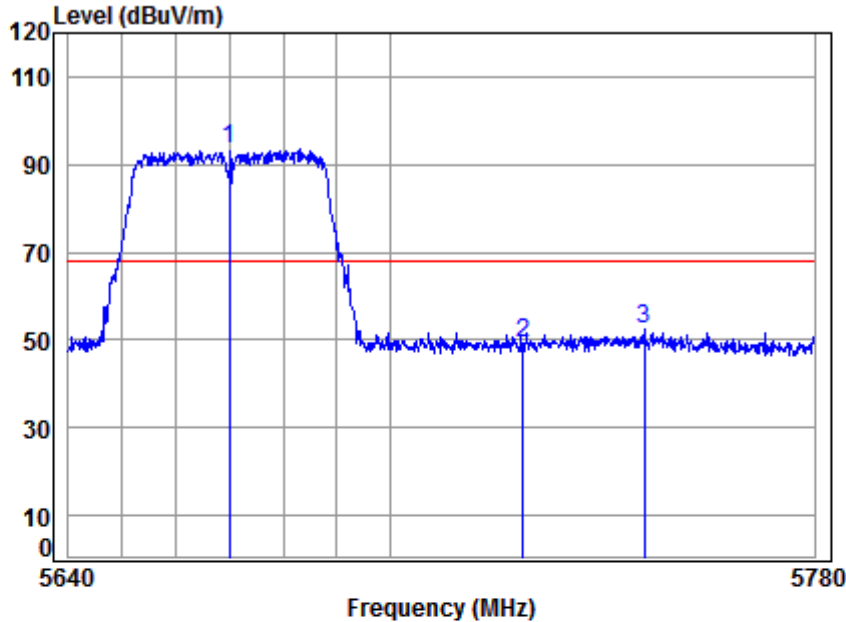
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10958CR
Mode : 5670 Band edge
: 5G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.45	34.77	43.13	90.75	91.84	68.20	23.64	peak
2	9.64	34.83	43.08	50.03	51.42	68.20	-16.78	peak
3	9.73	34.86	43.06	51.98	53.51	68.20	-14.69	peak



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4.3.1.6 11N40_MIMO_134_Vertival



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10958CR
 Mode : 5670 Band edge
 : 5G WIFI 11N40

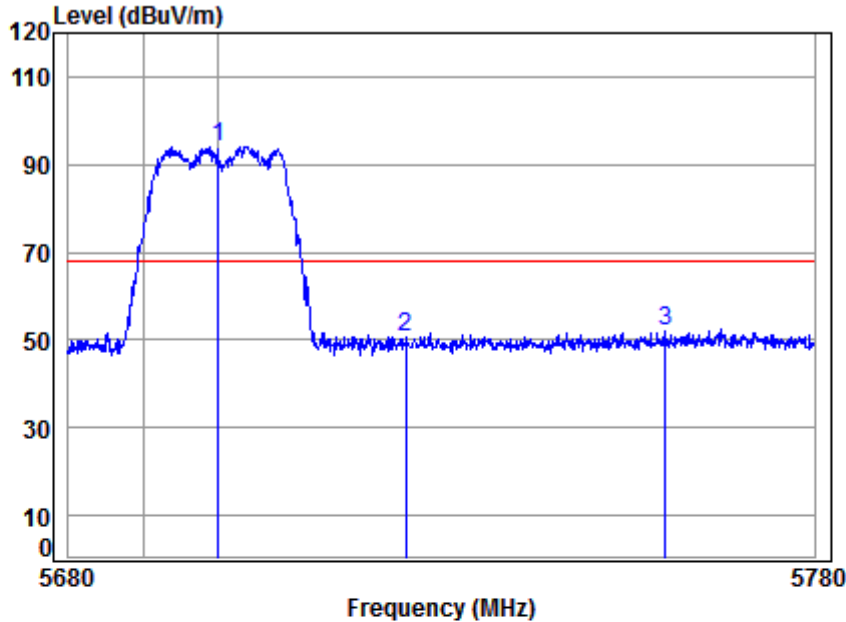
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5670.000	9.45	34.77	43.13	92.35	93.44	68.20	25.24	peak
2 5725.000	9.64	34.83	43.08	47.97	49.36	68.20	-18.84	peak
3 5747.777	9.72	34.85	43.06	50.99	52.50	68.20	-15.70	peak



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4.3.1.7 11AC20_MIMO_140 _ Horizontal



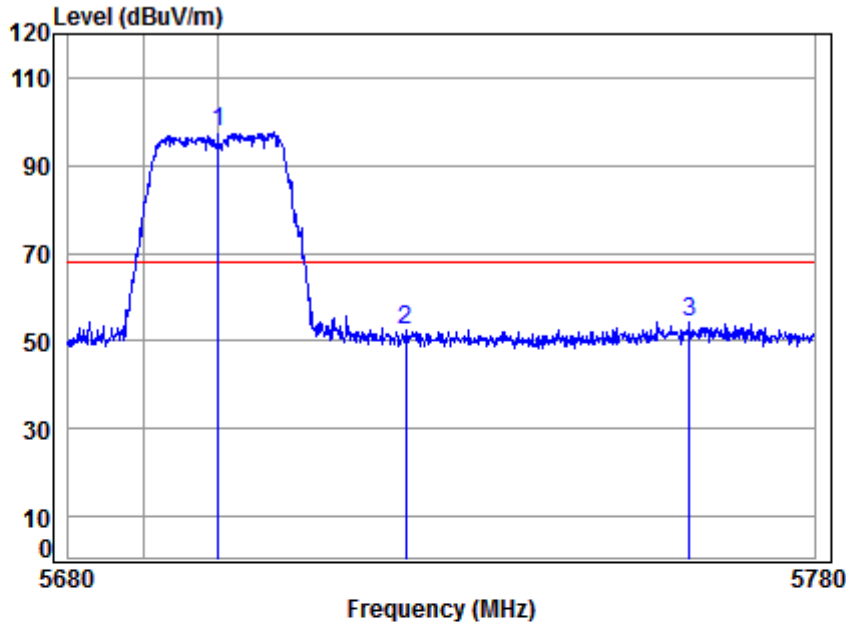
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10958CR
Mode : 5700 Band edge
: 5G WIFI 11AC20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	92.89	94.16	68.20	25.96	peak
2 5725.000	9.64	34.83	43.08	49.15	50.54	68.20	-17.66	peak
3 5759.860	9.76	34.87	43.05	50.55	52.13	68.20	-16.07	peak



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4.3.1.8 11AC20_MIMO_140_Vertical



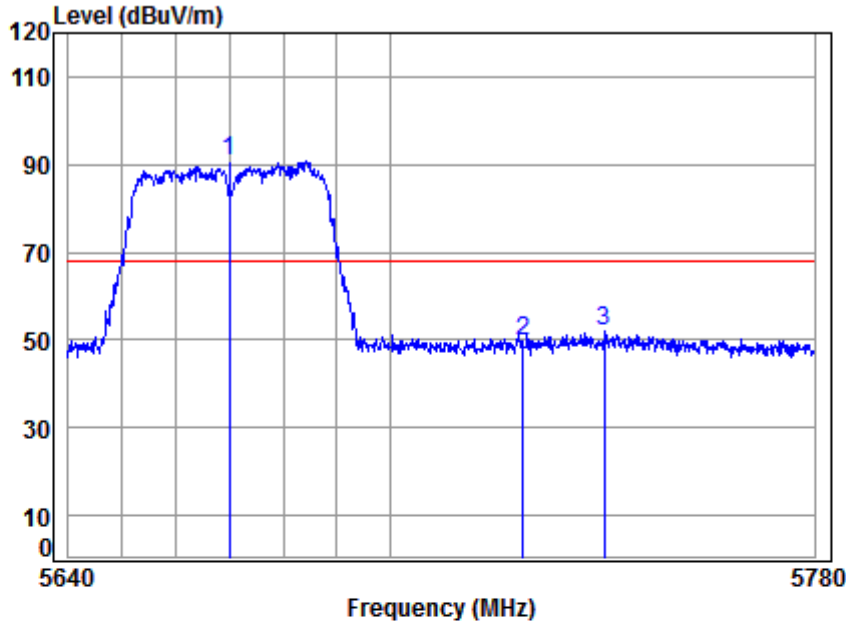
Site : chamber
 Condition: 3m VERTICAL
 Job No : 10958CR
 Mode : 5700 Band edge
 : 5G WIFI 11AC20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	96.20	97.47	68.20	29.27	peak
2 5725.000	9.64	34.83	43.08	50.88	52.27	68.20	-15.93	peak
3 5763.178	9.77	34.87	43.04	52.88	54.48	68.20	-13.72	peak



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4.3.1.9 11AC40_MIMO_134_Horizontal



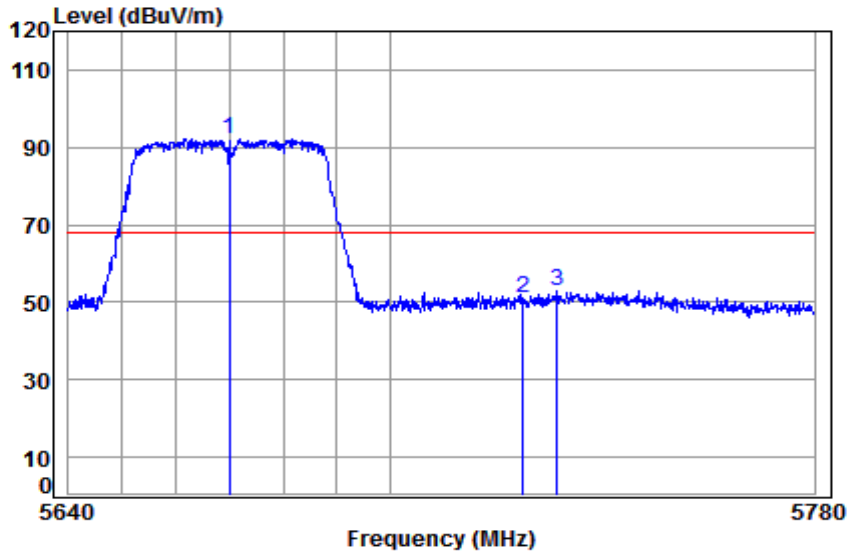
Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10958CR
 Mode : 5670 Band edge
 : 5G WIFI 11AC40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5670.000	9.45	34.77	43.13	89.84	90.93	68.20	22.73	peak
2 5725.000	9.64	34.83	43.08	48.43	49.82	68.20	-18.38	peak
3 5740.172	9.69	34.85	43.07	50.52	51.99	68.20	-16.21	peak



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4.3.1.10 11AC40_MIMO_134_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 10958CR
Mode : 5670 Band edge
: 5G WIFI 11AC40

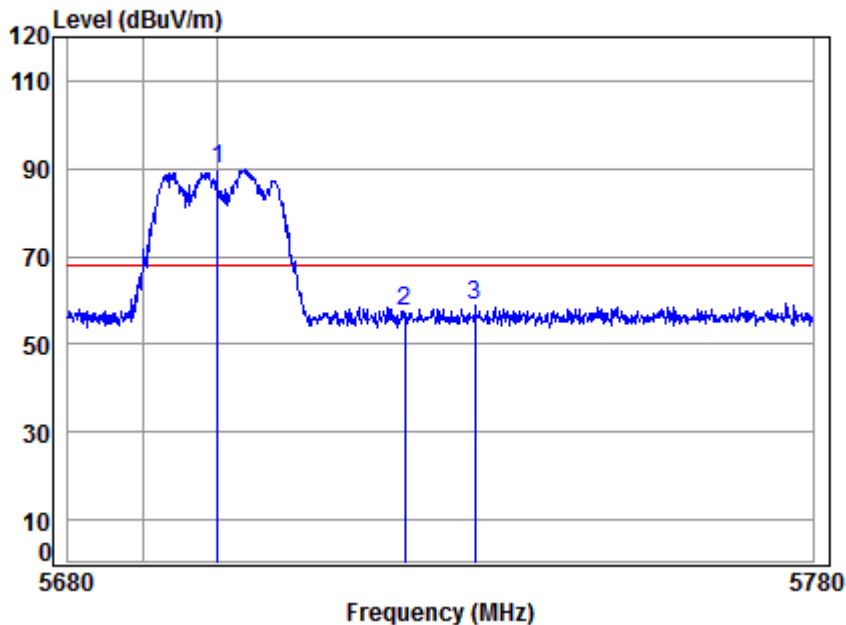
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark	
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.45	34.77	43.13	91.07	92.16	68.20	23.96	peak
2	9.64	34.83	43.08	49.74	51.13	68.20	-17.07	peak
3	9.66	34.84	43.07	51.58	53.01	68.20	-15.19	peak



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4.3.2 Test plots (CDD & MIMO) Wireless charging case

4.3.2.1 11A20_CDD_140 _ Horizontal



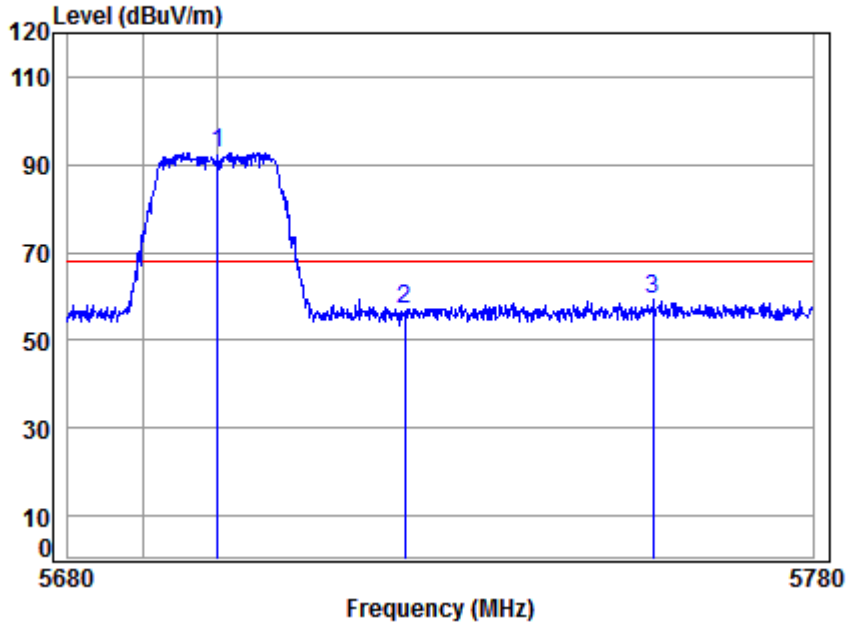
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5700 Band edge
: 5G WIFI 11A

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	88.40	89.67	68.20	21.47	peak
2 5725.000	9.64	34.83	43.08	55.98	57.37	68.20	-10.83	peak
3 5734.484	9.68	34.84	43.07	57.34	58.79	68.20	-9.41	peak



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4.3.2.2 11A20_CDD_140_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 10024
Mode : 5700 Band edge
: 5G WIFI 11A

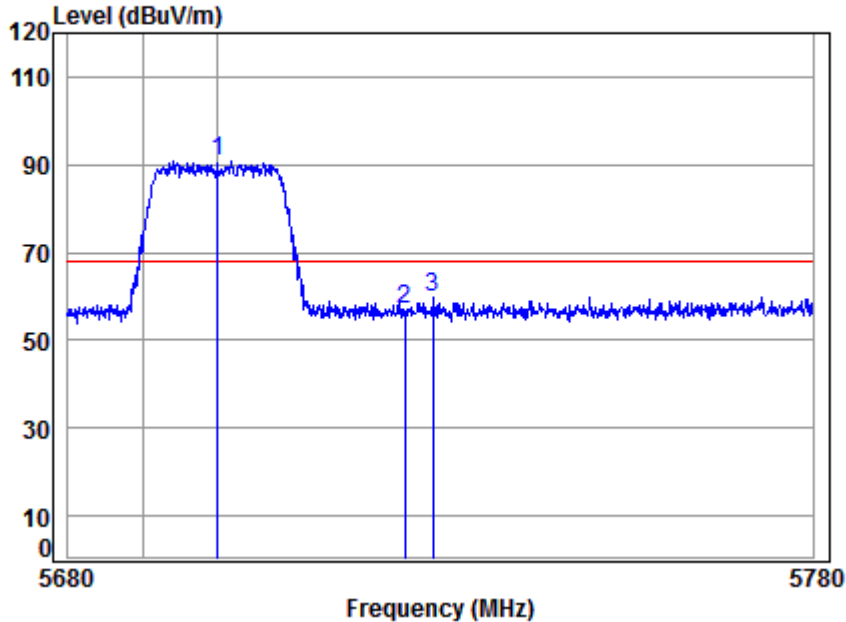
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.56	34.81	43.10	91.41	92.68	68.20	24.48	peak
2	9.64	34.83	43.08	55.82	57.21	68.20	-10.99	peak
3	9.76	34.86	43.05	57.69	59.26	68.20	-8.94	peak



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4.3.2.3 11N20_MIMO_140 _ Horizontal



Site : chamber
 Condition: 3m HORIZONTAL
 Job No : 10024
 Mode : 5700 Band edge
 : 5G WIFI 11N20

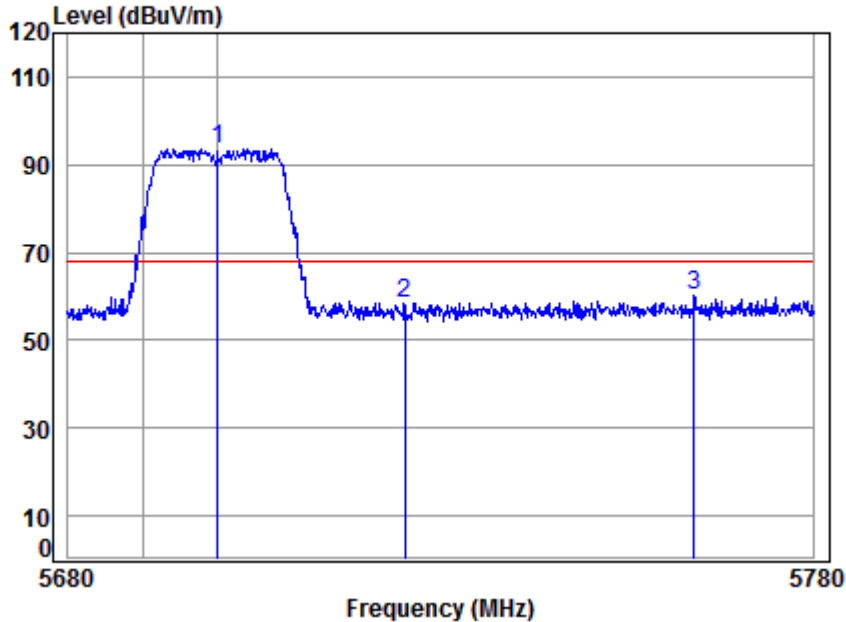
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	89.72	90.99	68.20	22.79	peak
2 5725.000	9.64	34.83	43.08	55.65	57.04	68.20	-11.16	peak
3 5728.782	9.66	34.83	43.08	58.37	59.78	68.20	-8.42	peak



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4.3.2.4 11N20_MIMO_140_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5700 Band edge
 : 5G WIFI 11N20

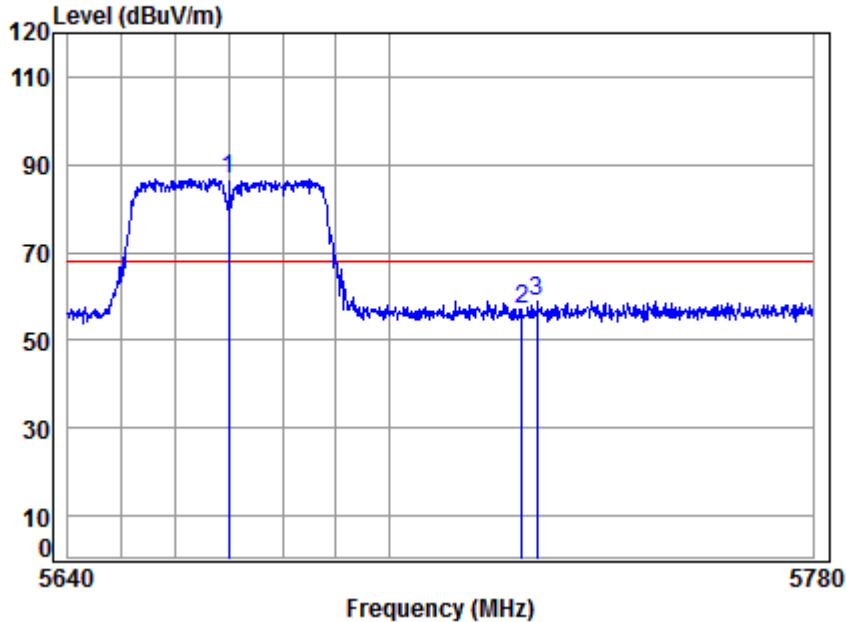
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	92.25	93.52	68.20	25.32	peak
2 5725.000	9.64	34.83	43.08	57.00	58.39	68.20	-9.81	peak
3 5763.882	9.78	34.87	43.04	58.63	60.24	68.20	-7.96	peak



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4.3.2.5 11N40_MIMO_134 _ Horizontal



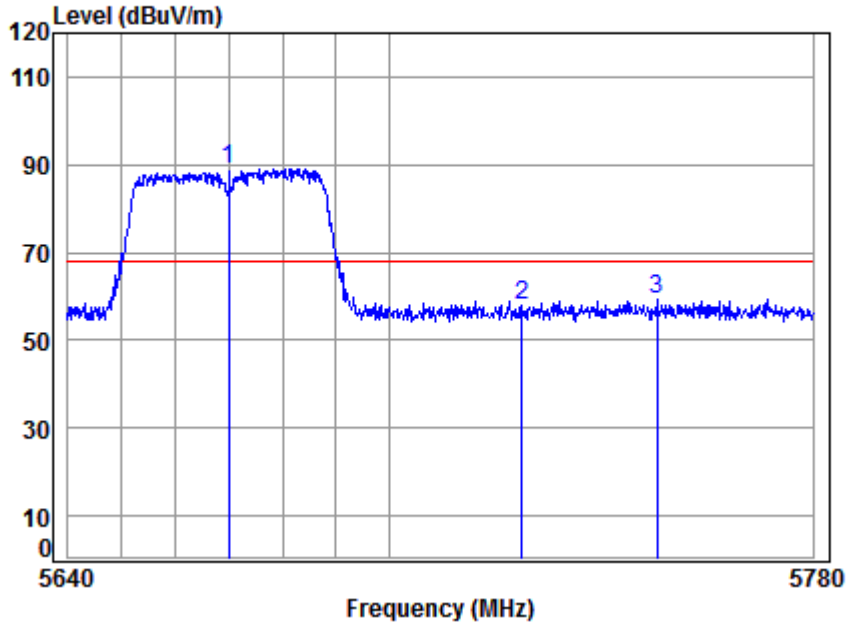
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5670 Band edge
: 5G WIFI 11N40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5670.000	9.45	34.77	43.13	85.76	86.85	68.20	18.65	peak
2 5725.000	9.64	34.83	43.08	55.67	57.06	68.20	-11.14	peak
3 5727.799	9.65	34.83	43.08	57.63	59.03	68.20	-9.17	peak



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4.3.2.6 11N40_MIMO_134_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 10024
Mode : 5670 Band edge
: 5G WIFI 11N40

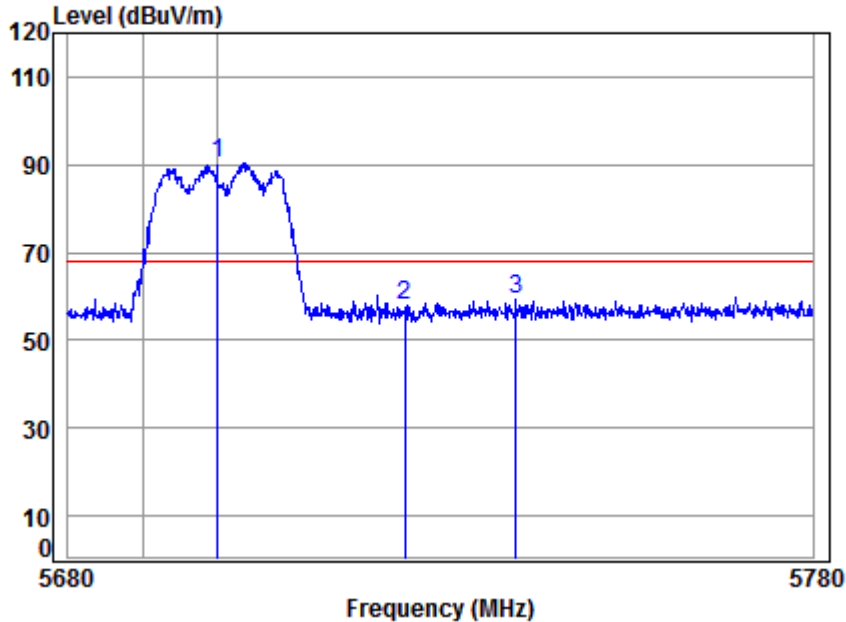
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.45	34.77	43.13	88.05	89.14	68.20	20.94	peak
2	9.64	34.83	43.08	56.74	58.13	68.20	-10.07	peak
3	9.73	34.86	43.06	57.60	59.13	68.20	-9.07	peak



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4.3.2.7 11AC20_MIMO_140 _ Horizontal



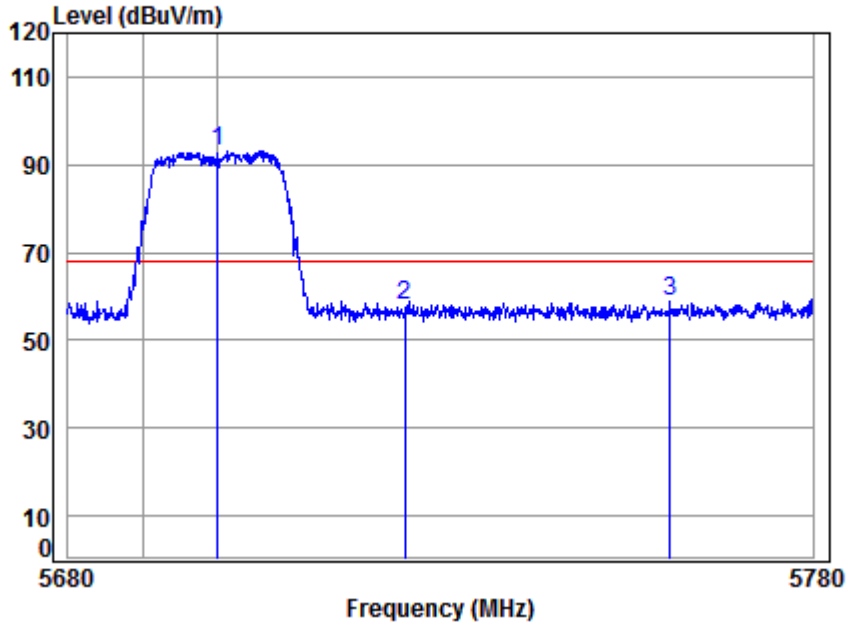
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5700 Band edge
: 5G WIFI 11AC20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.56	34.81	43.10	89.05	90.32	68.20	22.12	peak
2	9.64	34.83	43.08	56.44	57.83	68.20	-10.37	peak
3	9.69	34.85	43.07	57.81	59.28	68.20	-8.92	peak



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4.3.2.8 11AC20_MIMO_140_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5700 Band edge
 : 5G WIFI 11AC20

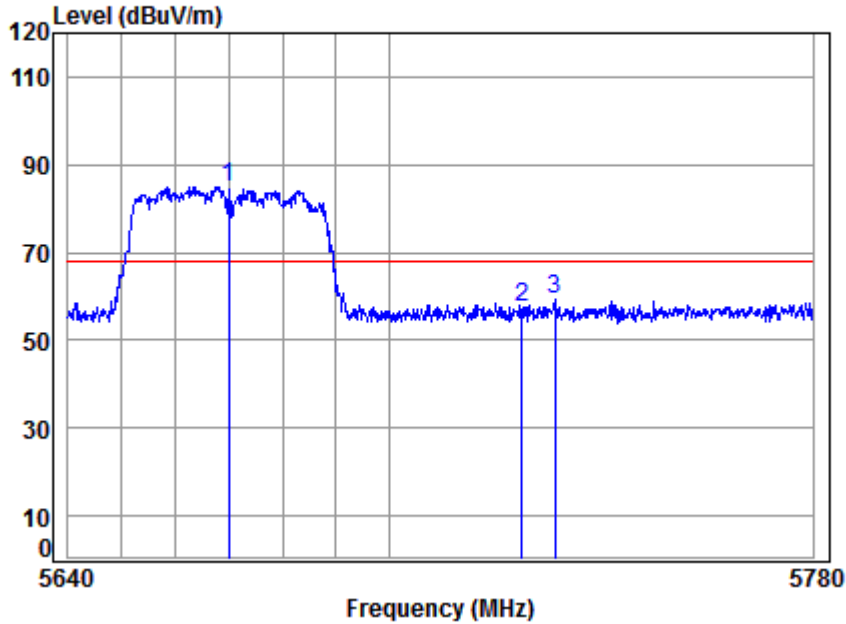
	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 * 5700.000	9.56	34.81	43.10	91.83	93.10	68.20	24.90	peak
2 5725.000	9.64	34.83	43.08	56.77	58.16	68.20	-10.04	peak
3 5760.765	9.77	34.87	43.05	57.19	58.78	68.20	-9.42	peak



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4.3.2.9 11AC40_MIMO_134_Horizontal



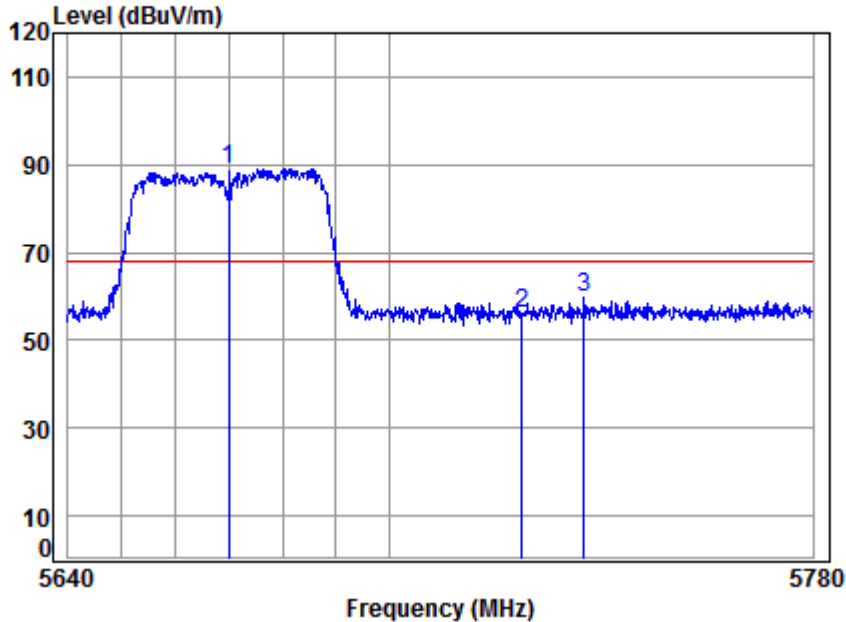
Site : chamber
Condition: 3m HORIZONTAL
Job No : 10024
Mode : 5670 Band edge
: 5G WIFI 11AC40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.45	34.77	43.13	83.82	84.91	68.20	16.71	peak
2	9.64	34.83	43.08	56.31	57.70	68.20	-10.50	peak
3	9.66	34.84	43.07	57.90	59.33	68.20	-8.87	peak



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4.3.2.10 11AC40_MIMO_134_Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No : 10024
 Mode : 5670 Band edge
 : 5G WIFI 11AC40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	9.45	34.77	43.13	87.95	89.04	68.20	20.84	peak
2	9.64	34.83	43.08	54.88	56.27	68.20	-11.93	peak
3	9.68	34.84	43.07	58.12	59.57	68.20	-8.63	peak

Remark:



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The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

All modes have been tested, but only the worst case data displayed in this report.



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5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radiated Spurious emission test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-25GHz)
2	Conduct emission test	±3.12 dB(9KHz- 30MHz)
3	Temperature test	±1°C
4	Humidity test	±3%
5	DC and low frequency voltages	±0.5%



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6 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018/9/2	2019/9/2
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2018/4/2	2019/4/1
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018/7/12	2019/7/11
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2019/2/11	2020/2/10
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2019/2/11	2020/2/10
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018/4/2	2019/4/1
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017/8/5	2020/8/4
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018/7/12	2019/7/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018/9/2	2019/9/2
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/6/27	2020/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2018/4/2	2019/4/1
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018/3/31	2021/3/30
EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2018/4/2	2019/4/1
Trilog-Broadband Antenna (25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2016/6/29	2019/6/28
Pre-amplifier (9k-1GHz)	Sonoma Instrument Co	310N	SEM005-03	2018/4/13	2019/4/12
Loop Antenna (9kHz-30MHz)	ETS-Lindgren	6502	SEM003-08	2017/8/22	2020/8/21
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2018/7/12	2019/7/11
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2018/4/2	2019/4/1
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Amplifier(0.1-1300MHz)	HP	8447D	SEM005-02	2018/9/2	2019/9/2
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2018/9/2	2019/9/2
Pre-Amplifier(0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	EMC2063	2018/11/20	2019/11/19
Pre-amplifier(26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018/4/2	2019/4/1
Band filter	N/A	N/A	N/A	N/A	N/A
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018/7/12	2019/7/11



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7 Photographs - EUT Test Setup Details

Refer to Appendix A - Photographs of EUT Test Setup Details for HR/2019/10024.

The End



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