FCC Radio Test Report

FCC ID: Q3N-RK95

Report No.	:	BTL-FCCP-4-1910T097
Equipment	:	Mobile Computer
Model Name	:	RK95
Brand Name	:	CIPHERLAB
Applicant	:	CIPHERLAB CO., LTD
Address	:	12F, 333, Dunhua S.Rd., Sec.2, Taipei, Taiwan
Radio Function	:	RLAN 5 GHz (U-NII 1, U-NII 3)
FCC Rule Part(s)	:	FCC Part15, Subpart E (15.407)
Measurement Procedure(s)	:	ANSI C63.4-2014
Date of Receipt	:	2019/10/24
Date of Test	:	2019/10/24 ~ 2019/11/20
Issued Date	:	2019/12/2
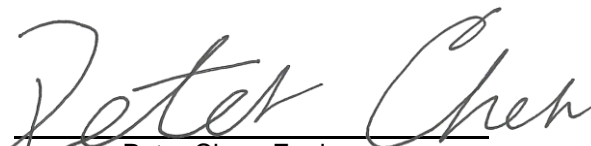
The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by :

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Approved by :

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	2019/11/27
R01	Revised report to address TCB's comments.	2019/12/2

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

FCC Part 15, Subpart E (15.407)				
Standard(s) Section	**Description**	**Test Result**	**Judgement**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	------
15.205 15.209 15.407(b)	Radiated Emissions	APPENDIX B APPENDIX C	Pass	------
15.407(a)	Bandwidth	APPENDIX D	Pass	------
15.407(a)	Output Power	APPENDIX E	Pass	------
15.407(a)	Power Spectral Density	APPENDIX F	Pass	------
15.203	Antenna Requirement	------	Pass	------
15.407(c)	Automatically Discontinue Transmission	------	Pass	**NOTE (2)**

NOTE:
(1) "N/A" denotes test is not applicable in this Test Report.
(2) The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

1.1   TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 355421 and DN: TW1099.

☒ C05	☐ CB08	☐ CB11	☐ CB15	☐ CB16
☒ SR06				

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan
The test sites and facilities are covered under FCC RN: 325517 and DN: TW1115.

☐ C03	☒ CB18	☐ CB19

1.2   MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k = 2**, providing a level of confidence of approximately **95 %**. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

A.   AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B.   Radiated emissions test :

Test Site	Measurement Frequency Range	U,(dB)
CB18	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C.   Conducted test :

Test Item	U,(dB)
Bandwidth	1.13
Output power	1.07
Power Spectral Density	1.20
Conducted Band edges	1.13
Frequency Stability	1.13

NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Tested by
AC Power Line Conducted Emissions	25 °C, 45 %	Tim Lee
Radiated emissions below 1 GHz	23 °C, 59 %	John Chuang Hunter Chiang
Radiated emissions above 1 GHz	23 °C, 59 %	John Chuang Hunter Chiang
Bandwidth	23.5 °C, 49 %	William Wei
Output Power	23.5 °C, 49 %	William Wei
Power Spectral Density	23.5 °C, 49 %	William Wei

1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

UNII-1			
Test Software	QRCT		
Mode	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	17	18	17.5
IEEE 802.11n (HT20)	17	17	16.5
IEEE 802.11ac (VHT20)	17	17	16.5
Mode	5190 MHz	5230 MHz	
IEEE 802.11n (HT40)	15.5	16.5	
IEEE 802.11ac (VHT40)	14.5	14	
Mode	5210 MHz		
IEEE 802.11ac (VHT80)	14		

UNII-2A			
Test Software	QRCT		
Mode	5260 MHz	5300 MHz	5320 MHz
IEEE 802.11a	18	18.5	17
IEEE 802.11n (HT20)	16.5	17.5	17
IEEE 802.11ac (VHT20)	16.5	17.5	17
Mode	5270 MHz	5310 MHz	
IEEE 802.11n (HT40)	17	14	
IEEE 802.11ac (VHT40)	14.5	14.5	
Mode	5290 MHz		
IEEE 802.11ac (VHT80)	12.5		

UNII-2C			
Test Software	QRCT		
Mode	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11a	17	17	17
IEEE 802.11n (HT20)	16.5	16.5	16.5
IEEE 802.11ac (VHT20)	16.5	16.5	16.5
Mode	5510 MHz	5550 MHz	5670 MHz
IEEE 802.11n (HT40)	16	16.5	16
IEEE 802.11ac (VHT40)	14	14	14
Mode	5530MHz	5610MHz	
IEEE 802.11ac (VHT80)	12.5	12.5	

UNII-3			
Test Software	QRCT		
Mode	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	17	17.5	17
IEEE 802.11n (HT20)	17.5	17.5	16
IEEE 802.11ac (VHT20)	17.5	17.5	16
Mode	5755 MHz	5795 MHz	
IEEE 802.11n (HT40)	17	16.5	
IEEE 802.11ac (VHT40)	15	14	
Mode	5775 MHz		
IEEE 802.11ac (VHT80)	15		

1.5 DUTY CYCLE

If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.

IEEE 802.11a	IEEE 802.11n (HT20)
Date: 13.NOV.2019 15:24:32	Date: 13.NOV.2019 15:28:55
IEEE 802.11n (HT40)	**IEEE 802.11ac (VHT80)**
Date: 13.NOV.2019 15:32:52	Date: 13.NOV.2019 15:40:14
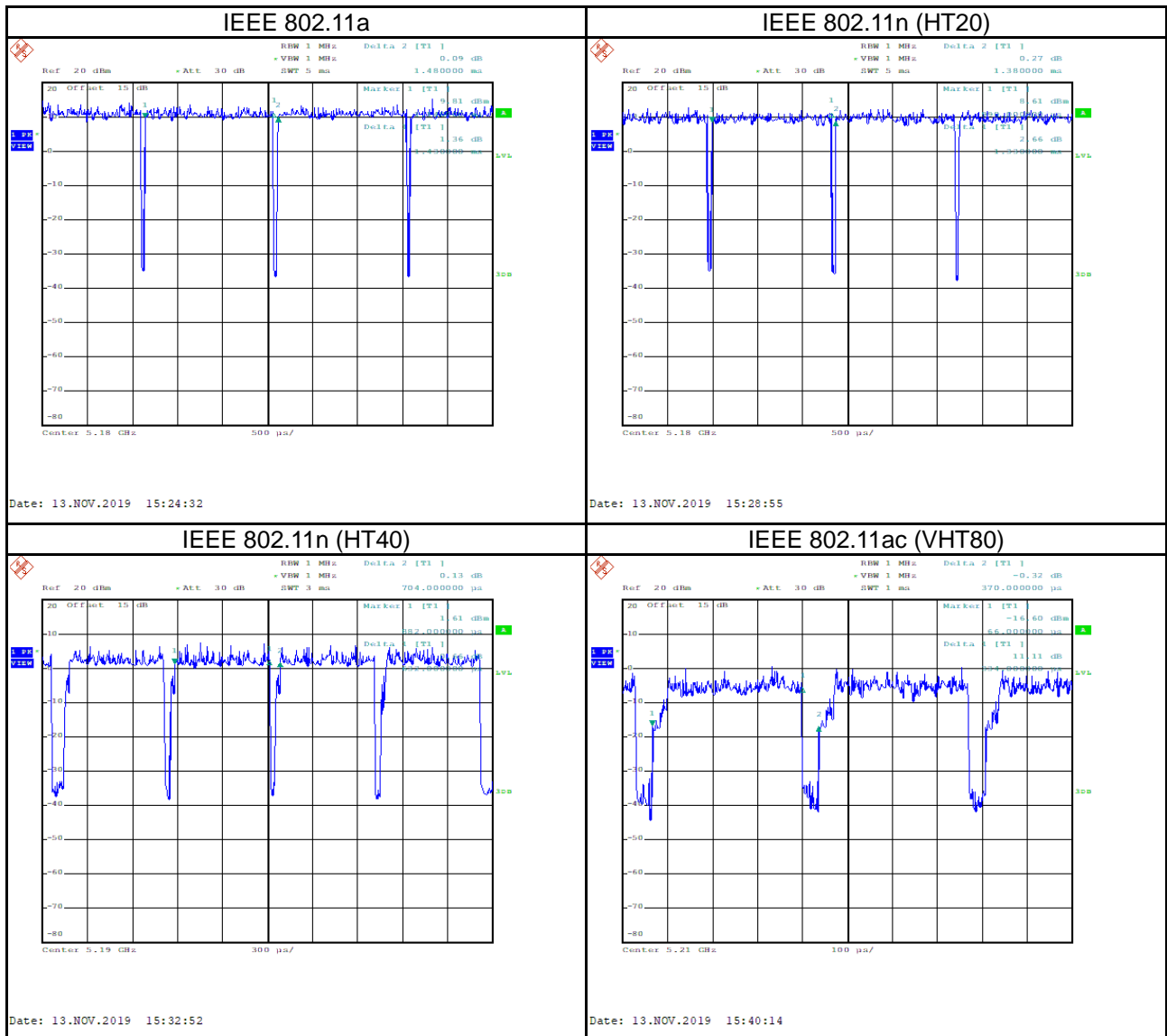
Remark	Delta 1			Delta 2	On Time/Period	10 log(1/Duty Cycle)
Mode	ON (ms)	Numbers (ON)	On Time (B) (ms)	Period (ON+OFF) (ms)	Duty Cycle (%)	Duty Factor (dB)
IEEE 802.11a	1.430	1	1.430	1.480	96.62%	0.15
IEEE 802.11n (HT20)	1.330	1	1.330	1.380	96.38%	0.16
IEEE 802.11n (HT40)	0.632	1	0.632	0.704	89.77%	0.47
IEEE 802.11n (HT40)	0.334	1	0.334	0.370	90.27%	0.44

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Mobile Computer
Model Name	RK95
Brand Name	CIPHERLAB
Model Difference	N/A
Power Source	DC voltage supplied from AC/DC Adapter.
Power Rating	I/P: 100-240~, 1.0A MAX,50-60Hz O/P: +5V⎓2A
Products Covered	1* Adapter: SYS1561-1005 1* SNOP-ON CABLE: CIPHERLAB/ SNP-RK95-USB 3* Reader: (1) SE4750SR (2) SE4750MR (3) SE4850 2* Keypad: (1) 59 Keys (2) 38 Keys 1* Camera
Frequency Range	UNII-1: 5150 MHz to 5250 MHz UNII-2A: 5250 MHz to 5350 MHz UNII-2C: 5470 MHz to 5725 MHz UNII-3: 5725 MHz to 5850 MHz
Operation Frequency	UNII-1: 5180 MHz to 5240 MHz UNII-2A: 5260 MHz to 5320 MHz UNII-2C: 5500 MHz to 5700 MHz UNII-3: 5745 MHz to 5825 MHz
Modulation Technology	OFDM
Transfer Rate	up to 866 Mbps
Output Power Max. for UNII-1	IEEE 802.11a: 18.46 dBm (0.0701 W) IEEE 802.11n (HT20): 20.20 dBm (0.1046 W) IEEE 802.11n (HT40): 19.89 dBm (0.0974 W) IEEE 802.11ac (VHT20): 20.22 dBm (0.1052 W) IEEE 802.11ac (VHT40): 18.16 dBm (0.0655 W) IEEE 802.11ac (VHT80): 17.59 dBm (0.0574 W)
Output Power Max. for UNII-2A	IEEE 802.11a: 18.59 dBm (0.0723 W) IEEE 802.11n (HT20): 20.32 dBm (0.1076 W) IEEE 802.11n (HT40): 20.44 dBm (0.1107 W) IEEE 802.11ac (VHT20): 20.33 dBm (0.1079 W) IEEE 802.11ac (VHT40): 18.11 dBm (0.0648 W) IEEE 802.11ac (VHT80): 15.56 dBm (0.0360 W)
Output Power Max. for UNII-2C	IEEE 802.11a: 18.35 dBm (0.0684 W) IEEE 802.11n (HT20): 20.37 dBm (0.1089 W) IEEE 802.11n (HT40): 20.68 dBm (0.1169 W) IEEE 802.11ac (VHT20): 20.46 dBm (0.1111 W) IEEE 802.11ac (VHT40): 18.38 dBm (0.0688 W) IEEE 802.11ac (VHT80): 16.40 dBm (0.0436 W)
Output Power Max. for UNII-3	IEEE 802.11a: 18.47 dBm (0.0703 W) IEEE 802.11n (HT20): 20.66 dBm (0.1163 W) IEEE 802.11n (HT40): 20.45 dBm (0.1109 W) IEEE 802.11ac (VHT20): 20.61 dBm (0.1150 W) IEEE 802.11ac (VHT40): 18.61 dBm (0.0726 W) IEEE 802.11ac (VHT80): 18.25 dBm (0.0668 W)
Test Model	RK95
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:
(1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

(2) Channel List:

UNII-1					
IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (VHT20)		IEEE 802.11n (HT40) IEEE 802.11ac (VHT40)		IEEE 802.11ac (VHT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

UNII-2A					
IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (VHT20)		IEEE 802.11n (HT40) IEEE 802.11ac (VHT40)		IEEE 802.11ac (VHT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

UNII-2C					
IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (VHT20)		IEEE 802.11n (HT40) IEEE 802.11ac (VHT40)		IEEE 802.11ac (VHT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550	122	5610
108	5540	118	5590		
112	5560	126	5630		
116	5580	134	5670		
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				

UNII-3					
IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (VHT20)		IEEE 802.11n (HT40) IEEE 802.11ac (VHT40)		IEEE 802.11ac (VHT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

(3) Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
CH0	Cipherlab	KZWBCF4950001	PCB	N/A	3.93	-
CH1	Cipherlab	KZWBCF4950002	PCB	N/A	3.70	-

NOTE:
(a) The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R). 2.4 GHz and 5GHz can't transmit simultaneously.

(b) For Power Spectral Density (CDD mode)

Directional Gain = $10\log[(10^{G1/20} + 10^{G2/20} + … + 10^{Gn/20})^2/N_{ANT}]$ = 6.83 dBi dBi. > 6dBi.

The reduced power spectral density limits (dBm/MHz) =

5150 MHz to 5250 MHz：11 dBm/MHz - (6.83 dBi- 6 dBi) = 10.17 dBm/MHz。

5250 MHz to 5350 MHz：11 dBm/MHz - (6.83 dBi- 6 dBi) = 10.17 dBm/MHz。

5470 MHz to 5725 MHz：11 dBm/MHz - (6.83 dBi- 6 dBi) = 10.17 dBm/MHz。

5725 MHz to 5850 MHz：30 dBm/500 kHz - (6.83 dBi- 6 dBi) = 29.17 dBm/500 kHz。

(c) For Conducted Output Power (CDD mode)

For N_{ANT} = 2 < 5,

Direction gain = G_{ANT} + 0 = 3.93 + 0 = 3.93 dBi .

The Direction gain is less than 6 dBi, so conducted power limits will not be reduced.

(4) Operating Mode and Antenna Configuration

Operating Mode / TX Mode	1TX	2TX
IEEE 802.11b	V (CH0 or CH1)	-
IEEE 802.11n (HT20)	-	V (CH0+ CH1)
IEEE 802.11n(HT40)	-	V (CH0+ CH1)
IEEE 802.11ac (VHT20)	-	V (CH0+ CH1)
IEEE 802.11ac (VHT40)	-	V (CH0+ CH1)
IEEE 802.11ac (VHT80)	-	V (CH0+ CH1)

2.2 TEST MODES

| Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal	-	-
Transmitter Radiated Emissions (below 1GHz)	TX Mode_IEEE 802.11a	36	-
Transmitter Radiated Emissions (above 1GHz)	TX Mode_IEEE 802.11a	36/40/48 52/60/64 100/116/140 149/157/165	-
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	38/46/54/62 102/110/134 151/159	-
	TX Mode_IEEE 802.11ac (VHT80)	42/58/106/122 155	
Bandwidth	TX Mode_IEEE 802.11a	36/40/48 52/60/64 100/116/140 149/157/165	-
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	38/46/54/62 102/110/134 151/159	
	TX Mode_IEEE 802.11ac (VHT80)	42/58/106/122 155	
Output Power	TX Mode_IEEE 802.11a	36/40/48 52/60/64 100/116/140 149/157/165	-
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	38/46/54/62 102/110/134 151/159	
	TX Mode_IEEE 802.11ac (VHT80)	42/58/106/122 155	
Power Spectral Density	TX Mode_IEEE 802.11a	36/40/48 52/60/64 100/116/140 149/157/165	-
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11n (HT40)	38/46/54/62 102/110/134 151/159	
	TX Mode_IEEE 802.11ac (VHT80)	42/58/106/122 155	

NOTE:
(1) The Radiated emissions test was verified based on the worst conducted power and Bandwidth test results reported in the original report.
(2) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.
(3) All X, Y and Z axes are evaluated, but only the worst case (X axis) is recorded.
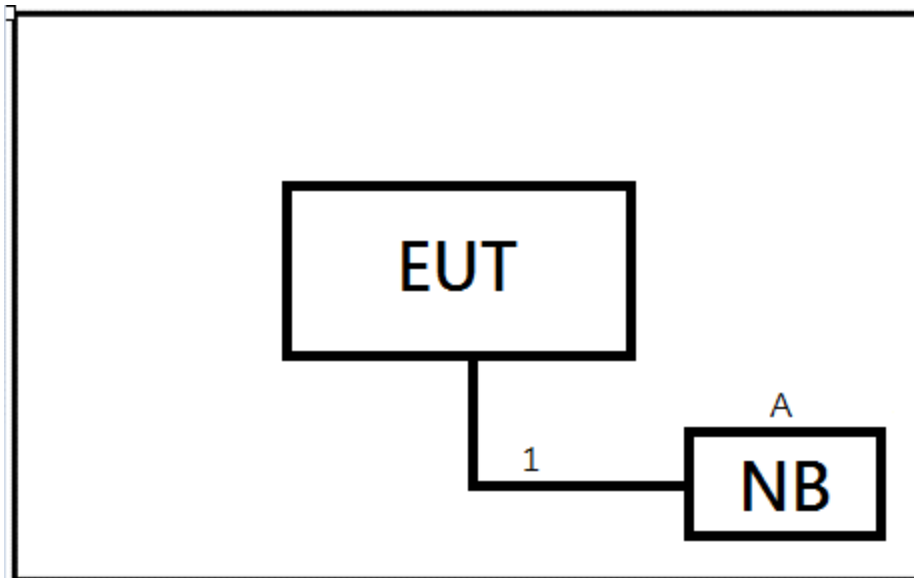(4) There were no emissions found below 30 MHz within 20 dB of the limit.

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.

AC power line conducted emissions
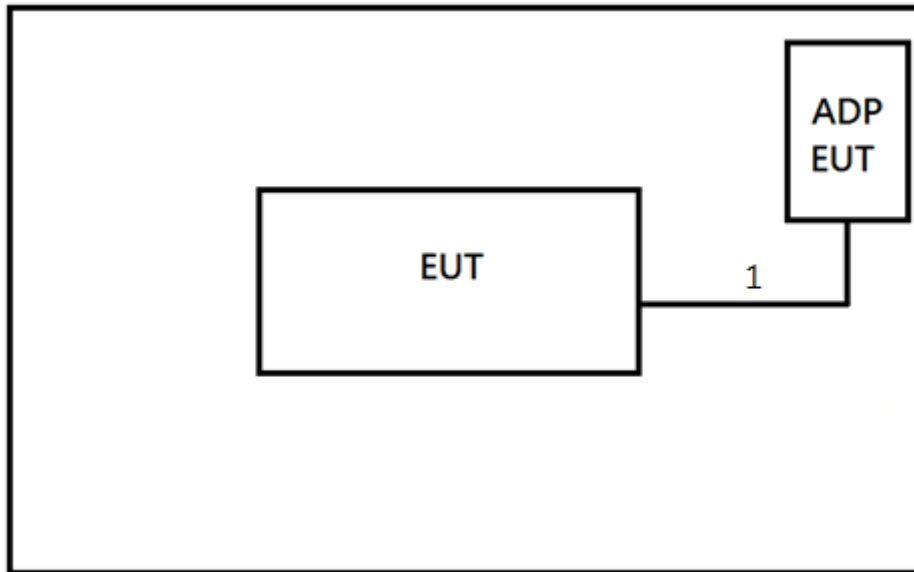
Radiated Emissions

2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	RF-02	HP	TPN-I119	NA	-

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	NA	NA	1.5M	SNOP-ON Cable	-

3   AC POWER LINE CONDUCTED EMISSIONS TEST

3.1   LIMIT

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2   TEST PROCEDURE

a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
e. For the actual test configuration, please refer to the related Item - EUT TEST PHOTO.

NOTE:
(1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
BW=9 kHz (6 dB Bandwidth)
(2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3   DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP
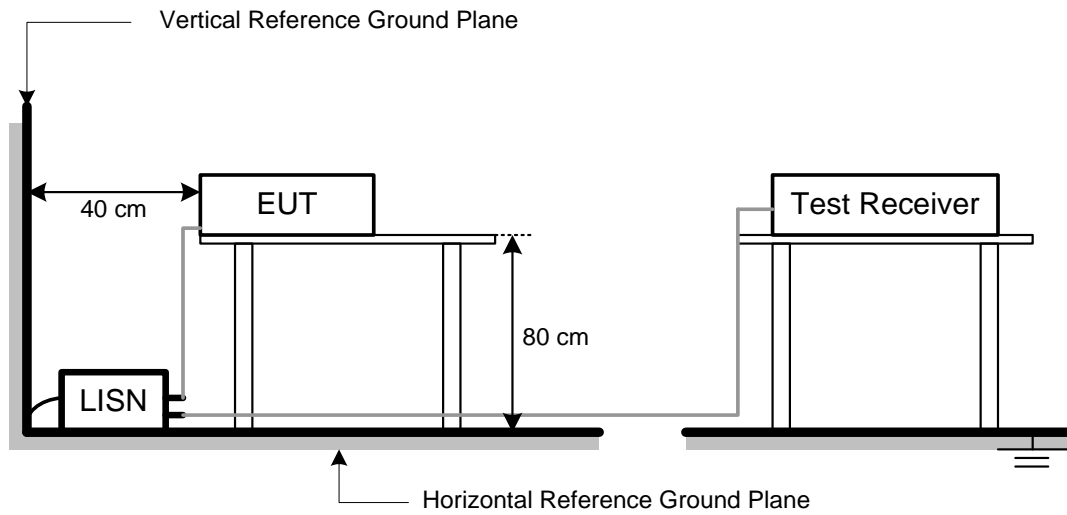
3.5 TEST RESULT

Please refer to the APPENDIX A.

4   RADIATED EMISSIONS TEST

4.1   LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (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
960~1000	500	3

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBµV/m)
5150-5250	-27	68.3
5250-5350	-27	68.3
5470-5725	-27	68.3
5725-5850	-27 (NOTE 2)	68.3
	10 (NOTE 2)	105.3
	15.6 (NOTE 2)	110.9
	27 (NOTE 2)	122.3

NOTE:
(1) The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$

µV/m, where P is the eirp (Watts)

(2) According to FCC 16-24,All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	=	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	68.3	=	-47.08

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2   TEST PROCEDURE

a.   The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)

b.   The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)

c.   The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. 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 find the maximum reading (used Bore sight function).

e.   The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

f.   The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

g.   All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)

h.   All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)

i.   For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.
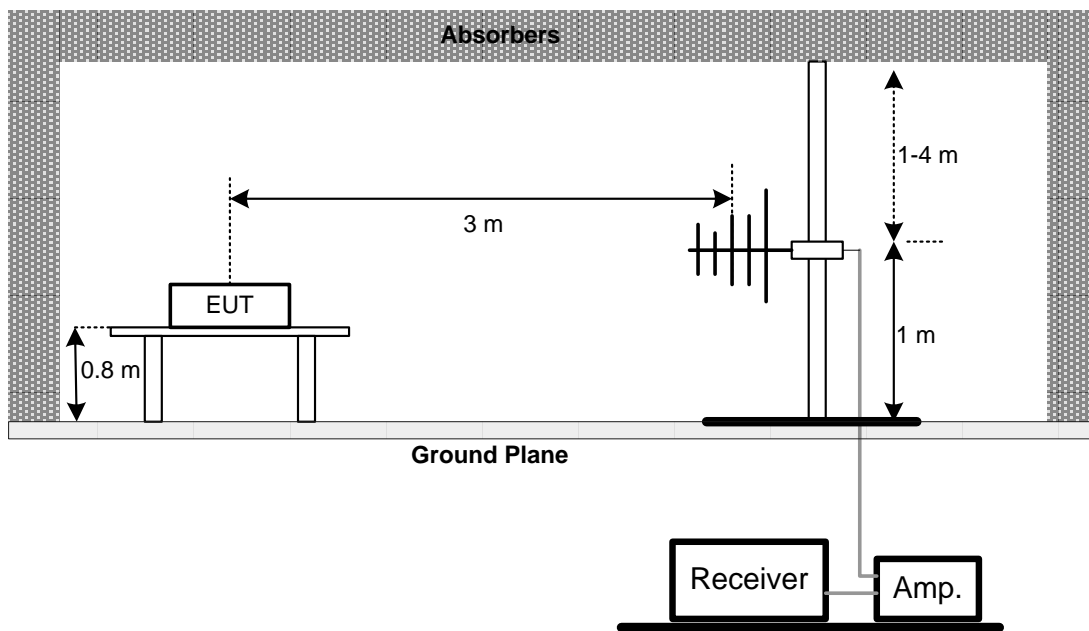
4.3   DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP

9 kHz to 30 MHz
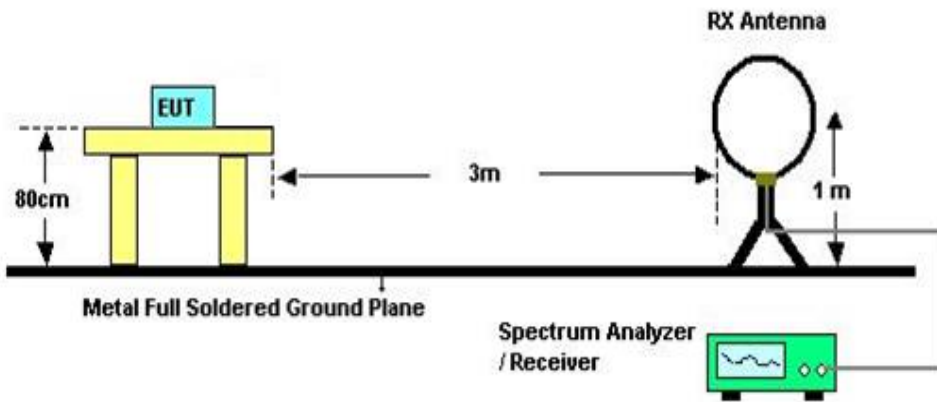
30 MHz to 1 GHz
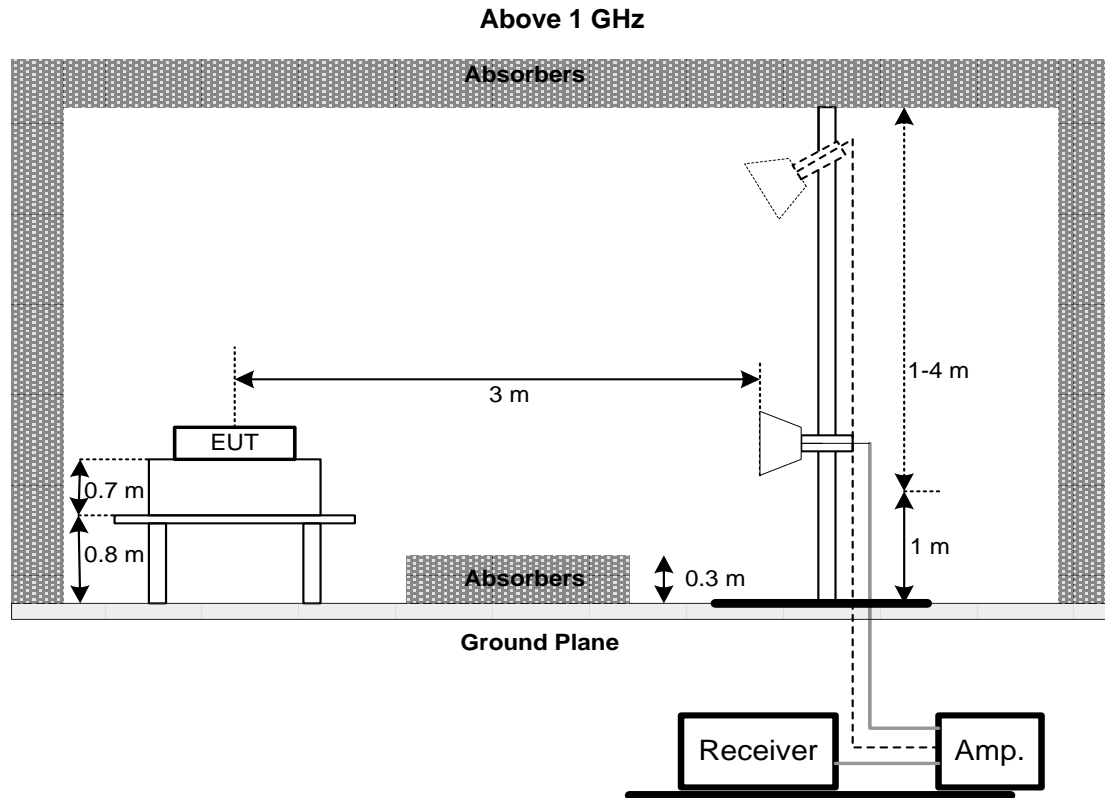
Above 1 GHz

4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.7 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:
  (1) No limit: This is fundamental signal, the judgment is not applicable.
       For fundamental signal judgment was referred to Peak output test.

5 BANDWIDTH TEST

5.1 LIMIT

FCC Part15, Subpart E (15.407)		
Section	Test Item	Frequency Range (MHz)
15.407(a)	26 dB Bandwidth	5150-5250
		5250-5350
		5470-5725
	Minimum 500 kHz 6 dB Bandwidth	5725-5850

5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting:

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 26 dB Bandwidth
RBW	300 kHz(Bandwidth 20 MHz) 1 MHz(Bandwidth 40 MHz and 80 MHz)
VBW	1 MHz(Bandwidth 20 MHz) 3 MHz(Bandwidth 40 MHz and 80 MHz)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 DEVIATION FROM TEST STANDARD

No deviation.

5.4 TEST SETUP

5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT

Please refer to the APPENDIX D.

6 OUTPUT POWER TEST

6.1 LIMIT

FCC Part15, Subpart E (15.407)			
Section	Test Item	Limit	Frequency Range (MHz)
15.407(a)	Maximum Output Power	Fixed:1 Watt (30 dBm) Mobile and portable: 250 mW (24 dBm)	5150-5250
		250 mW (24 dBm)	5250-5350
			5470-5725
		1 Watt (30dBm)	5725-5850

Note: The maximum e.i.r.p at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW(21 dBm).

6.2 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
b. Spectrum Setting:

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	= 1 MHz
VBW	≥ 3 MHz
Detector	RMS
Trace	Max Hold
Sweep Time	auto

c. The maximum peak conducted output power was performed in accordance with method of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

6.3 DEVIATION FROM TEST STANDARD

No deviation.

6.4 TEST SETUP
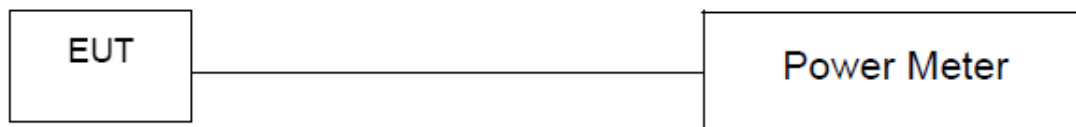
6.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULT

Please refer to the APPENDIX E.

7 POWER SPECTRAL DENSITY

7.1 LIMIT

FCC Part15, Subpart E (15.407)			
Section	Test Item	Limit	Frequency Range (MHz)
15.407(a)	Power Spectral Density	Other than Mobile and portable: 17 dBm/MHz Mobile and portable: 11 dBm/MHz	5150-5250
		11 dBm/MHz	5250-5350
			5470-5725
		30 dBm/500 kHz	5725-5850

7.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting:

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	= 1 MHz
VBW	≥ 3 MHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

7.3 DEVIATION FROM TEST STANDARD

No deviation.

7.4 TEST SETUP
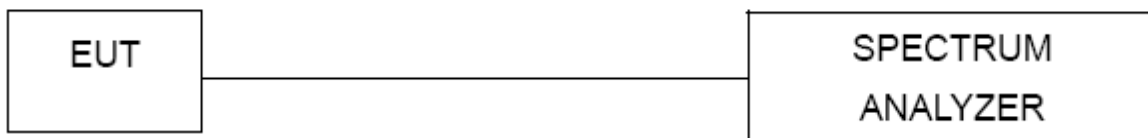
7.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULT

Please refer to the APPENDIX F.

8   LIST OF MEASURING EQUIPMENTS

	AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	2019/3/18	2020/3/17
2	Test Cable	EMCI	EMCCFD300-BM-BMR-6000	170715	2019/8/7	2020/8/6
3	EMI Test Receiver	R&S	ESR7	101433	2018/12/5	2019/12/4
4	Measurement Software	EZ	EZ_EMC (Version NB-03A)	N/A	N/A	N/A

	Radiated Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC001340	980555	2019/4/12	2020/4/11
2	Preamplifier	EMCI	EMC02325B	980217	2019/4/12	2020/4/11
3	Preamplifier	EMCI	EMC012645B	980267	2019/4/12	2020/4/11
4	Test Cable	EMCI	EMC104-SM-SM-800	150207	2019/4/12	2020/4/11
5	Test Cable	EMCI	EMC104-SM-SM-3000	151205	2019/4/12	2020/4/11
6	Test Cable	EMCI	EMC-SM-SM-7000	180408	2019/4/12	2020/4/11
7	MXE EMI Receiver	Agilent	N9038A	MY55420127	2019/3/26	2020/3/25
8	Signal Analyzer	Agilent	N9010A	MY56480554	2019/6/6	2020/6/5
9	Loop Ant	EMCO	EMCI-LPA600	274	2019/5/31	2020/5/30
10	Horm Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	2019/6/10	2020/6/9
11	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	000992	2019/5/29	2020/5/28
12	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0508	2019/5/29	2020/5/28

	Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22

	Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22
2	Power Meter	Anritsu	ML2495A	1128008	2018/12/6	2019/12/5
3	Power Sensor	Anritsu	MA2411B	1126001	2018/12/6	2019/12/5

	Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.
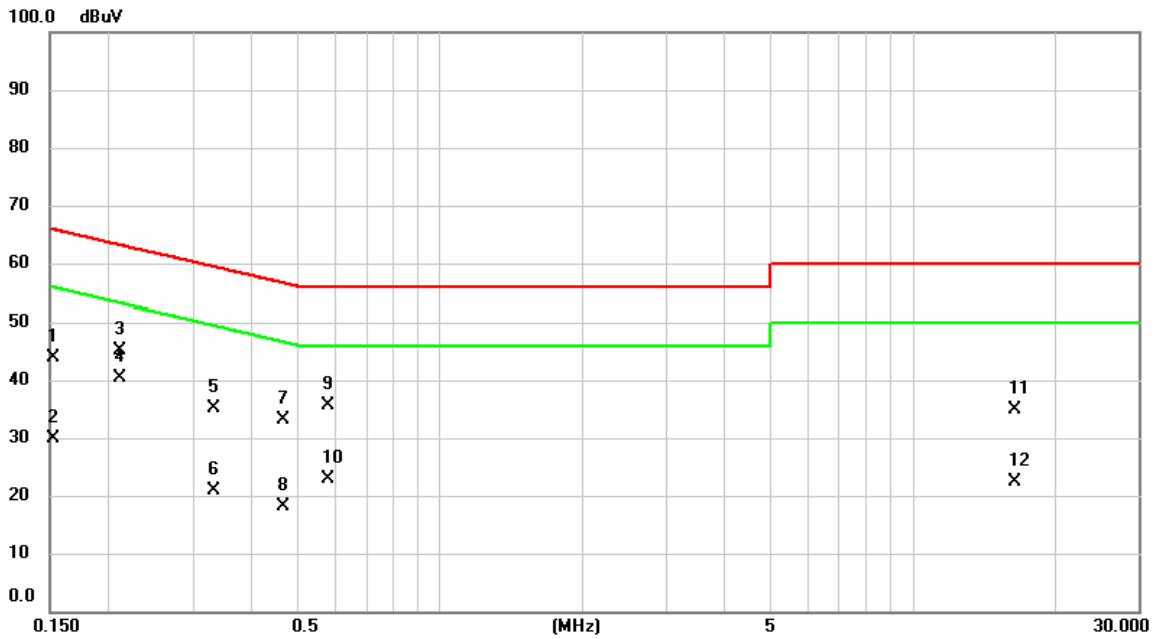All calibration period of equipment list is one year.

9 EUT TEST PHOTO

Please refer to document Appendix No.: TP-1910T097-FCCP-2 (APPENDIX-TEST PHOTOS).

10 EUT PHOTOS

Please refer to document Appendix No.: EP-1910T097-1 (APPENDIX-EUT PHOTOS).

APPENDIX A   AC POWER LINE CONDUCTED EMISSIONS

Test Mode	Normal		Tested Date	2019/11/8
Test Voltage	AC 120V/60Hz		Phase	Line

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1522	34.38	9.57	43.95	65.88	-21.93	QP	
2		0.1522	20.28	9.57	29.85	55.88	-26.03	AVG	
3		0.2108	35.45	9.56	45.01	63.17	-18.16	QP	
4	*	0.2108	30.73	9.56	40.29	53.17	-12.88	AVG	
5		0.3322	25.62	9.62	35.24	59.40	-24.16	QP	
6		0.3322	11.23	9.62	20.85	49.40	-28.55	AVG	
7		0.4650	23.46	9.62	33.08	56.60	-23.52	QP	
8		0.4650	8.40	9.62	18.02	46.60	-28.58	AVG	
9		0.5797	25.92	9.62	35.54	56.00	-20.46	QP	
10		0.5797	13.37	9.62	22.99	46.00	-23.01	AVG	
11		16.4265	24.85	9.94	34.79	60.00	-25.21	QP	
12		16.4265	12.38	9.94	22.32	50.00	-27.68	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	Normal	Tested Date	2019/11/8
Test Voltage	AC 120V/60Hz	Phase	Neutral
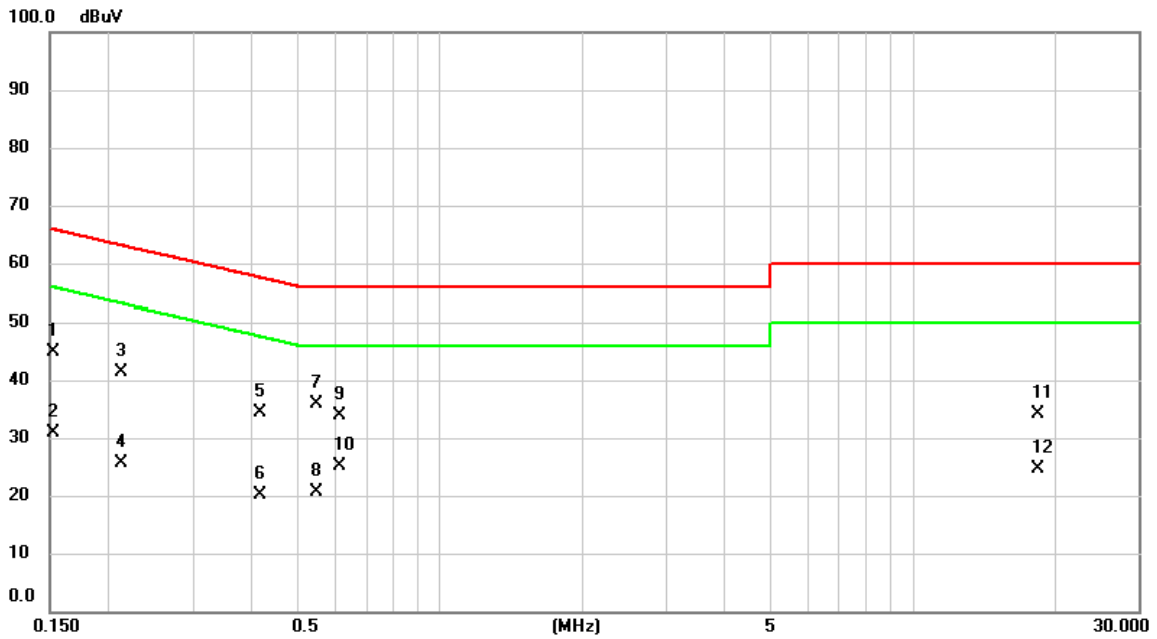
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1522	35.21	9.57	44.78	65.88	-21.10	QP	
2		0.1522	21.31	9.57	30.88	55.88	-25.00	AVG	
3		0.2130	31.89	9.56	41.45	63.09	-21.64	QP	
4		0.2130	16.16	9.56	25.72	53.09	-27.37	AVG	
5		0.4155	24.73	9.62	34.35	57.54	-23.19	QP	
6		0.4155	10.60	9.62	20.22	47.54	-27.32	AVG	
7	*	0.5482	26.32	9.62	35.94	56.00	-20.06	QP	
8		0.5482	10.89	9.62	20.51	46.00	-25.49	AVG	
9		0.6134	24.17	9.62	33.79	56.00	-22.21	QP	
10		0.6134	15.60	9.62	25.22	46.00	-20.78	AVG	
11		18.3188	24.06	9.95	34.01	60.00	-25.99	QP	
12		18.3188	14.78	9.95	24.73	50.00	-25.27	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B   RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

Test Mode	IEEE 802.11a	Tested Date	2019/11/15
Test Frequency	CH36: 5180 MHz	Polarization	Vertical
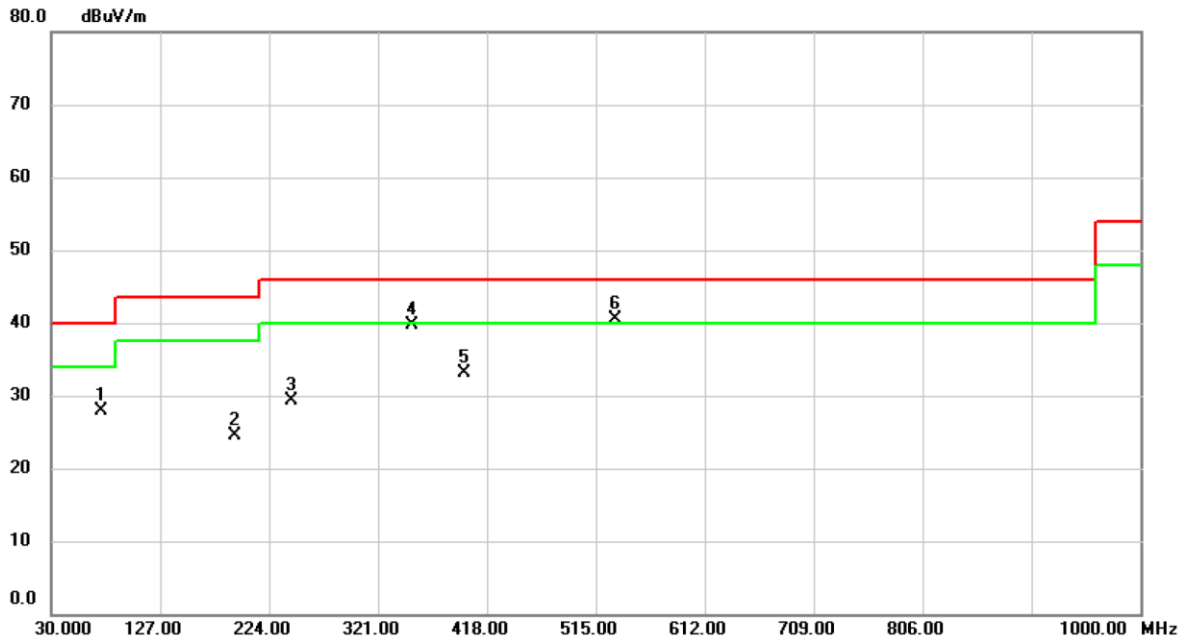
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		74.6200	42.61	-14.66	27.95	40.00	-12.05	peak	
2		193.9300	38.65	-14.07	24.58	43.50	-18.92	peak	
3		243.4000	42.42	-13.11	29.31	46.00	-16.69	peak	
4		351.0700	49.41	-9.80	39.61	46.00	-6.39	peak	
5		397.6300	41.59	-8.41	33.18	46.00	-12.82	peak	
6	*	532.4600	45.86	-5.42	40.44	46.00	-5.56	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/15
Test Frequency	CH36: 5180 MHz	Polarization	Horizontal
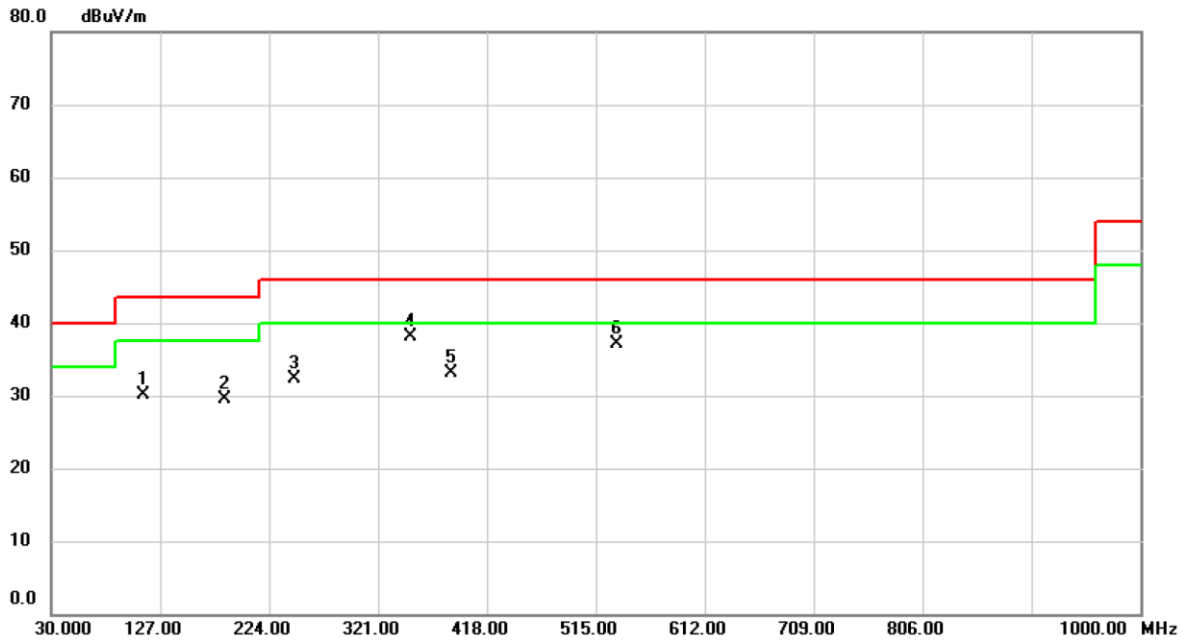
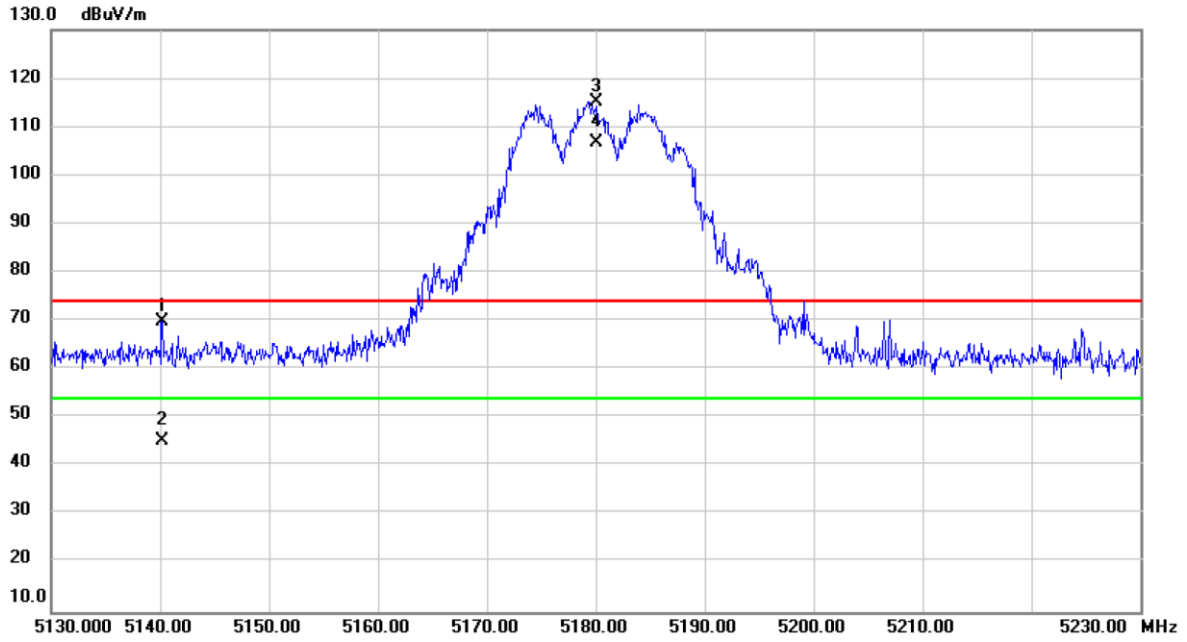| No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		112.4500	44.44	-14.30	30.14	43.50	-13.36	peak	
2		184.2300	42.72	-13.19	29.53	43.50	-13.97	peak	
3		246.3100	45.27	-13.02	32.25	46.00	-13.75	peak	
4	*	350.1000	47.89	-9.83	38.06	46.00	-7.94	peak	
5		385.9900	41.75	-8.74	33.01	46.00	-12.99	peak	
6		533.4300	42.45	-5.40	37.05	46.00	-8.95	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C   RADIATED EMISSIONS - ABOVE 1 GHZ

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH36: 5180 MHz	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5140.200	31.77	38.08	69.85	74.00	-4.15	peak	
2		5140.200	7.21	38.08	45.29	54.00	-8.71	AVG	
3	X	5180.000	77.15	38.13	115.28	74.00	41.28	peak	No Limit
4	*	5180.000	68.56	38.13	106.69	54.00	52.69	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH48: 5240 MHz	Polarization	Horizontal
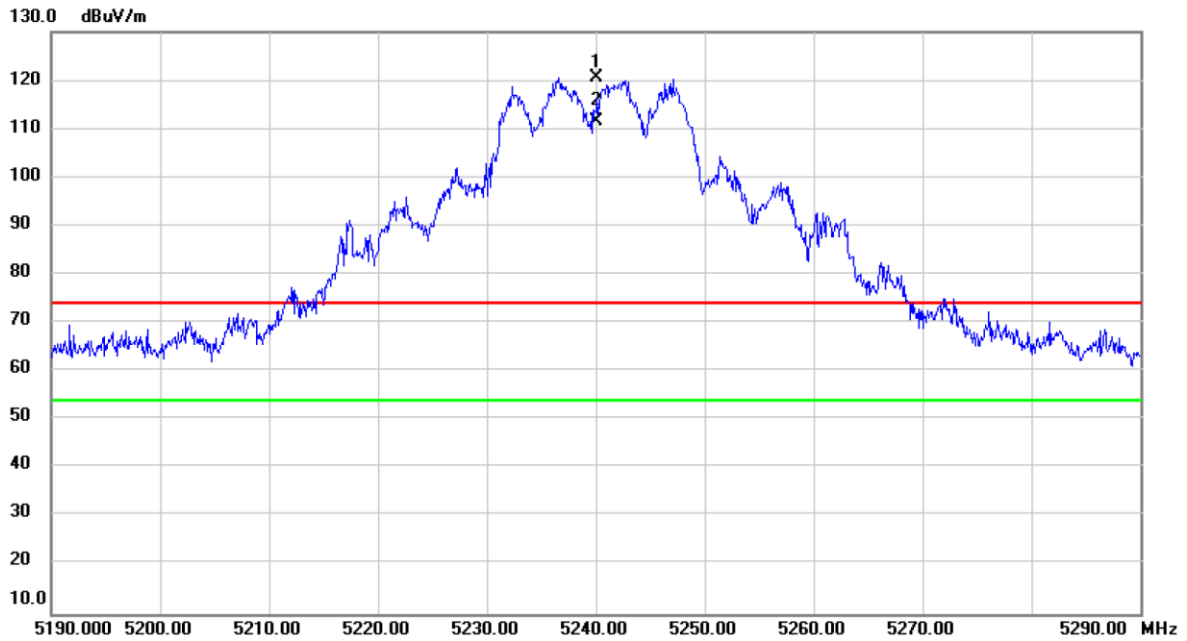
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5240.000	82.24	38.18	120.42	74.00	46.42	peak	No Limit
2	*	5240.000	73.31	38.18	111.49	54.00	57.49	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH52: 5260 MHz	Polarization	Vertical
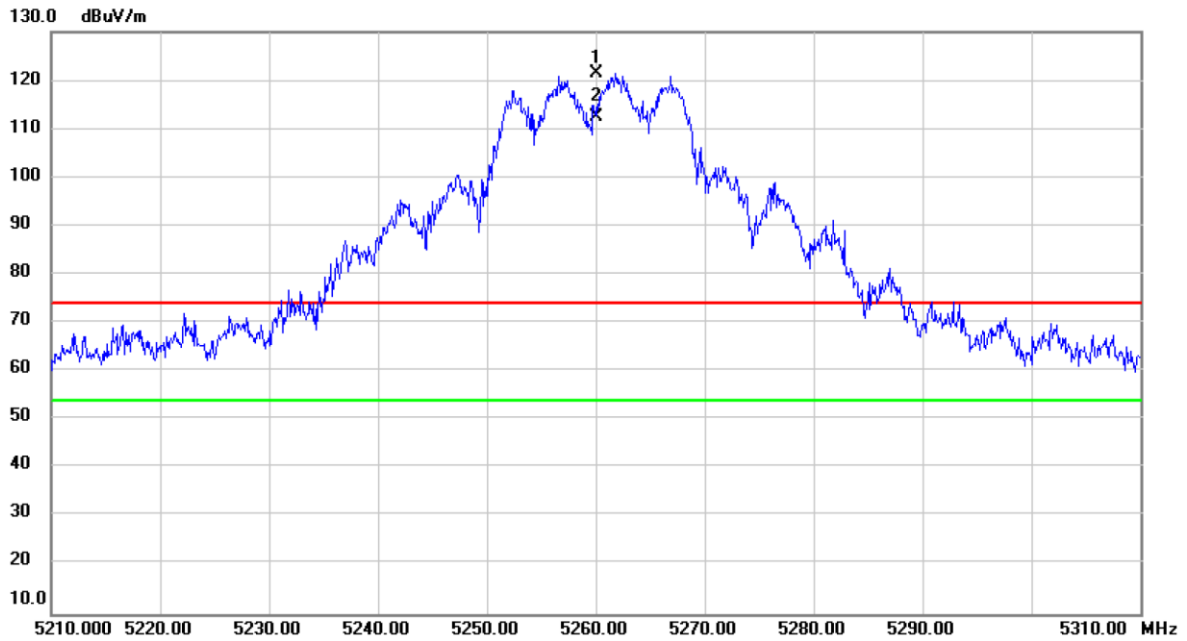
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5260.000	83.33	38.21	121.54	74.00	47.54	peak	No Limit
2	*	5260.000	74.21	38.21	112.42	54.00	58.42	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH64: 5320 MHz	Polarization	Horizontal
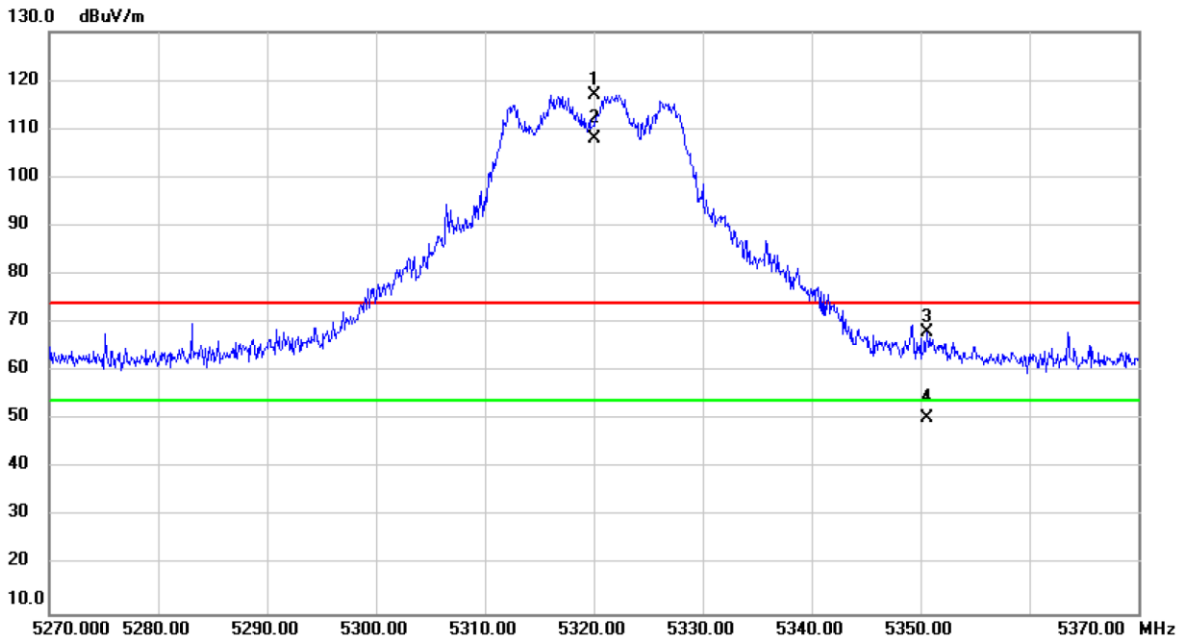
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5320.000	78.71	38.26	116.97	74.00	42.97	peak	No Limit
2	*	5320.000	69.72	38.26	107.98	54.00	53.98	AVG	No Limit
3		5350.600	29.80	38.30	68.10	74.00	-5.90	peak	
4		5350.600	11.97	38.30	50.27	54.00	-3.73	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH100: 5500 MHz	Polarization	Vertical
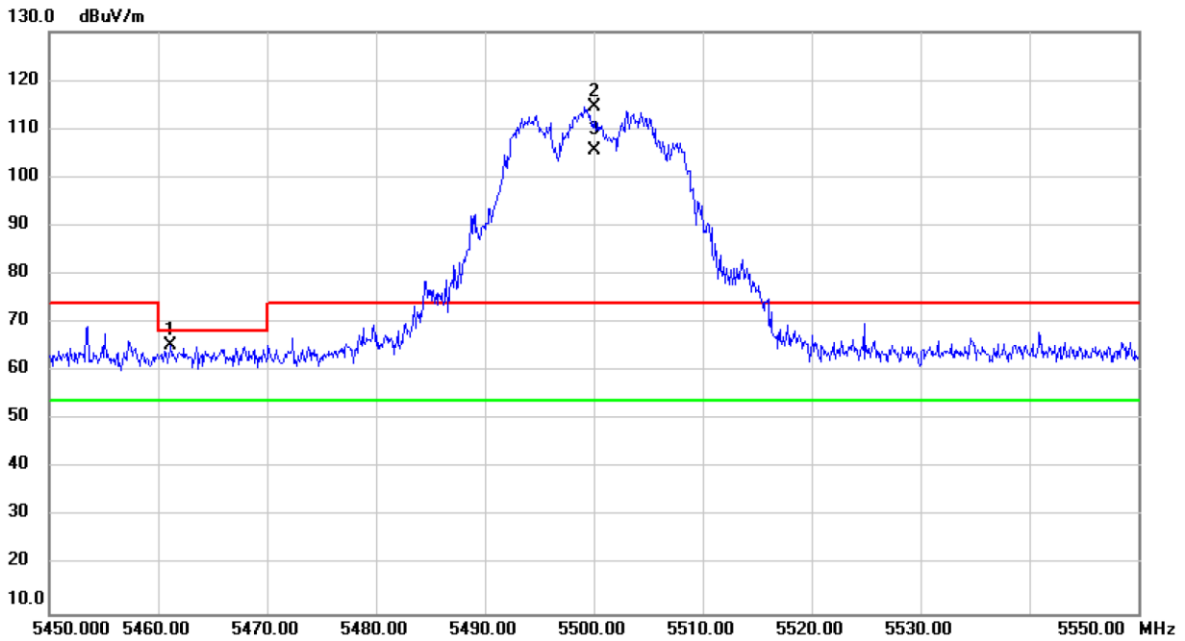
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5461.200	26.95	38.41	65.36	68.20	-2.84	peak	
2	X	5500.000	76.02	38.45	114.47	74.00	40.47	peak	No Limit
3	*	5500.000	67.22	38.45	105.67	54.00	51.67	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH140: 5700 MHz	Polarization	Horizontal
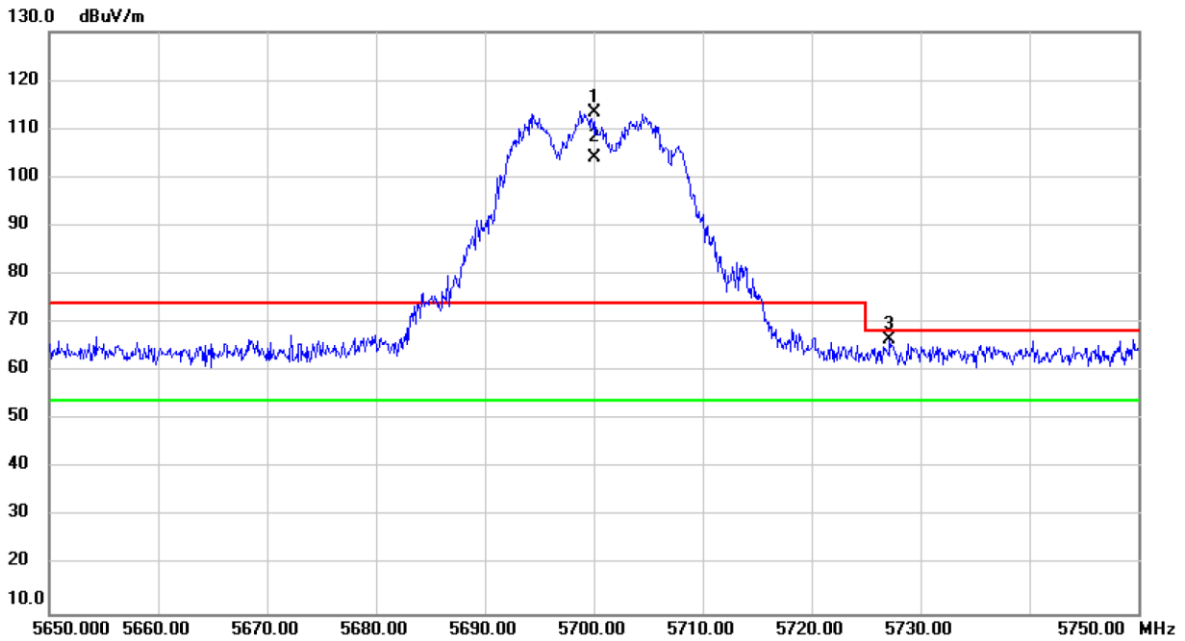
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5700.000	74.69	38.81	113.50	74.00	39.50	peak	No Limit
2	*	5700.000	65.15	38.81	103.96	54.00	49.96	AVG	No Limit
3		5727.200	27.69	38.86	66.55	68.20	-1.65	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH149: 5745 MHz	Polarization	Vertical
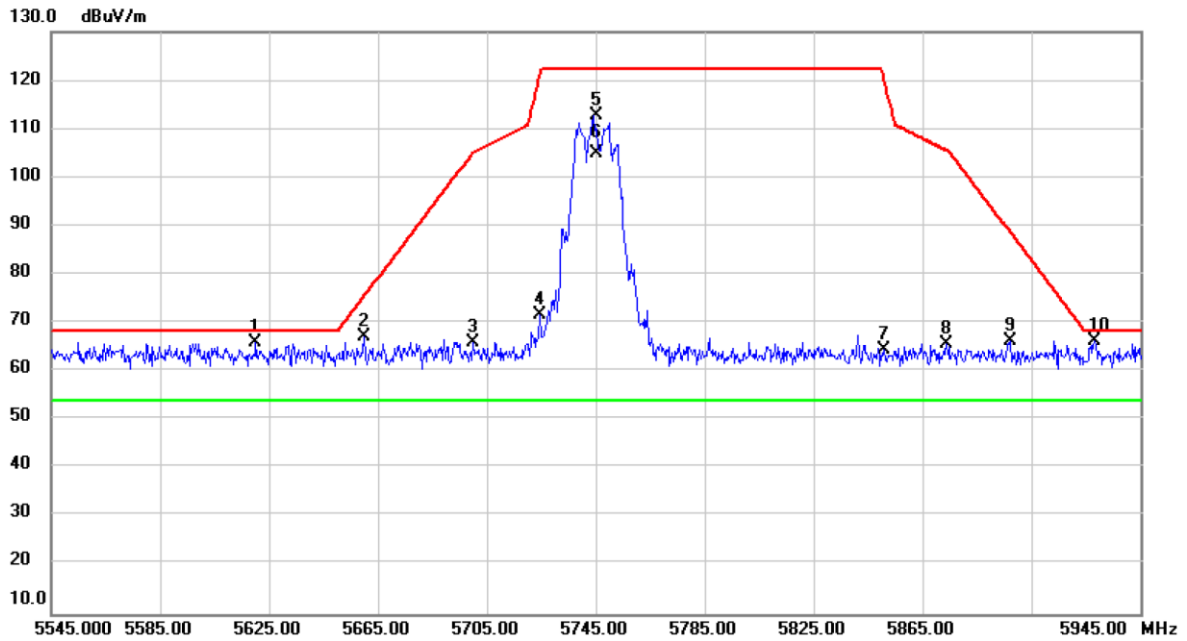
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5620.200	27.26	38.67	65.93	68.20	-2.27	peak	
2		5659.800	28.54	38.73	67.27	75.45	-8.18	peak	
3		5699.800	27.16	38.81	65.97	105.05	-39.08	peak	
4		5724.600	32.73	38.85	71.58	121.29	-49.71	peak	
5		5745.000	73.90	38.89	112.79	122.20	-9.41	peak	No Limit
6	*	5745.000	66.14	38.89	105.03	54.00	51.03	AVG	No Limit
7		5850.600	25.31	39.08	64.39	120.83	-56.44	peak	
8		5873.800	26.53	39.12	65.65	105.54	-39.89	peak	
9		5897.400	27.22	39.17	66.39	88.62	-22.23	peak	
10		5928.200	27.01	39.22	66.23	68.20	-1.97	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/11
Test Frequency	CH165: 5825 MHz	Polarization	Horizontal
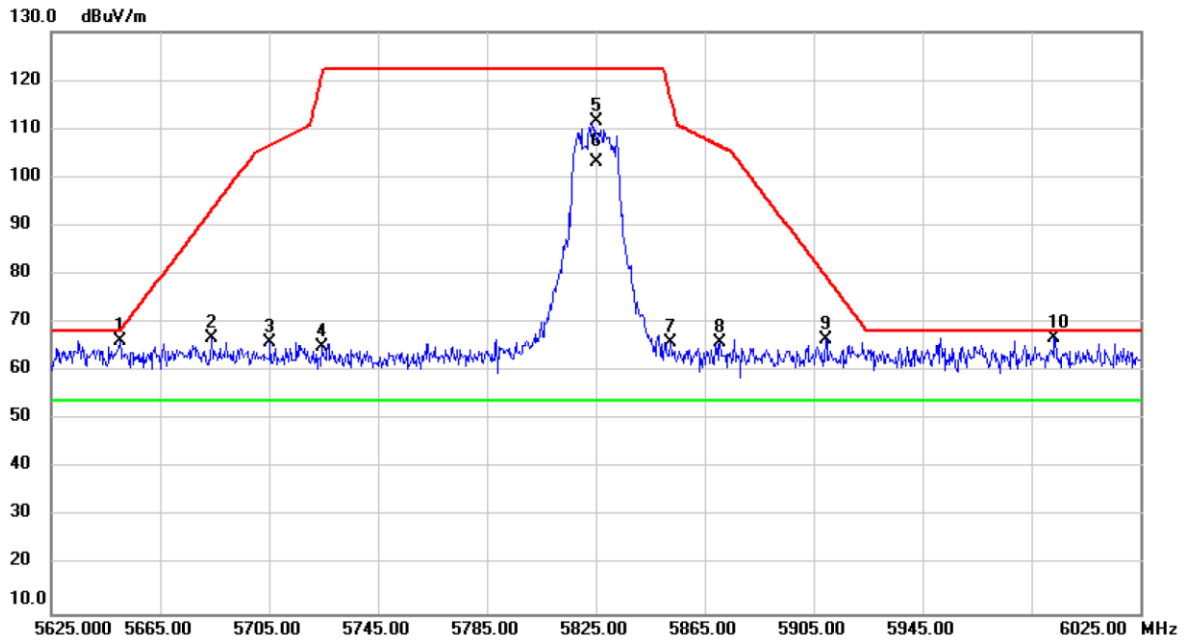
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		5650.200	27.52	38.72	66.24	68.35	-2.11	peak	
2		5684.200	28.06	38.78	66.84	93.51	-26.67	peak	
3		5705.400	27.21	38.82	66.03	106.71	-40.68	peak	
4		5724.600	26.13	38.85	64.98	121.29	-56.31	peak	
5		5825.000	72.55	39.04	111.59	122.20	-10.61	peak	No Limit
6	*	5825.000	64.12	39.04	103.16	54.00	49.16	AVG	No Limit
7		5852.600	27.01	39.08	66.09	116.27	-50.18	peak	
8		5870.600	26.75	39.12	65.87	106.43	-40.56	peak	
9		5909.400	27.47	39.18	66.65	79.74	-13.09	peak	
10		5993.400	27.61	39.34	66.95	68.20	-1.25	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH36: 5180 MHz	Polarization	Vertical
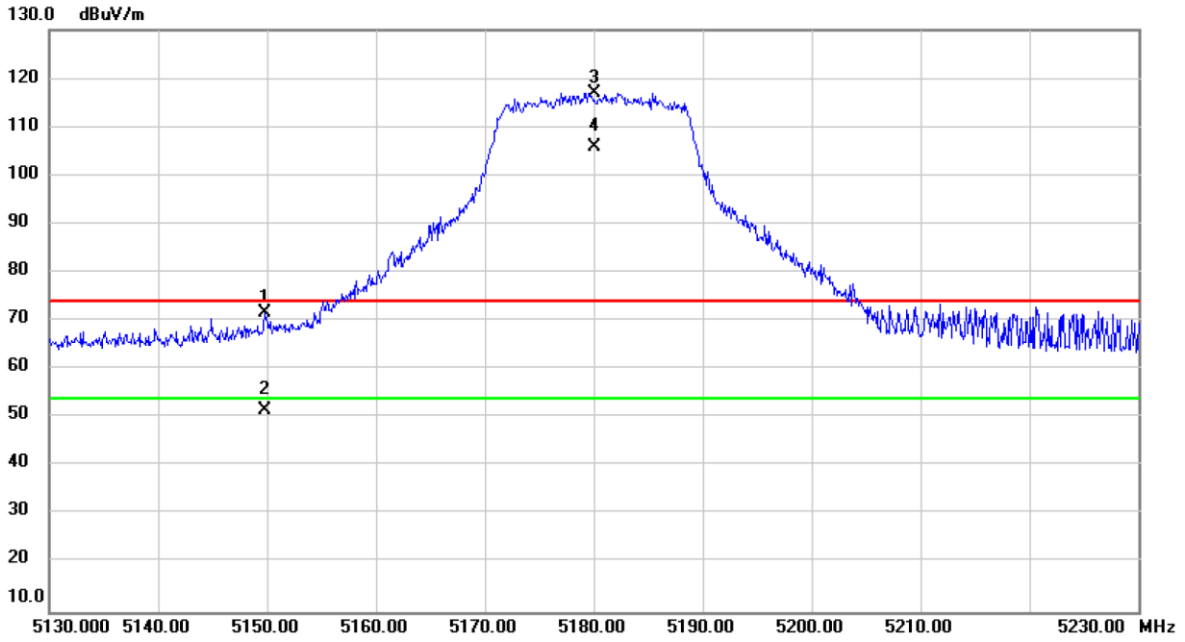
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		5149.800	33.67	38.09	71.76	74.00	-2.24	peak	
2		5149.800	13.46	38.09	51.55	54.00	-2.45	AVG	
3	X	5180.000	78.94	38.13	117.07	74.00	43.07	peak	No Limit
4	*	5180.000	67.80	38.13	105.93	54.00	51.93	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH48: 5240 MHz	Polarization	Horizontal
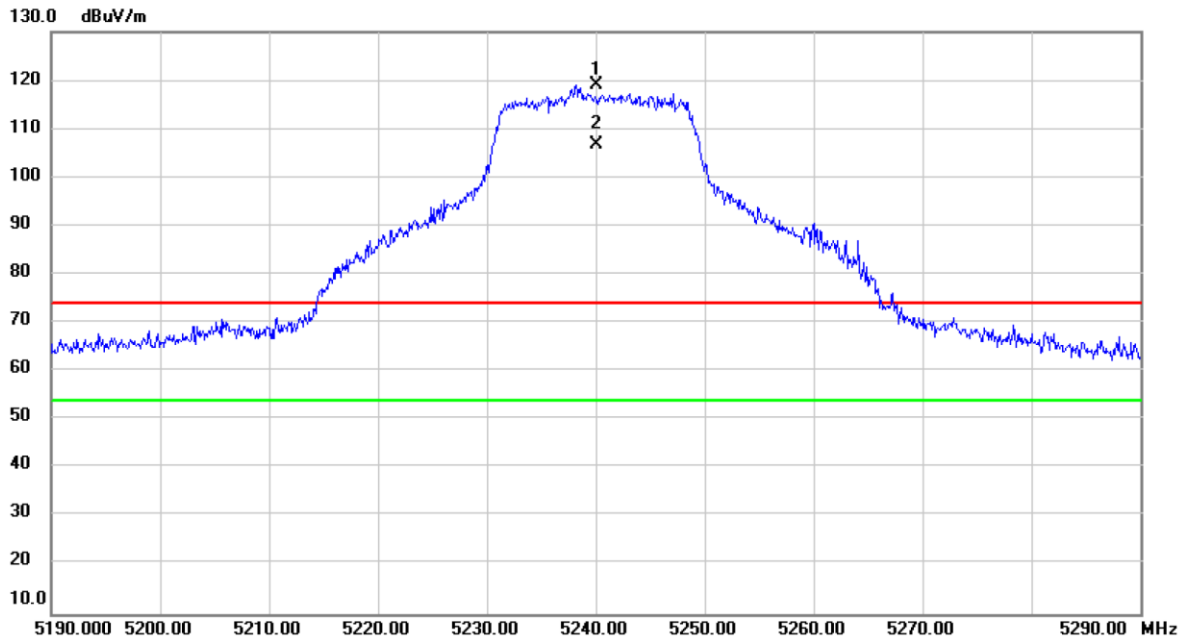
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5240.000	80.94	38.18	119.12	74.00	45.12	peak	No Limit
2	*	5240.000	68.65	38.18	106.83	54.00	52.83	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH52: 5260 MHz	Polarization	Vertical
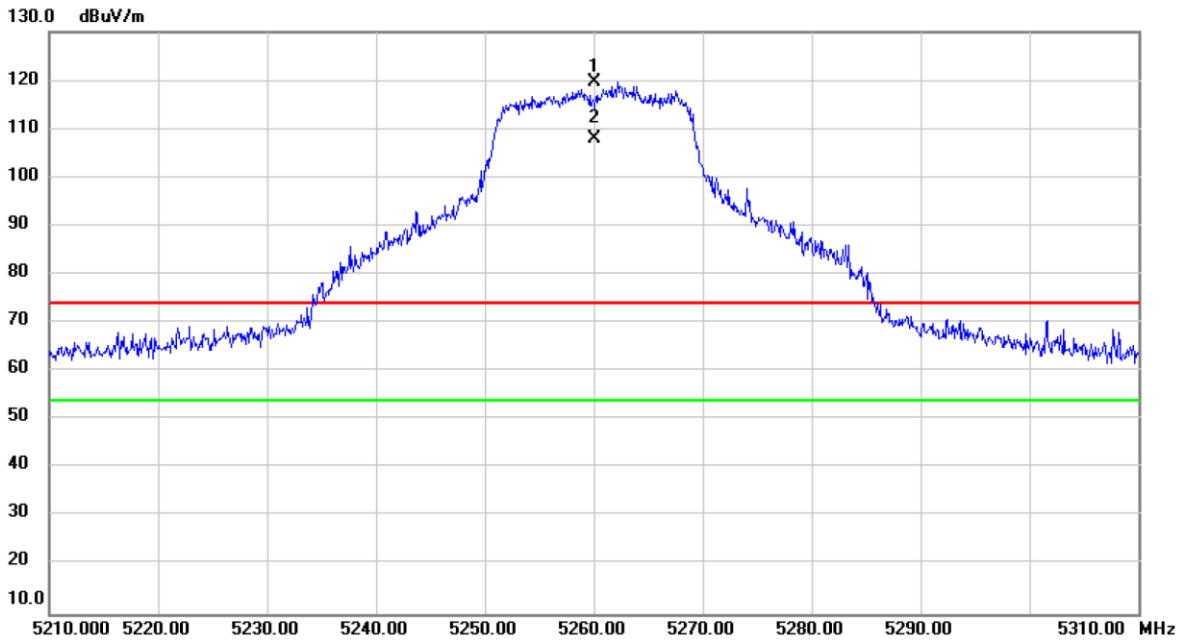
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5260.000	81.52	38.21	119.73	74.00	45.73	peak	No Limit
2	*	5260.000	69.84	38.21	108.05	54.00	54.05	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH64: 5320 MHz	Polarization	Horizontal
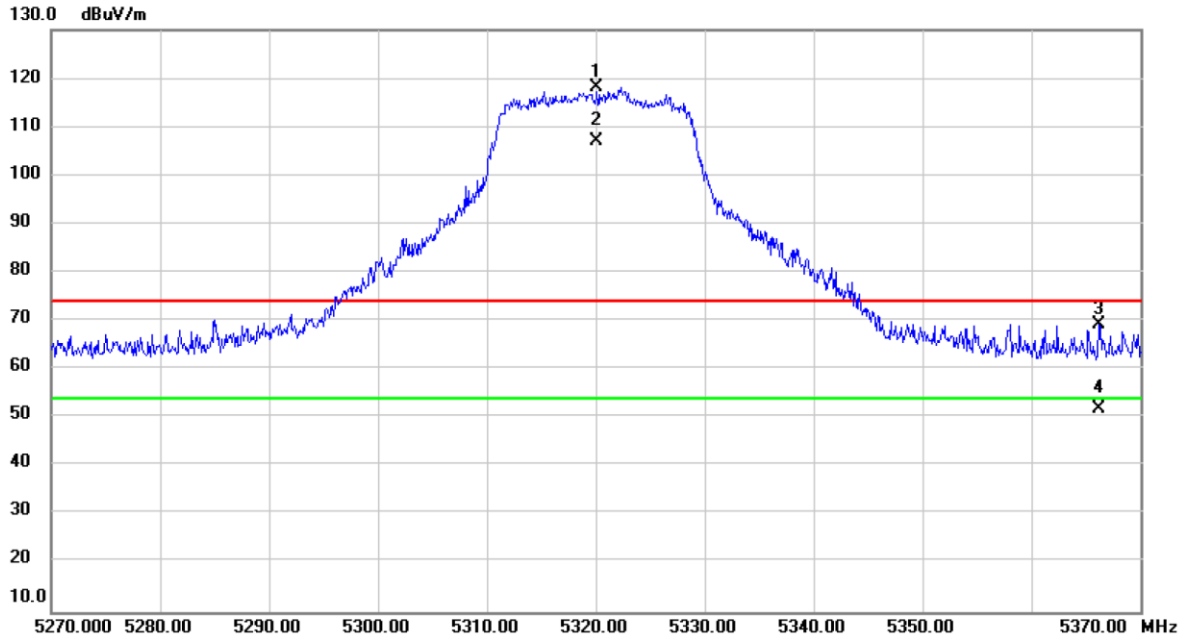
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5320.000	79.81	38.26	118.07	74.00	44.07	peak	No Limit
2	*	5320.000	68.64	38.26	106.90	54.00	52.90	AVG	No Limit
3		5366.200	31.01	38.31	69.32	74.00	-4.68	peak	
4		5366.200	13.57	38.31	51.88	54.00	-2.12	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH100: 5500 MHz	Polarization	Vertical
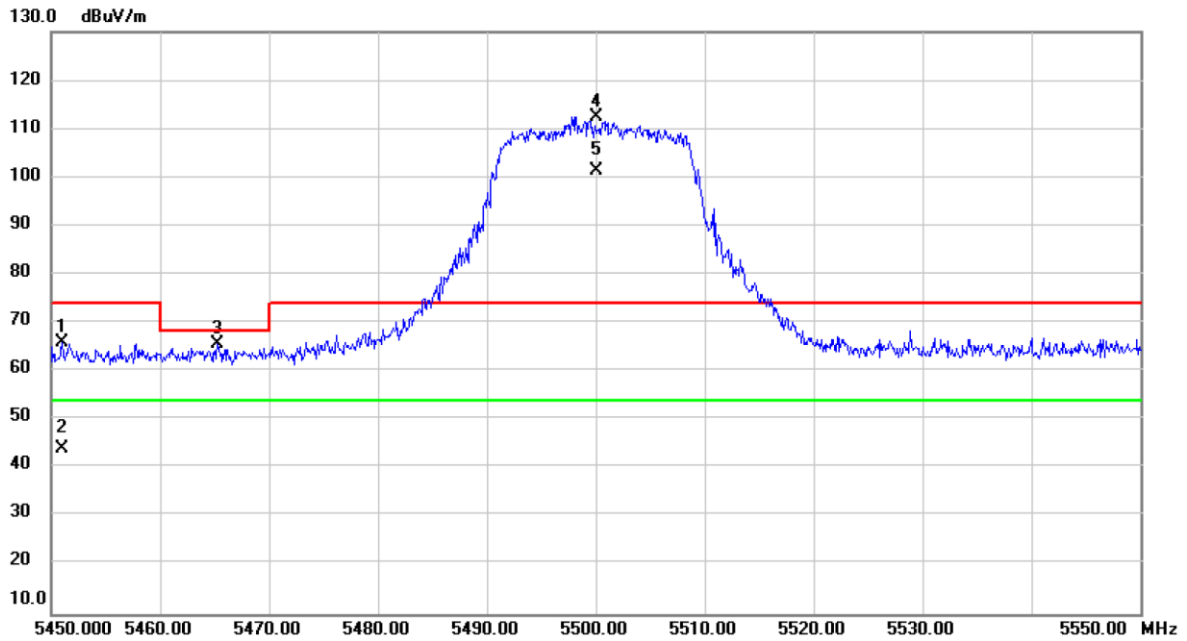
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5451.000	27.66	38.40	66.06	74.00	-7.94	peak	
2		5451.000	5.61	38.40	44.01	54.00	-9.99	AVG	
3		5465.300	27.23	38.42	65.65	68.20	-2.55	peak	
4	X	5500.000	74.12	38.45	112.57	74.00	38.57	peak	No Limit
5	*	5500.000	62.99	38.45	101.44	54.00	47.44	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH140: 5700 MHz	Polarization	Horizontal
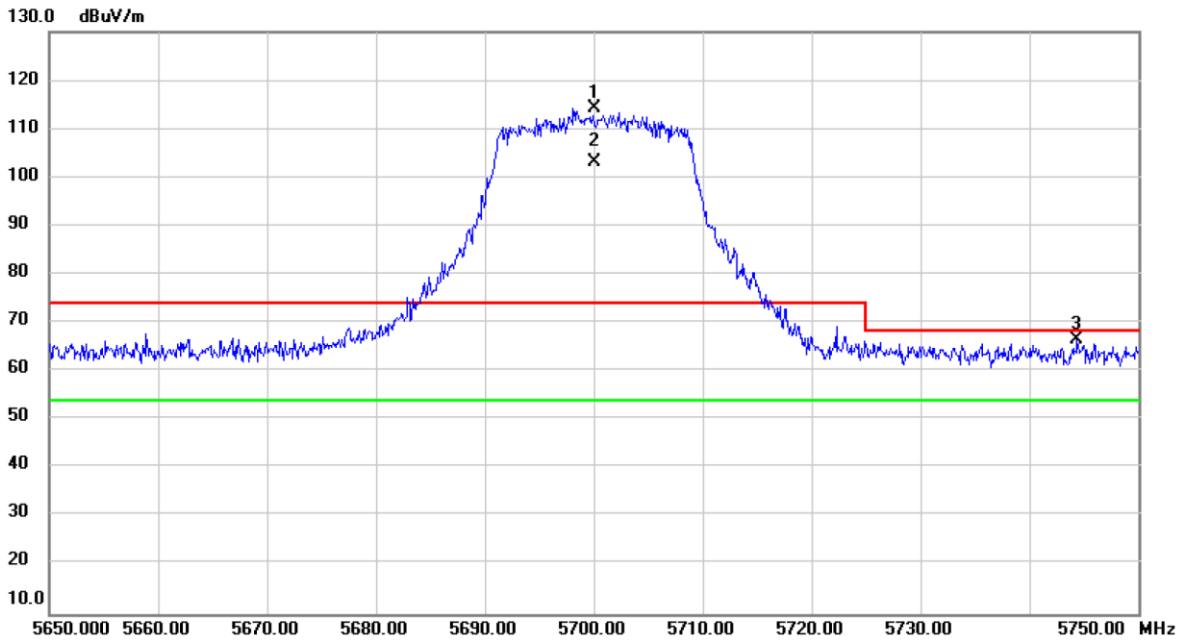
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5700.000	75.35	38.81	114.16	74.00	40.16	peak	No Limit
2	*	5700.000	64.20	38.81	103.01	54.00	49.01	AVG	No Limit
3		5744.400	27.51	38.89	66.40	68.20	-1.80	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH149: 5745 MHz	Polarization	Vertical
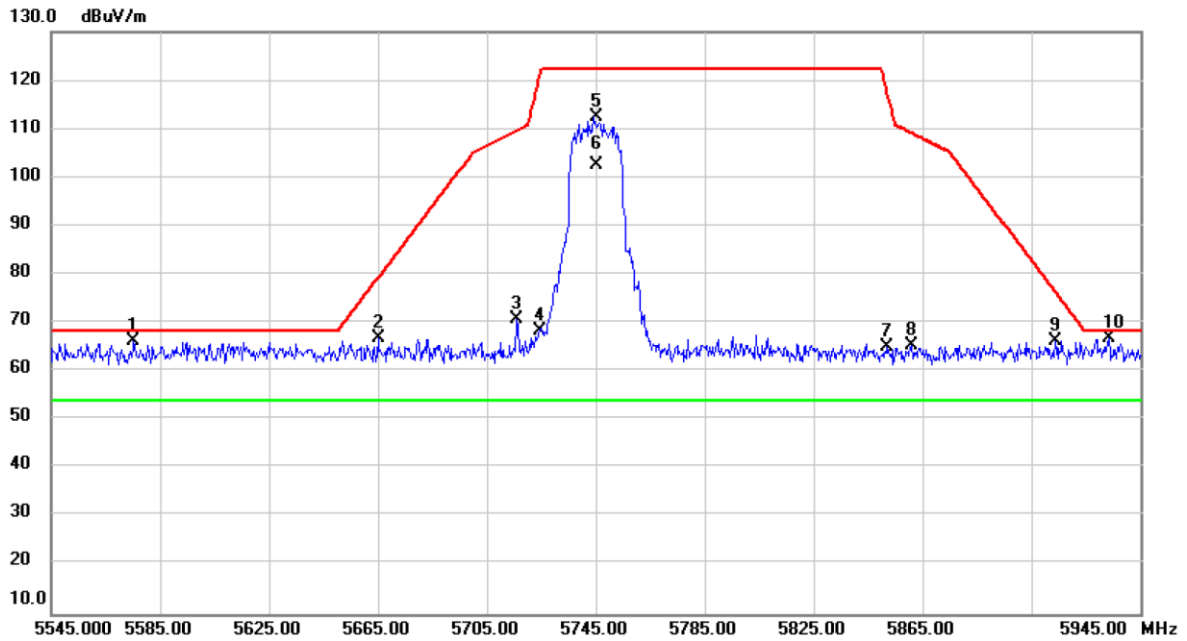
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5575.400	27.74	38.59	66.33	68.20	-1.87	peak	
2		5665.000	28.01	38.75	66.76	79.30	-12.54	peak	
3		5716.200	31.93	38.84	70.77	109.74	-38.97	peak	
4		5724.600	29.63	38.85	68.48	121.29	-52.81	peak	
5		5745.000	73.70	38.89	112.59	122.20	-9.61	peak	No Limit
6	*	5745.000	63.65	38.89	102.54	54.00	48.54	AVG	No Limit
7		5852.200	25.83	39.08	64.91	117.18	-52.27	peak	
8		5861.000	26.25	39.10	65.35	109.12	-43.77	peak	
9		5913.800	27.02	39.20	66.22	76.49	-10.27	peak	
10		5933.400	27.53	39.23	66.76	68.20	-1.44	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Tested Date	2019/11/11
Test Frequency	CH165: 5825 MHz	Polarization	Horizontal
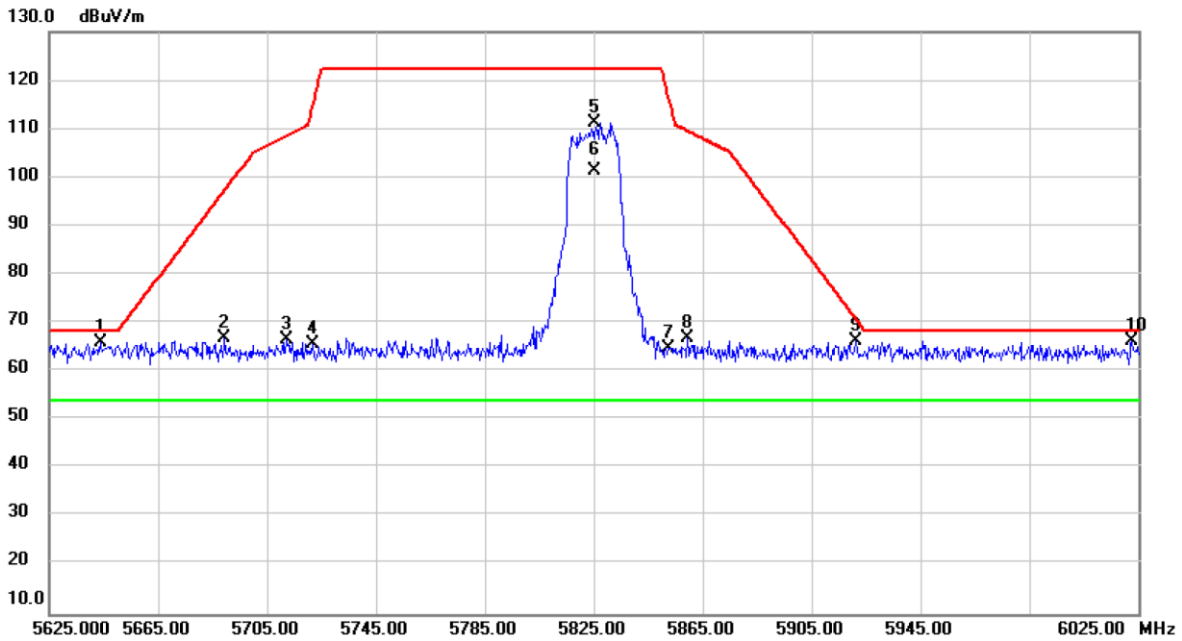
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		5643.800	27.34	38.71	66.05	68.20	-2.15	peak	
2		5689.400	28.19	38.80	66.99	97.36	-30.37	peak	
3		5712.200	27.62	38.83	66.45	108.62	-42.17	peak	
4		5721.800	26.91	38.85	65.76	114.90	-49.14	peak	
5		5825.000	72.19	39.04	111.23	122.20	-10.97	peak	No Limit
6	*	5825.000	62.17	39.04	101.21	54.00	47.21	AVG	No Limit
7		5852.600	25.76	39.08	64.84	116.27	-51.43	peak	
8		5859.400	27.70	39.09	66.79	109.57	-42.78	peak	
9		5921.400	27.03	39.21	66.24	70.86	-4.62	peak	
10		6022.600	26.88	39.44	66.32	68.20	-1.88	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH38: 5190 MHz	Polarization	Vertical
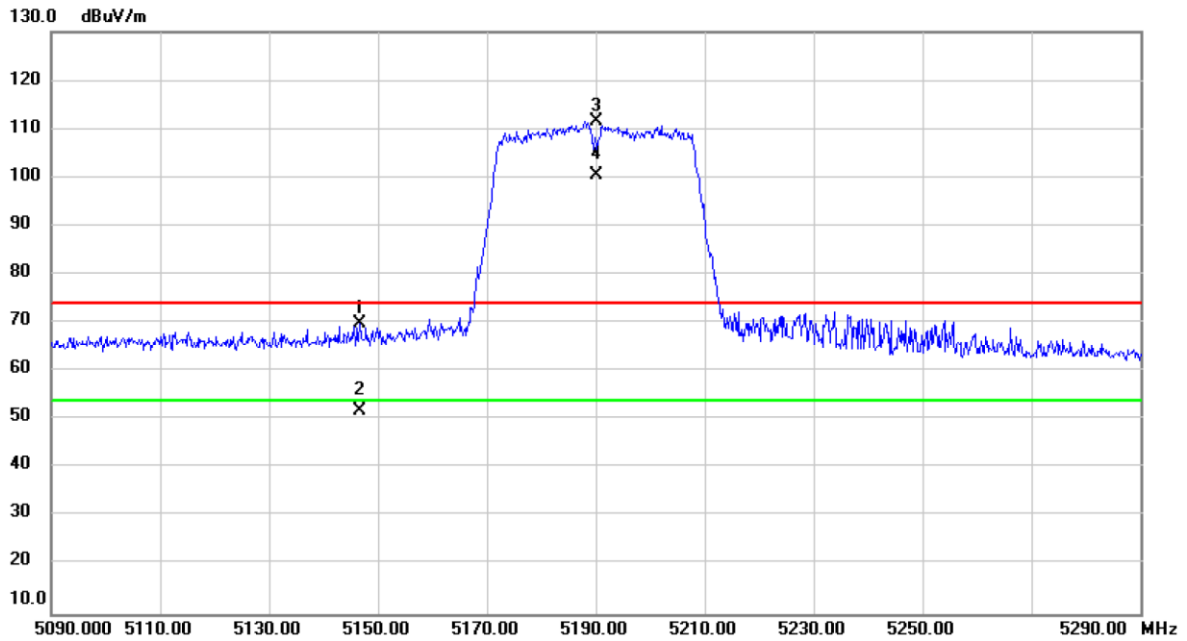
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		5146.600	31.81	38.09	69.90	74.00	-4.10	peak	
2		5146.600	13.80	38.09	51.89	54.00	-2.11	AVG	
3	X	5190.000	73.53	38.13	111.66	74.00	37.66	peak	No Limit
4	*	5190.000	62.36	38.13	100.49	54.00	46.49	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH46: 5230 MHz	Polarization	Horizontal
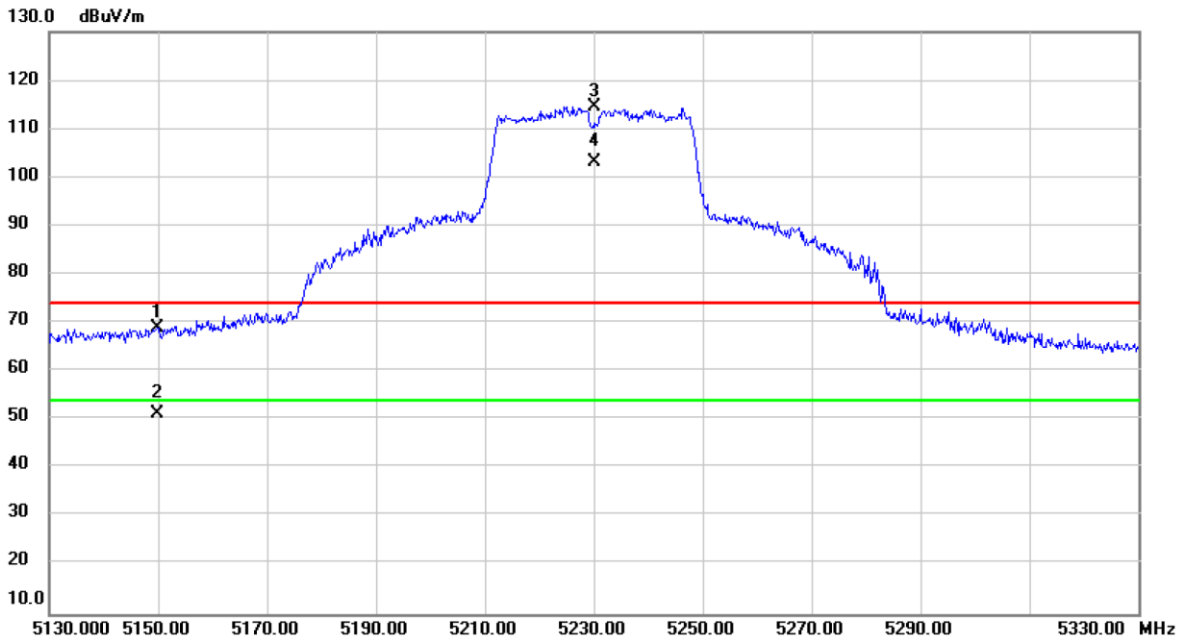
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5149.800	30.82	38.09	68.91	74.00	-5.09	peak	
2		5149.800	13.17	38.09	51.26	54.00	-2.74	AVG	
3	X	5230.000	76.33	38.18	114.51	74.00	40.51	peak	No Limit
4	*	5230.000	65.00	38.18	103.18	54.00	49.18	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH54: 5270 MHz	Polarization	Vertical
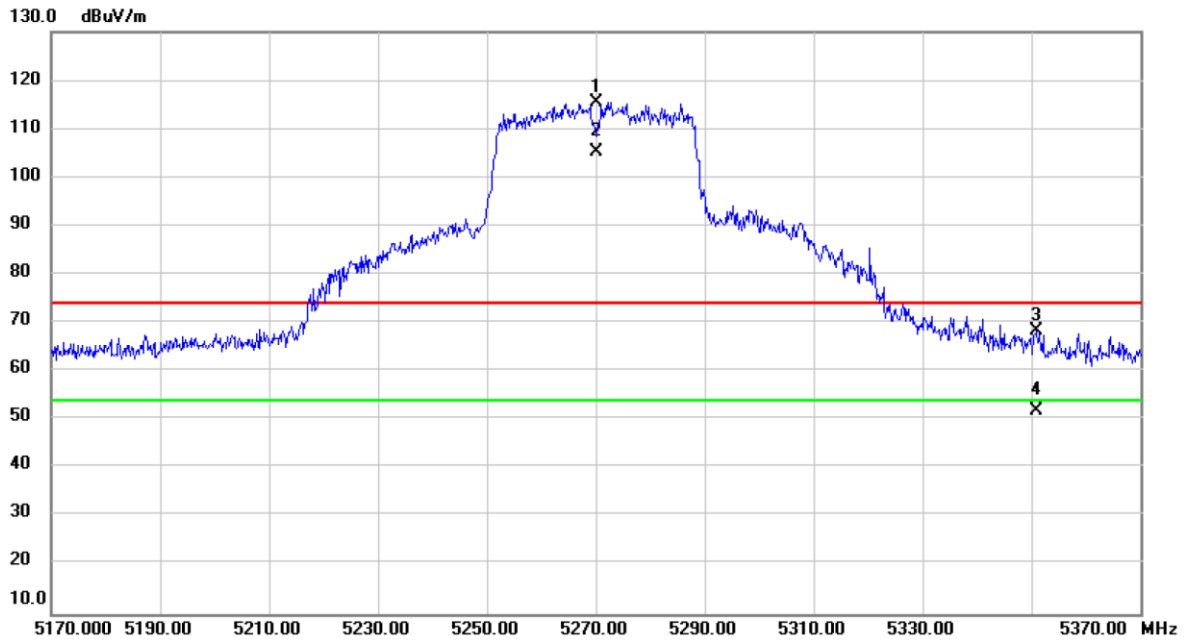
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5270.000	77.37	38.21	115.58	74.00	41.58	peak	No Limit
2	*	5270.000	67.17	38.21	105.38	54.00	51.38	AVG	No Limit
3		5351.000	30.11	38.30	68.41	74.00	-5.59	peak	
4		5351.000	13.45	38.30	51.75	54.00	-2.25	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH62: 5310 MHz	Polarization	Horizontal
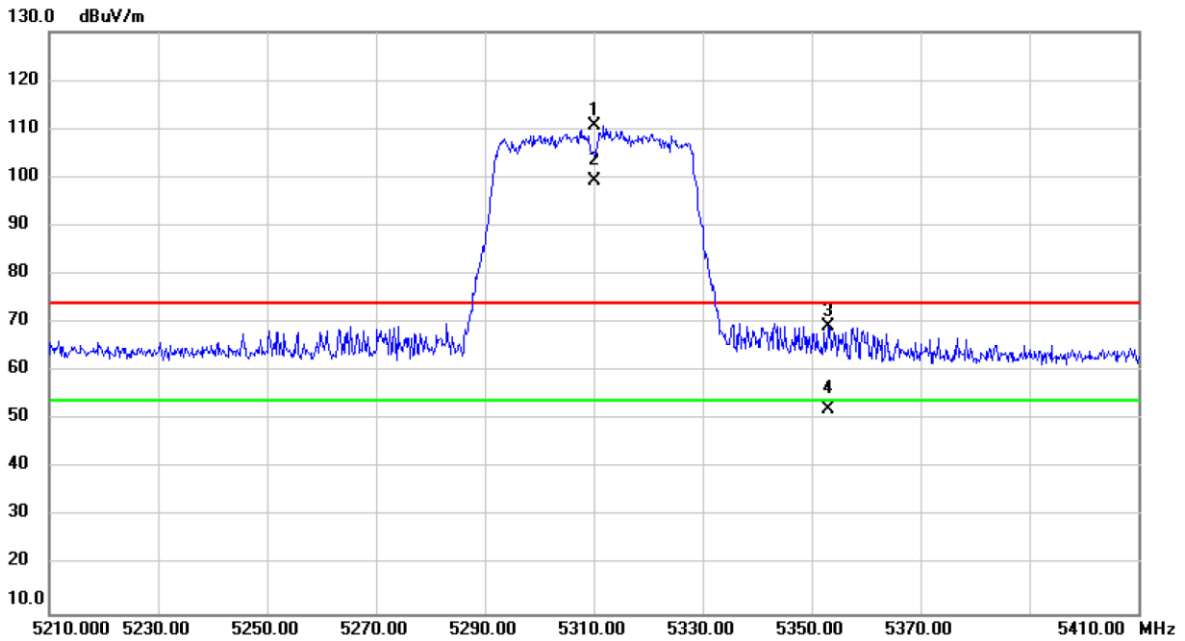
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	5310.000	72.29	38.26	110.55	74.00	36.55	peak	No Limit
2	*	5310.000	60.87	38.26	99.13	54.00	45.13	AVG	No Limit
3		5353.200	31.09	38.30	69.39	74.00	-4.61	peak	
4		5353.200	13.79	38.30	52.09	54.00	-1.91	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH102: 5510 MHz	Polarization	Vertical
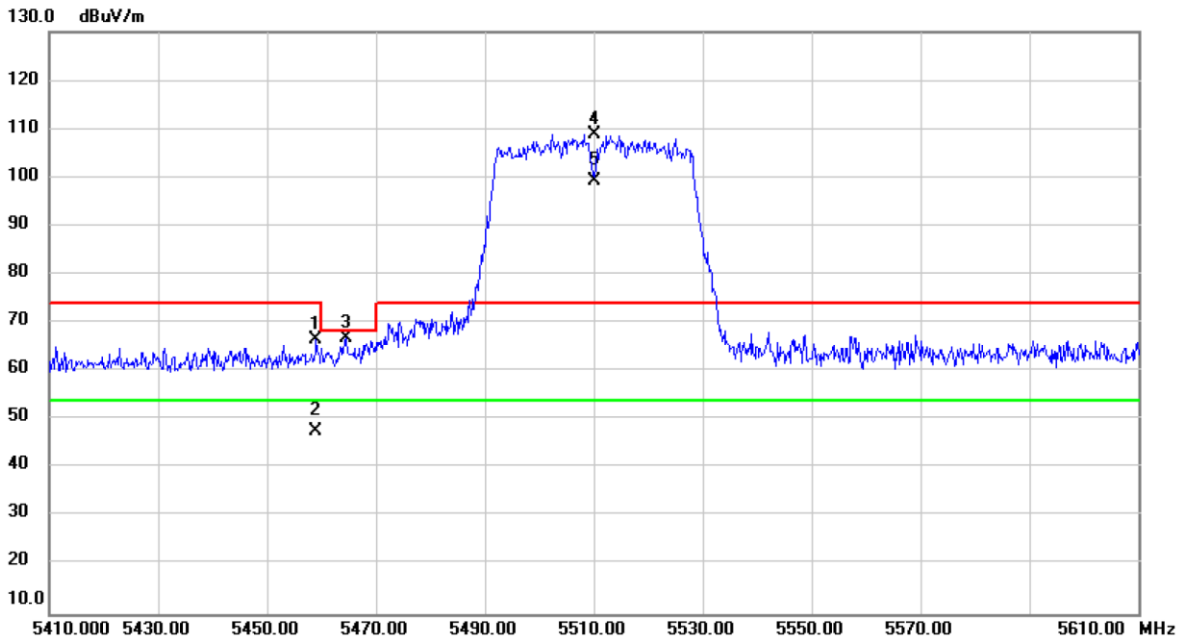
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5459.000	28.11	38.41	66.52	74.00	-7.48	peak	
2		5459.000	9.34	38.41	47.75	54.00	-6.25	AVG	
3		5464.600	28.41	38.42	66.83	68.20	-1.37	peak	
4	X	5510.000	70.35	38.46	108.81	74.00	34.81	peak	No Limit
5	*	5510.000	60.91	38.46	99.37	54.00	45.37	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH134: 5670 MHz	Polarization	Horizontal
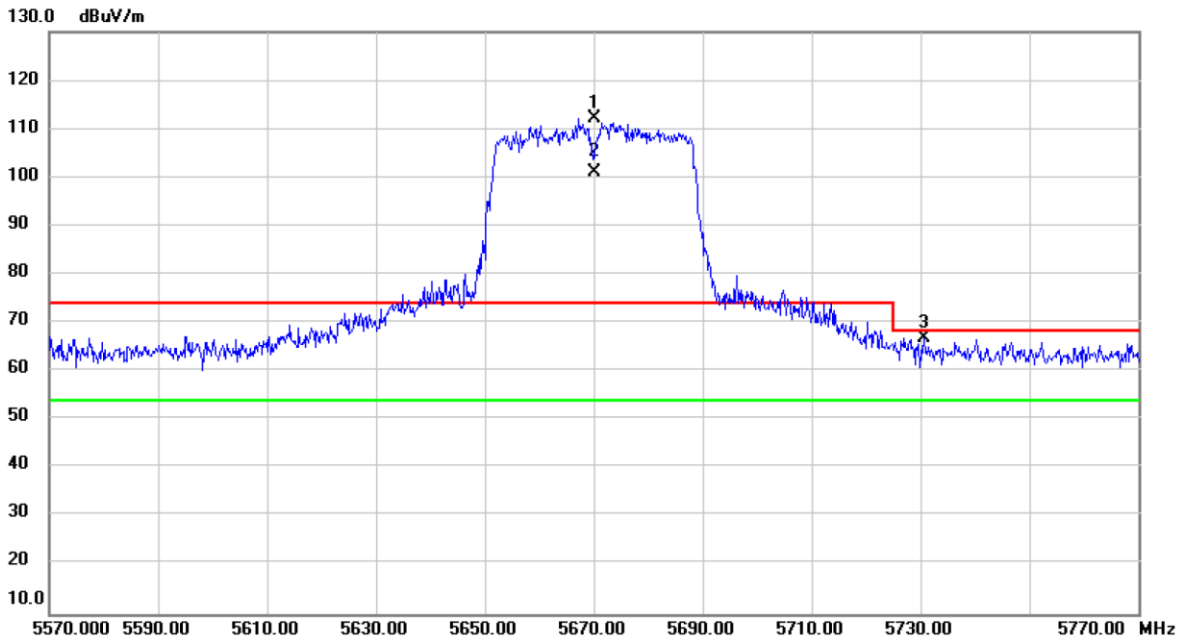
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	5670.000	73.43	38.76	112.19	74.00	38.19	peak	No Limit
2	*	5670.000	62.35	38.76	101.11	54.00	47.11	AVG	No Limit
3		5730.600	28.05	38.86	66.91	68.20	-1.29	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH151: 5755 MHz	Polarization	Vertical
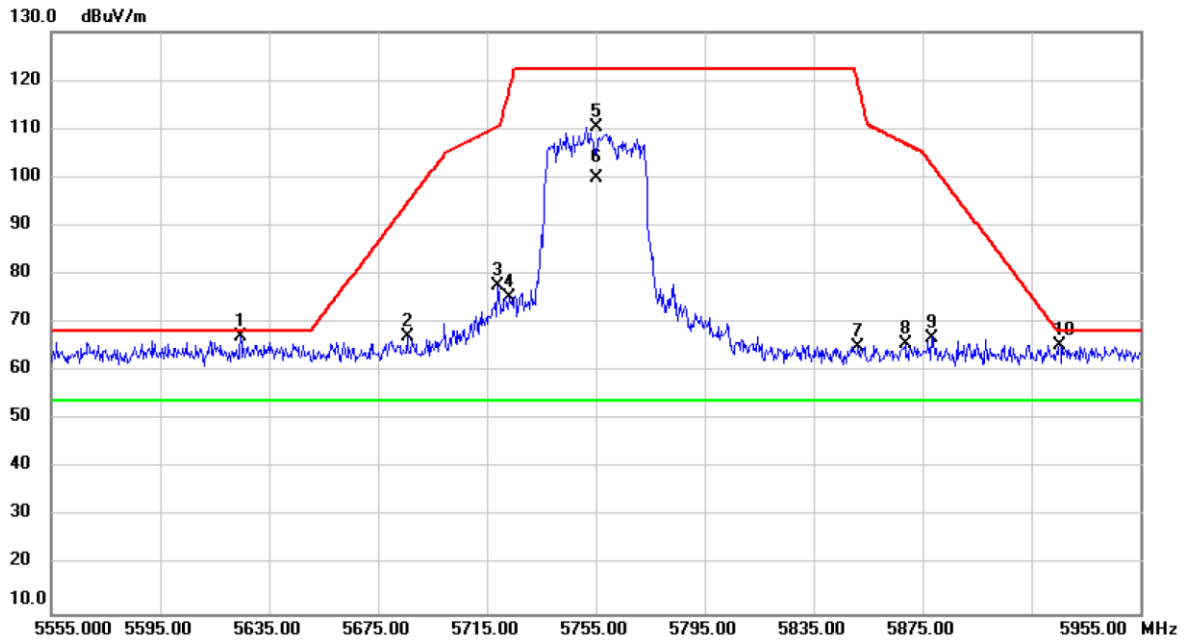
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5624.600	28.40	38.67	67.07	68.20	-1.13	peak	
2		5685.800	28.34	38.78	67.12	94.69	-27.57	peak	
3		5719.000	38.81	38.85	77.66	110.52	-32.86	peak	
4		5723.000	36.51	38.85	75.36	117.64	-42.28	peak	
5		5755.000	71.30	38.91	110.21	122.20	-11.99	peak	No Limit
6	*	5755.000	60.87	38.91	99.78	54.00	45.78	AVG	No Limit
7		5851.400	26.11	39.08	65.19	119.01	-53.82	peak	
8		5868.600	26.49	39.12	65.61	106.99	-41.38	peak	
9		5878.600	27.87	39.13	67.00	102.54	-35.54	peak	
10		5925.400	26.02	39.22	65.24	68.20	-2.96	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT40)	Tested Date	2019/11/11
Test Frequency	CH159: 5795 MHz	Polarization	Horizontal
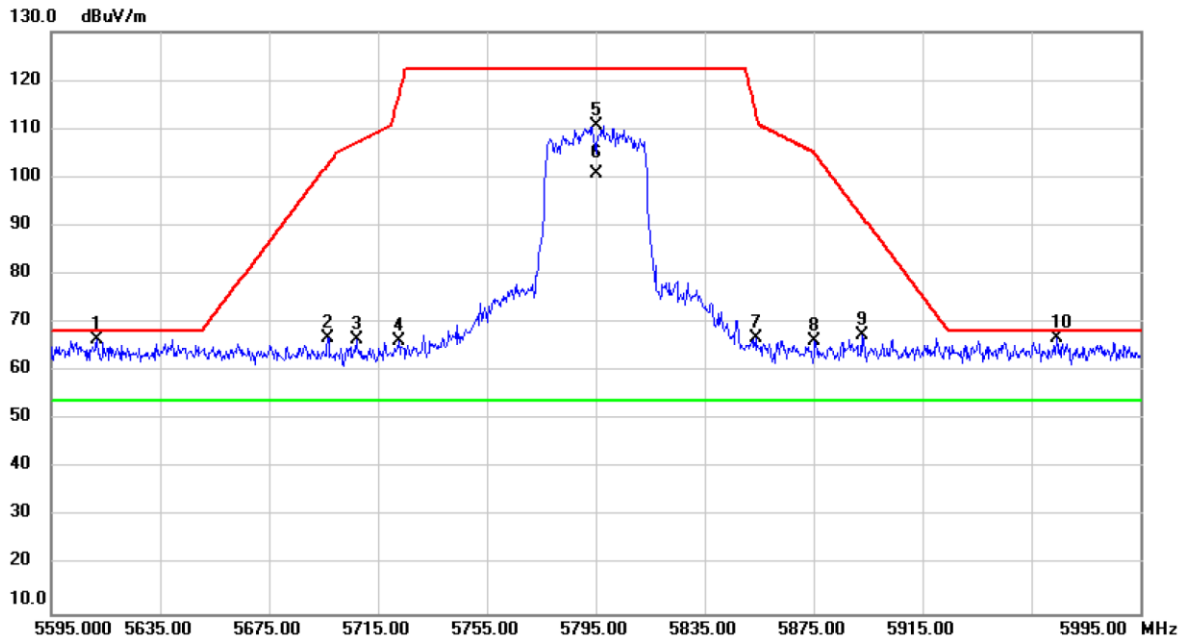
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5611.800	27.97	38.65	66.62	68.20	-1.58	peak	
2		5696.600	28.15	38.81	66.96	102.68	-35.72	peak	
3		5707.000	27.63	38.82	66.45	107.16	-40.71	peak	
4		5722.600	27.49	38.85	66.34	116.73	-50.39	peak	
5		5795.000	71.65	38.98	110.63	122.20	-11.57	peak	No Limit
6	*	5795.000	61.91	38.98	100.89	54.00	46.89	AVG	No Limit
7		5853.800	27.87	39.09	66.96	113.54	-46.58	peak	
8		5875.400	27.26	39.13	66.39	104.90	-38.51	peak	
9		5892.600	28.29	39.16	67.45	92.18	-24.73	peak	
10		5964.200	27.53	39.29	66.82	68.20	-1.38	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11ac (VHT80)	Tested Date	2019/11/11
Test Frequency	CH42: 5210 MHz	Polarization	Vertical
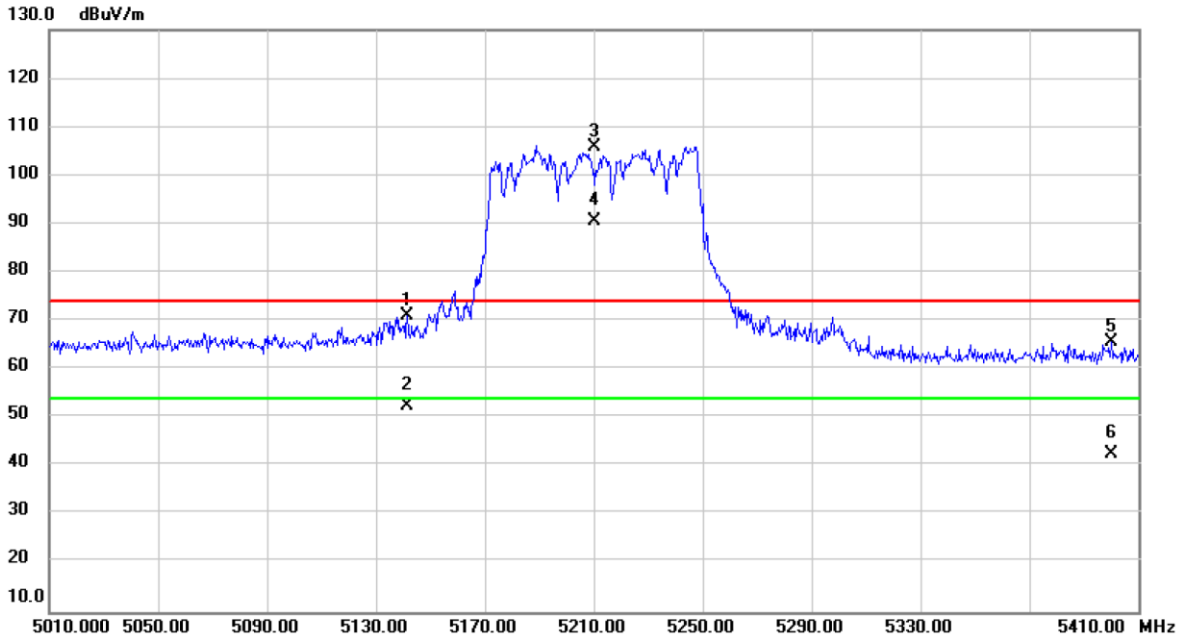
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5141.600	33.05	38.08	71.13	74.00	-2.87	peak	
2		5141.600	14.51	38.08	52.59	54.00	-1.41	AVG	
3	X	5210.000	67.84	38.16	106.00	74.00	32.00	peak	No Limit
4	*	5210.000	52.26	38.16	90.42	54.00	36.42	AVG	No Limit
5		5400.400	27.32	38.35	65.67	74.00	-8.33	peak	
6		5400.400	4.23	38.35	42.58	54.00	-11.42	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11ac (VHT80)	Tested Date	2019/11/11
Test Frequency	CH58: 5290 MHz	Polarization	Horizontal
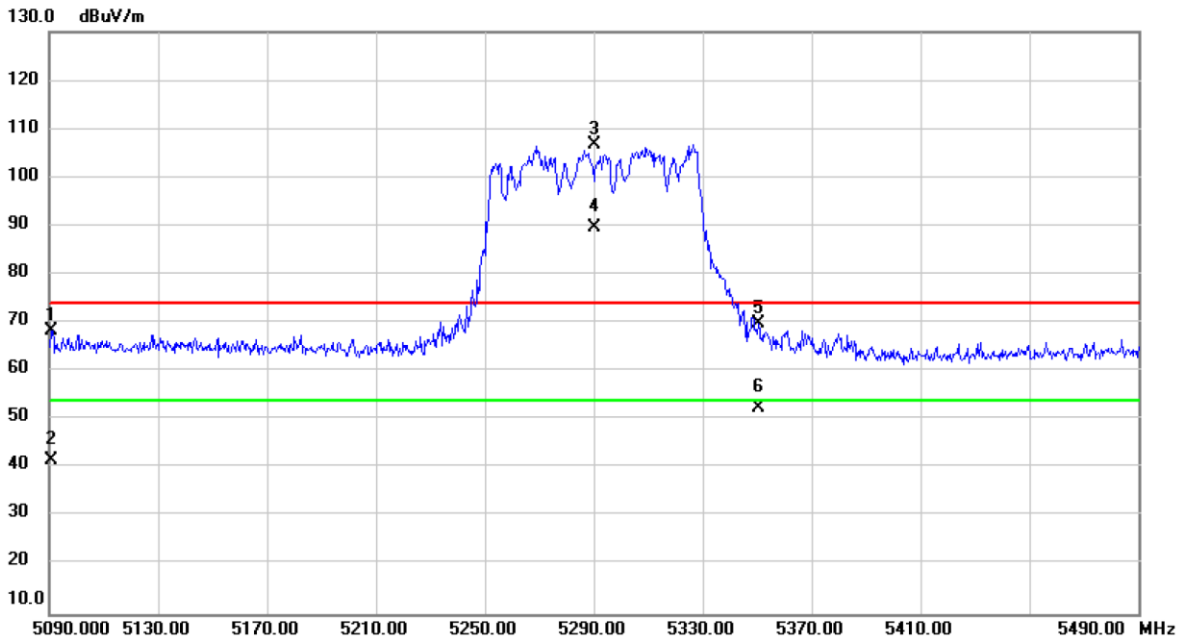
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		5090.800	30.46	38.03	68.49	74.00	-5.51	peak	
2		5090.800	3.60	38.03	41.63	54.00	-12.37	AVG	
3	X	5290.000	68.41	38.23	106.64	74.00	32.64	peak	No Limit
4	*	5290.000	51.55	38.23	89.78	54.00	35.78	AVG	No Limit
5		5350.400	31.59	38.30	69.89	74.00	-4.11	peak	
6		5350.400	14.06	38.30	52.36	54.00	-1.64	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11ac (VHT80)	Tested Date	2019/11/11
Test Frequency	CH106: 5530 MHz	Polarization	Vertical
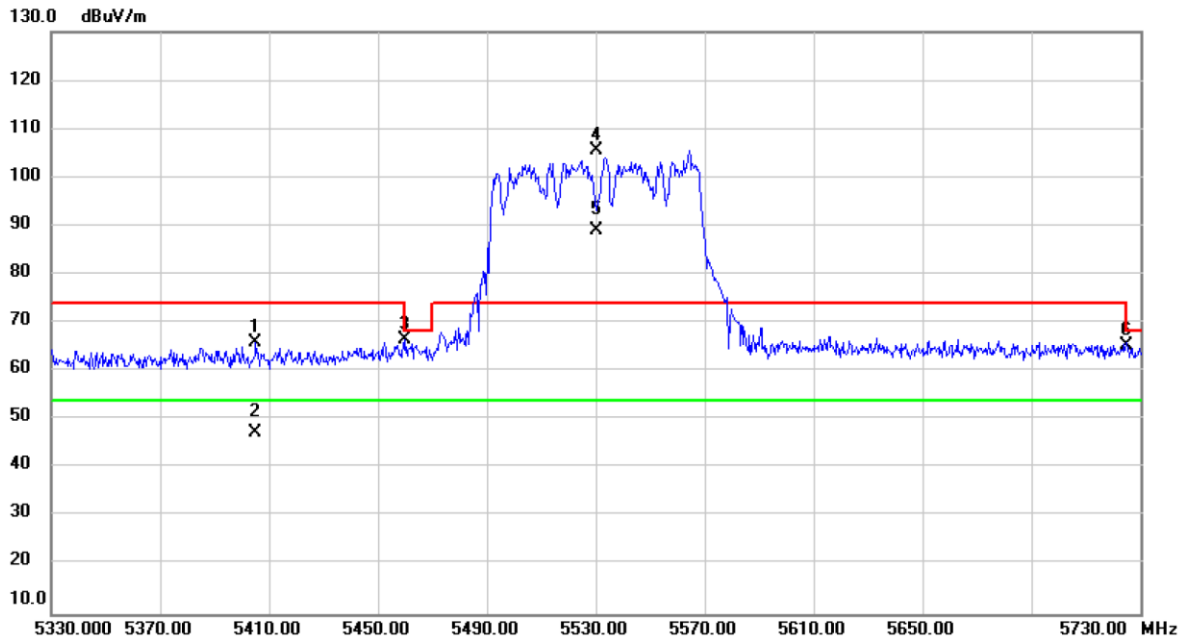
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	
1		5405.200	27.66	38.35	66.01	74.00	-7.99	peak	
2		5405.200	8.89	38.35	47.24	54.00	-6.76	AVG	
3		5460.000	28.19	38.41	66.60	68.20	-1.60	peak	
4	X	5530.000	66.93	38.50	105.43	74.00	31.43	peak	No Limit
5	*	5530.000	50.58	38.50	89.08	54.00	35.08	AVG	No Limit
6		5725.200	26.59	38.86	65.45	68.20	-2.75	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11ac (VHT80)	Tested Date	2019/11/11
Test Frequency	CH122: 5610 MHz	Polarization	Horizontal
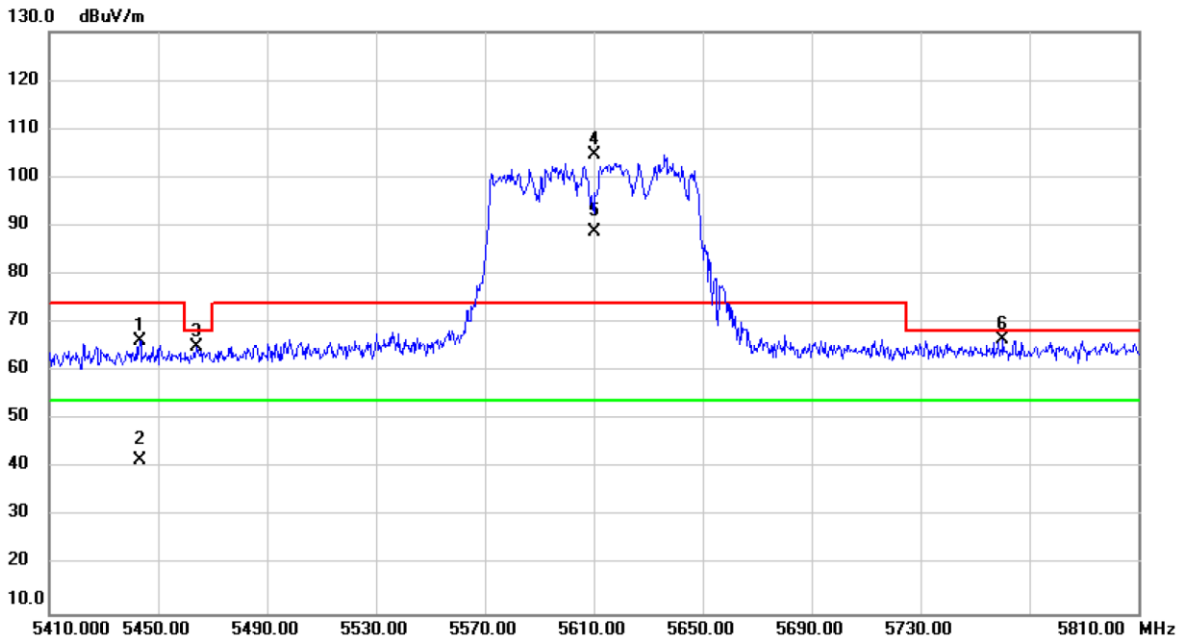
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5443.200	27.81	38.40	66.21	74.00	-7.79	peak	
2		5443.200	3.31	38.40	41.71	54.00	-12.29	AVG	
3		5464.400	26.61	38.42	65.03	68.20	-3.17	peak	
4	X	5610.000	65.88	38.64	104.52	74.00	30.52	peak	No Limit
5	*	5610.000	50.13	38.64	88.77	54.00	34.77	AVG	No Limit
6		5760.400	27.53	38.91	66.44	68.20	-1.76	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11ac (VHT80)	Tested Date	2019/11/11
Test Frequency	CH155: 5775 MHz	Polarization	Vertical
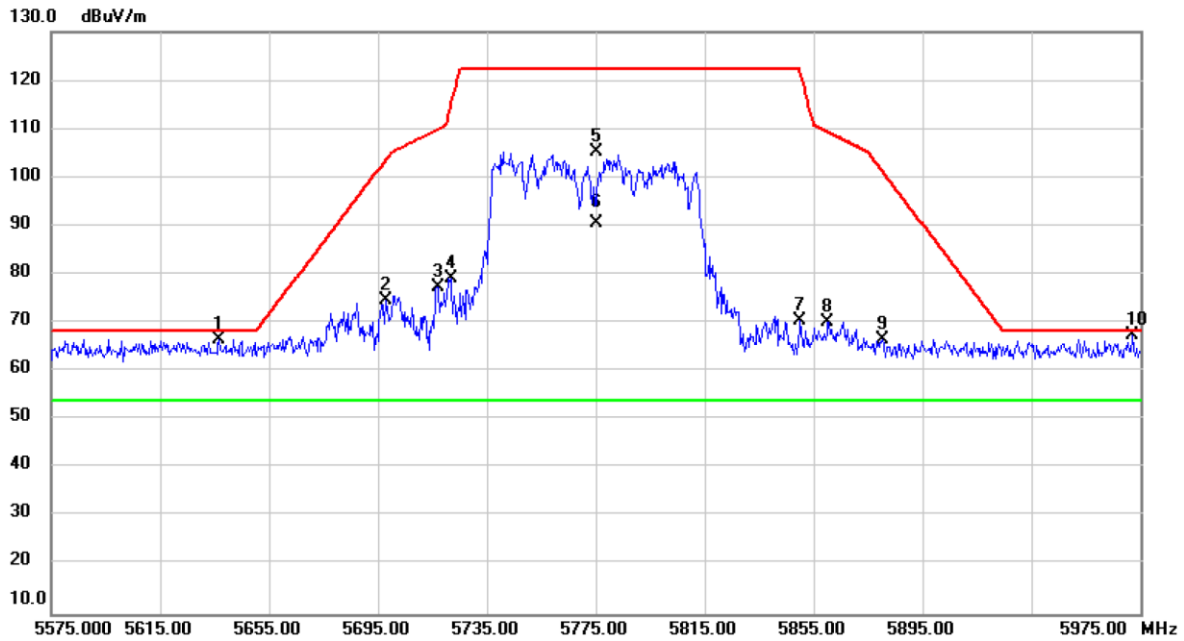
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		5636.600	27.83	38.69	66.52	68.20	-1.68	peak	
2		5697.800	35.85	38.81	74.66	103.57	-28.91	peak	
3		5717.000	38.45	38.84	77.29	109.96	-32.67	peak	
4		5721.800	40.42	38.85	79.27	114.90	-35.63	peak	
5		5775.000	66.38	38.94	105.32	122.20	-16.88	peak	No Limit
6	*	5775.000	51.51	38.94	90.45	54.00	36.45	AVG	No Limit
7		5850.200	31.26	39.08	70.34	121.74	-51.40	peak	
8		5860.200	31.10	39.09	70.19	109.34	-39.15	peak	
9		5880.200	27.36	39.13	66.49	101.35	-34.86	peak	
10		5972.200	28.08	39.30	67.38	68.20	-0.82	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH36: 5180 MHz	Polarization	Vertical
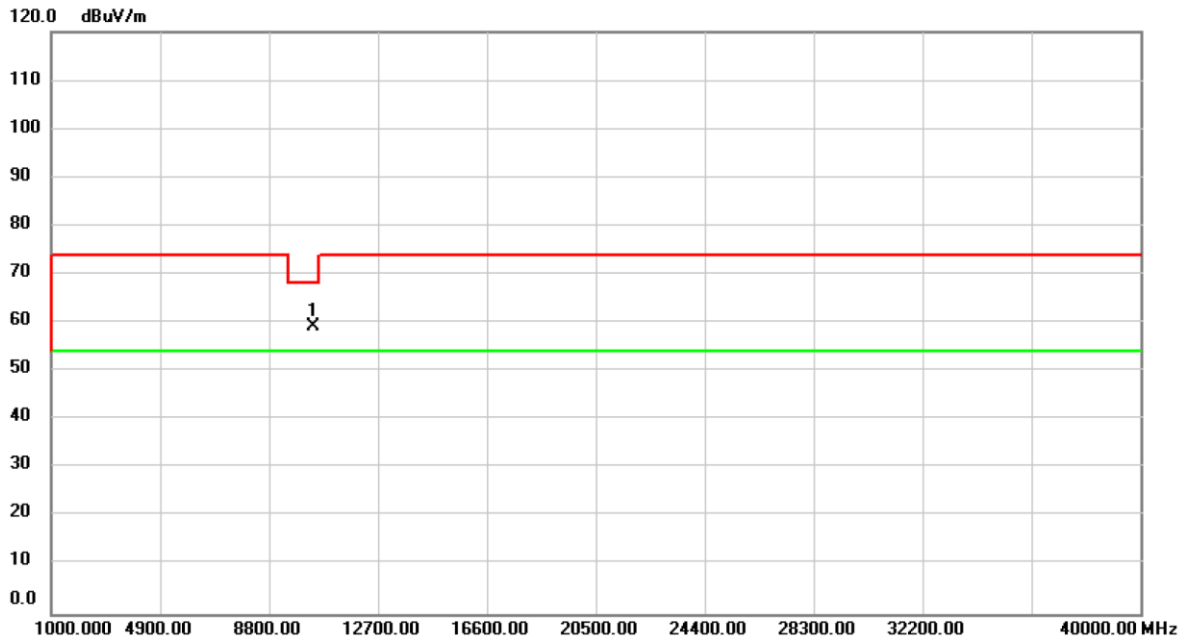
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	10360.00	56.29	2.83	59.12	68.20	-9.08	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH36: 5180 MHz	Polarization	Horizontal
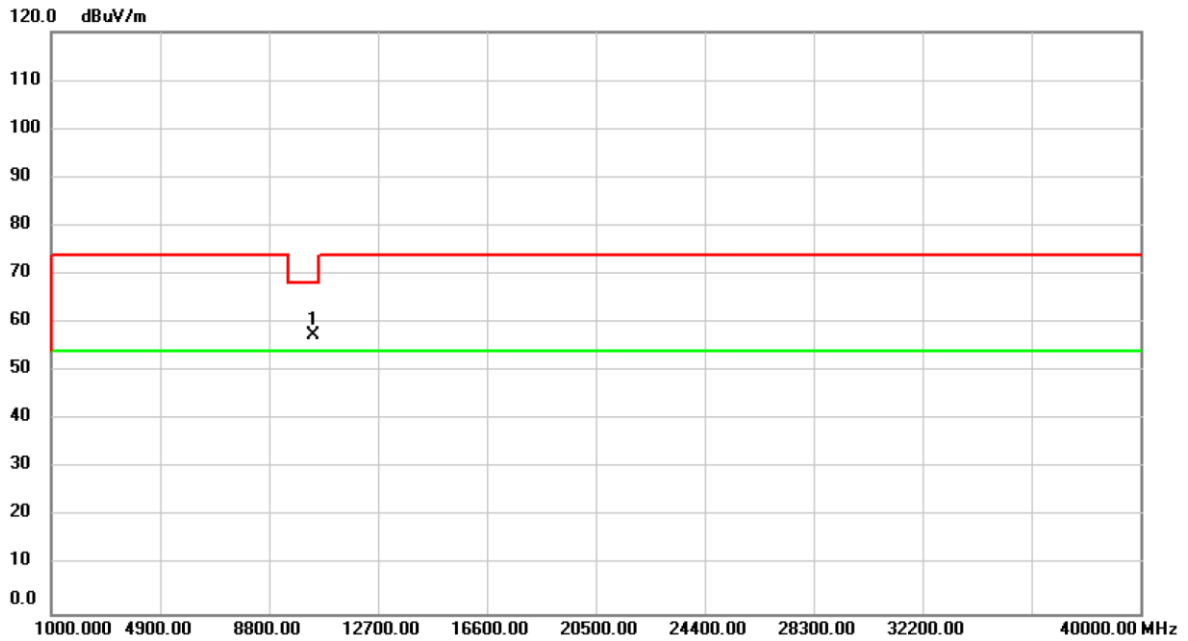
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	10360.00	54.49	2.83	57.32	68.20	-10.88	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH40: 5200 MHz	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	10400.00	56.87	2.89	59.76	68.20	-8.44	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH40: 5200 MHz	Polarization	Horizontal
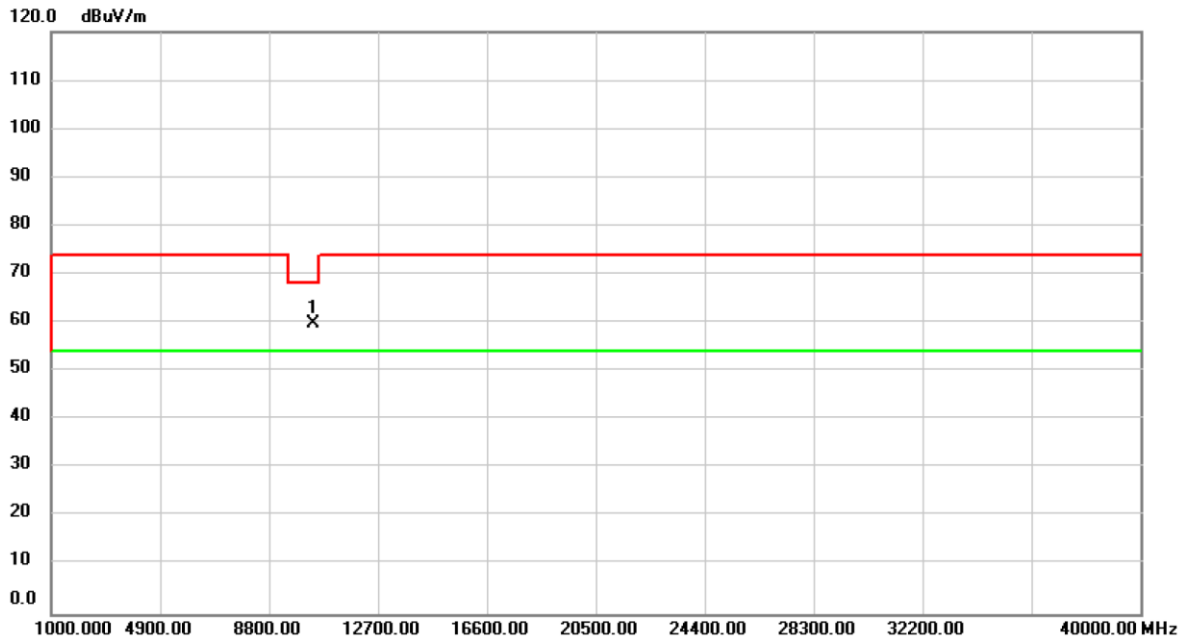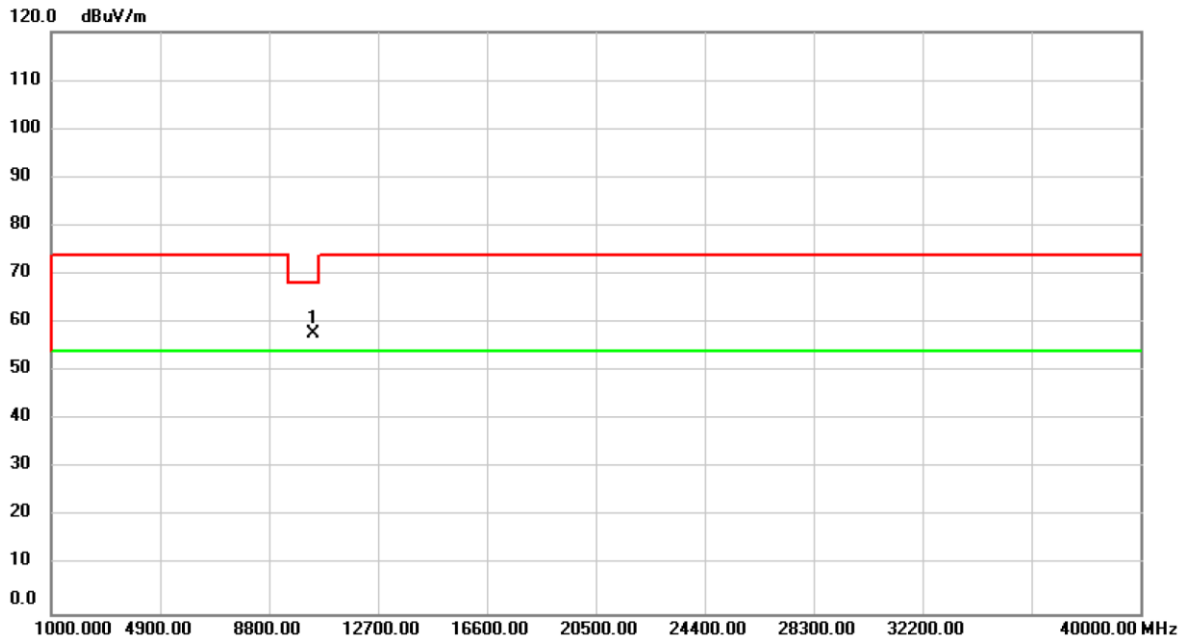
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	10400.00	54.78	2.89	57.67	68.20	-10.53	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH48: 5240 MHz	Polarization	Vertical
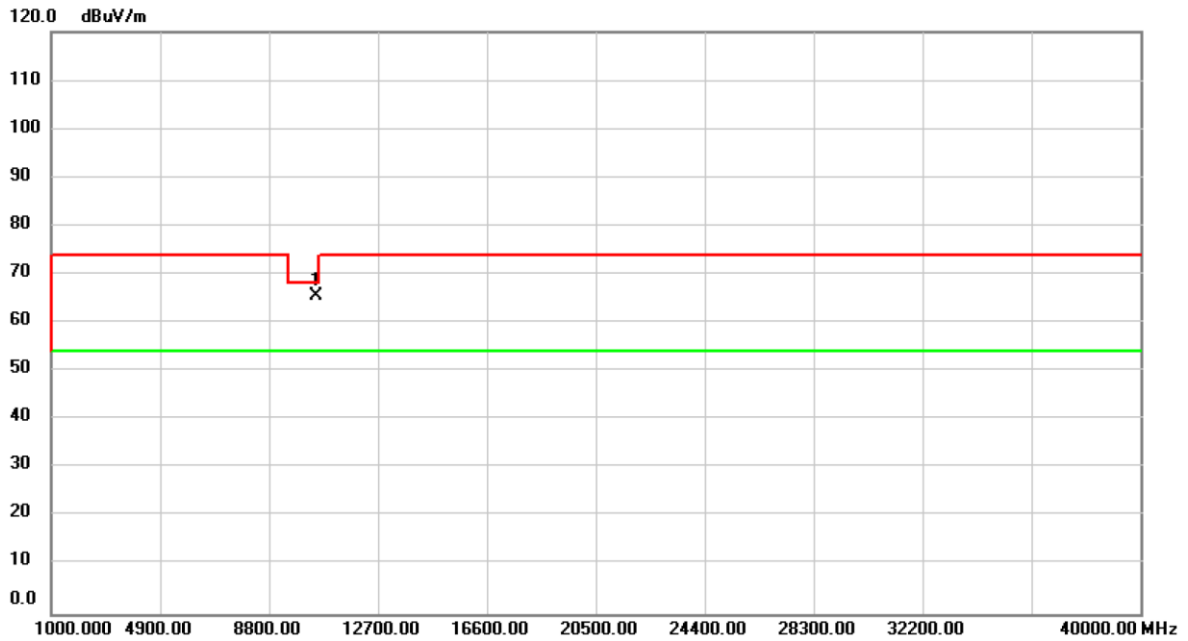
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	10480.00	62.44	3.00	65.44	68.20	-2.76	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH48: 5240 MHz	Polarization	Horizontal
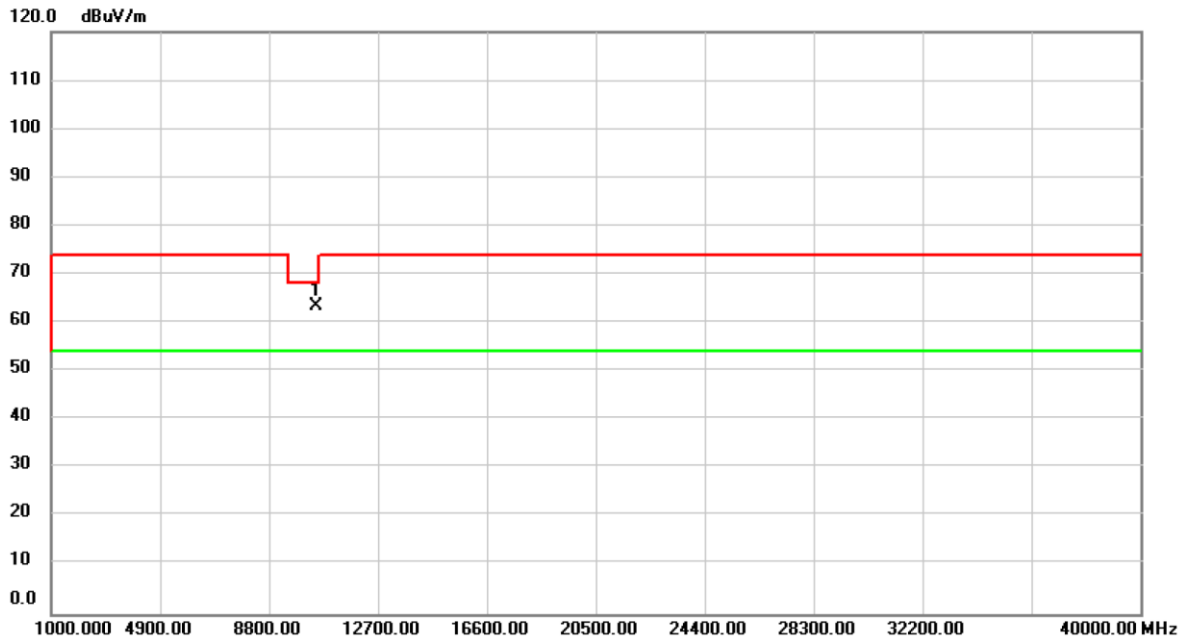
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	10480.00	60.31	3.00	63.31	68.20	-4.89	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH52: 5260 MHz	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	10520.00	61.21	3.02	64.23	68.20	-3.97	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH52: 5260 MHz	Polarization	Horizontal
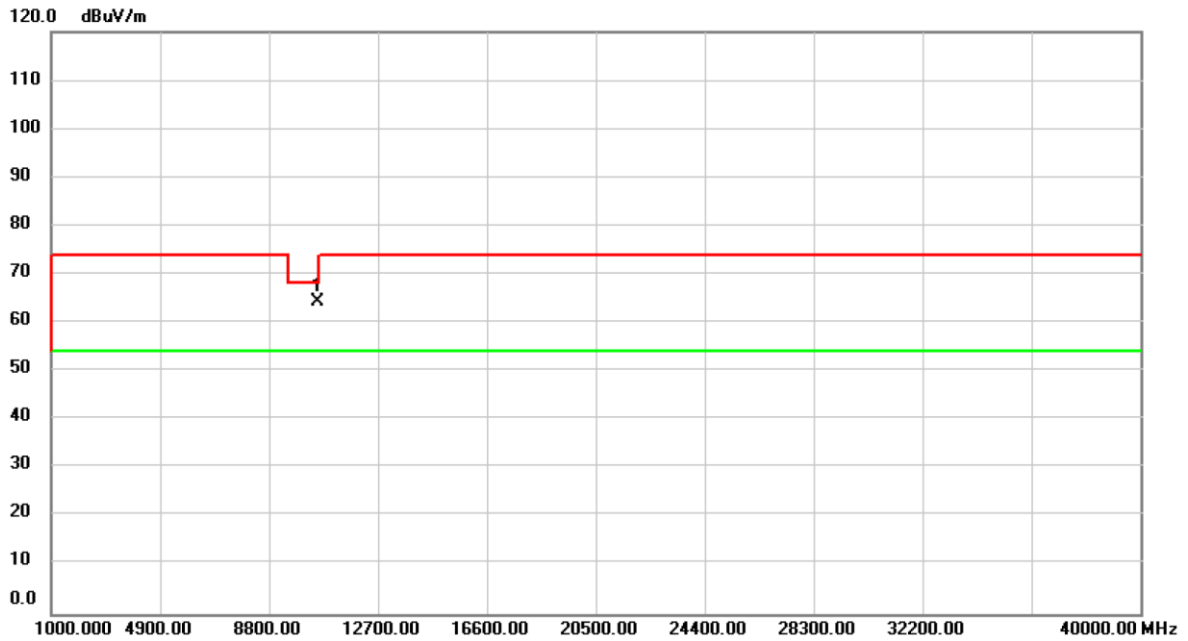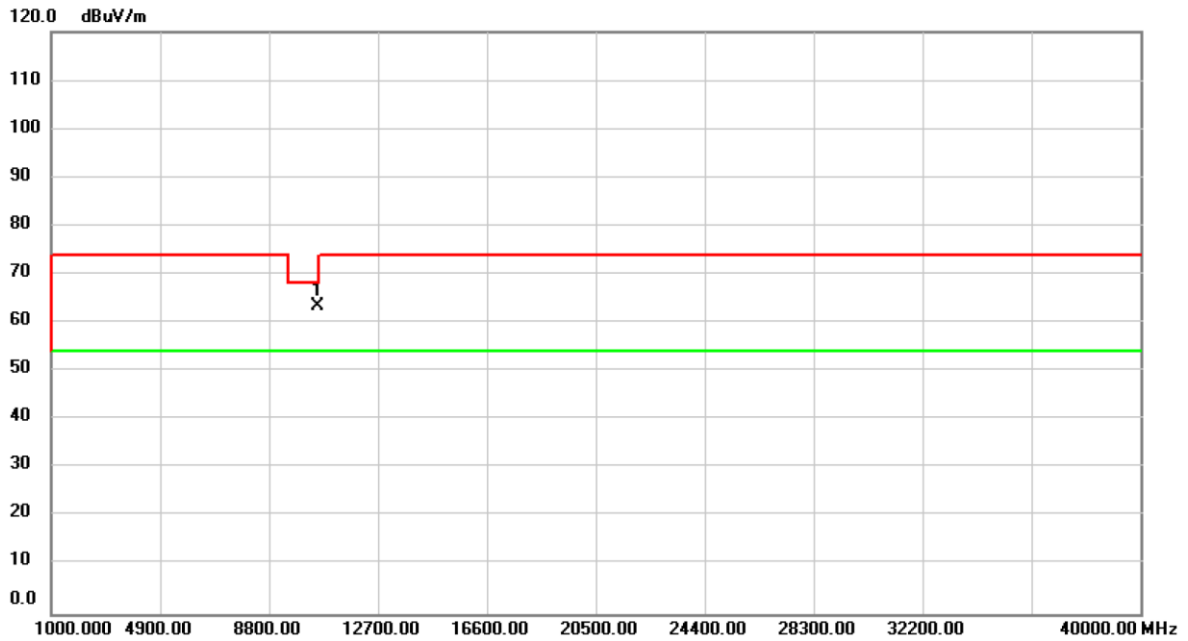
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	10520.00	60.34	3.02	63.36	68.20	-4.84	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
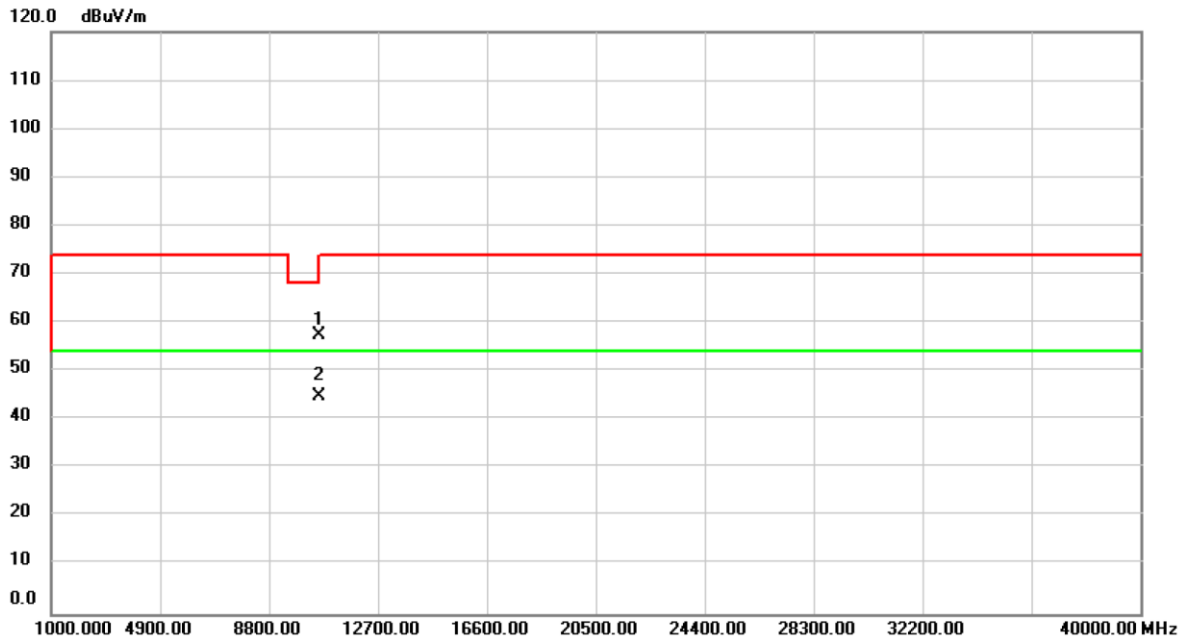(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH60: 5300 MHz	Polarization	Vertical
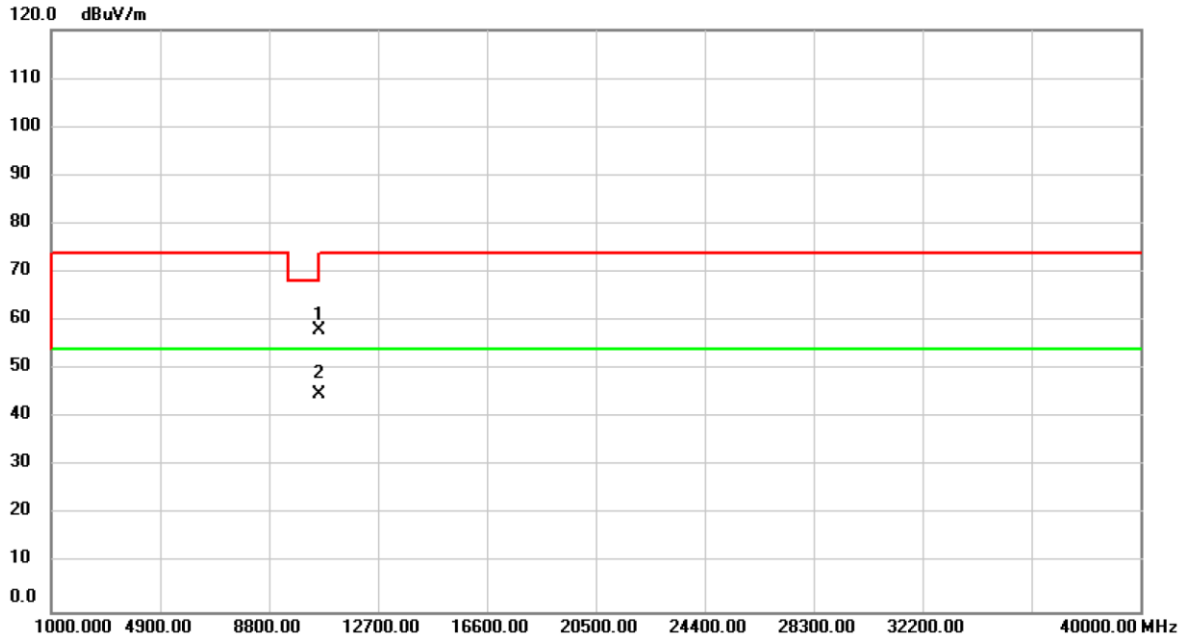
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10600.00	55.06	2.96	58.02	68.20	-10.18	peak	
2	*	10600.00	42.03	2.96	44.99	54.00	-9.01	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH60: 5300 MHz	Polarization	Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		10600.00	54.48	2.96	57.44	68.20	-10.76	peak	
2	*	10600.00	41.86	2.96	44.82	54.00	-9.18	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH64: 5320 MHz	Polarization	Vertical
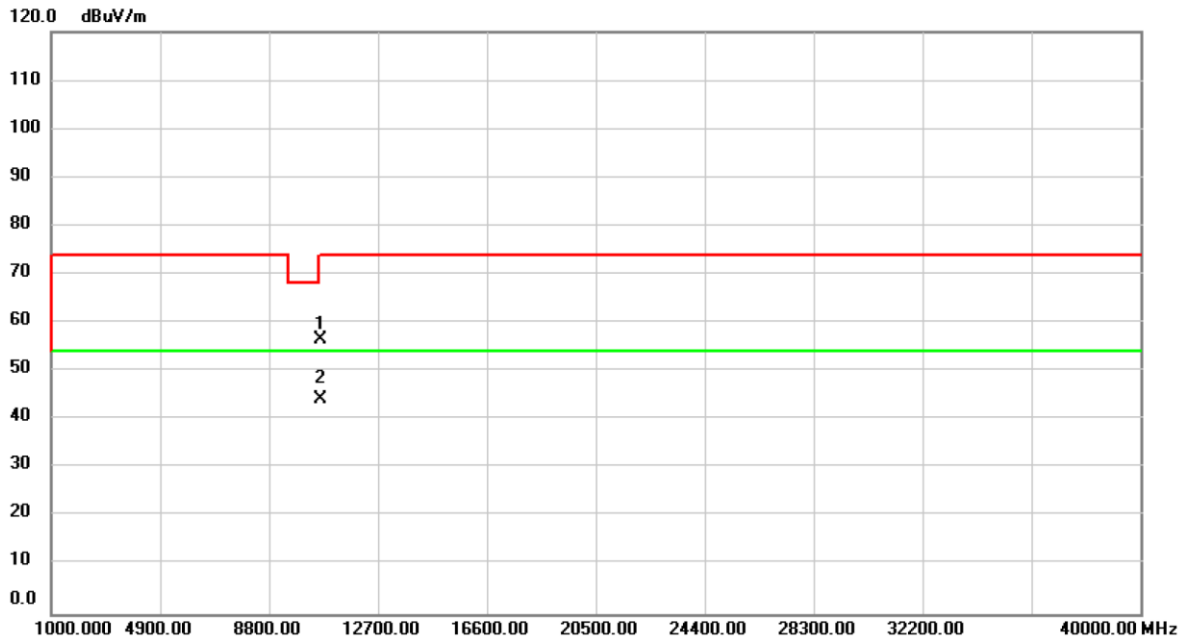
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		10640.00	53.57	2.93	56.50	74.00	-17.50	peak	
2	*	10640.00	41.35	2.93	44.28	54.00	-9.72	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH64: 5320 MHz	Polarization	Horizontal
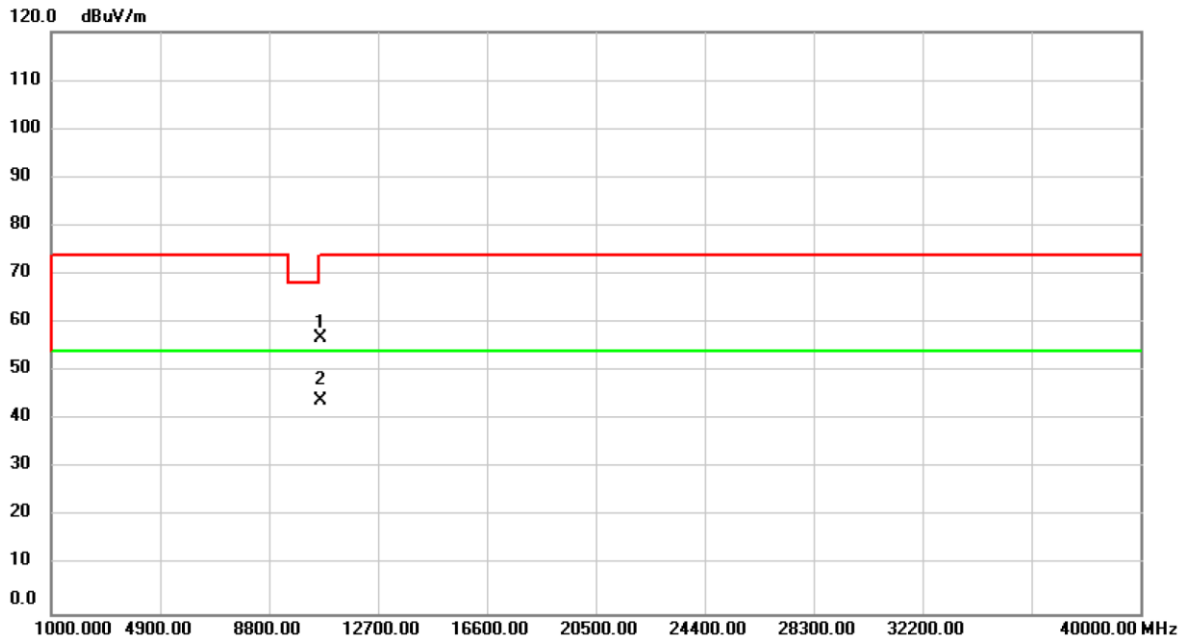
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		10640.00	54.03	2.93	56.96	74.00	-17.04	peak	
2	*	10640.00	41.08	2.93	44.01	54.00	-9.99	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH100: 5500 MHz	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		11000.00	54.29	2.62	56.91	74.00	-17.09	peak	
2	*	11000.00	41.80	2.62	44.42	54.00	-9.58	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH100: 5500 MHz	Polarization	Horizontal
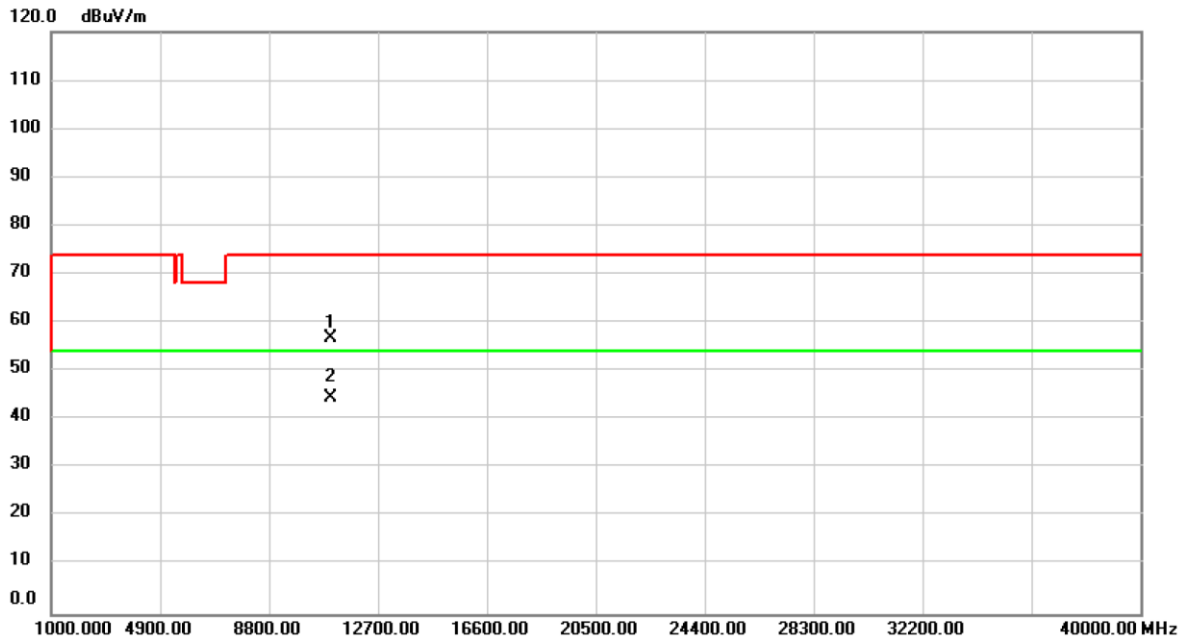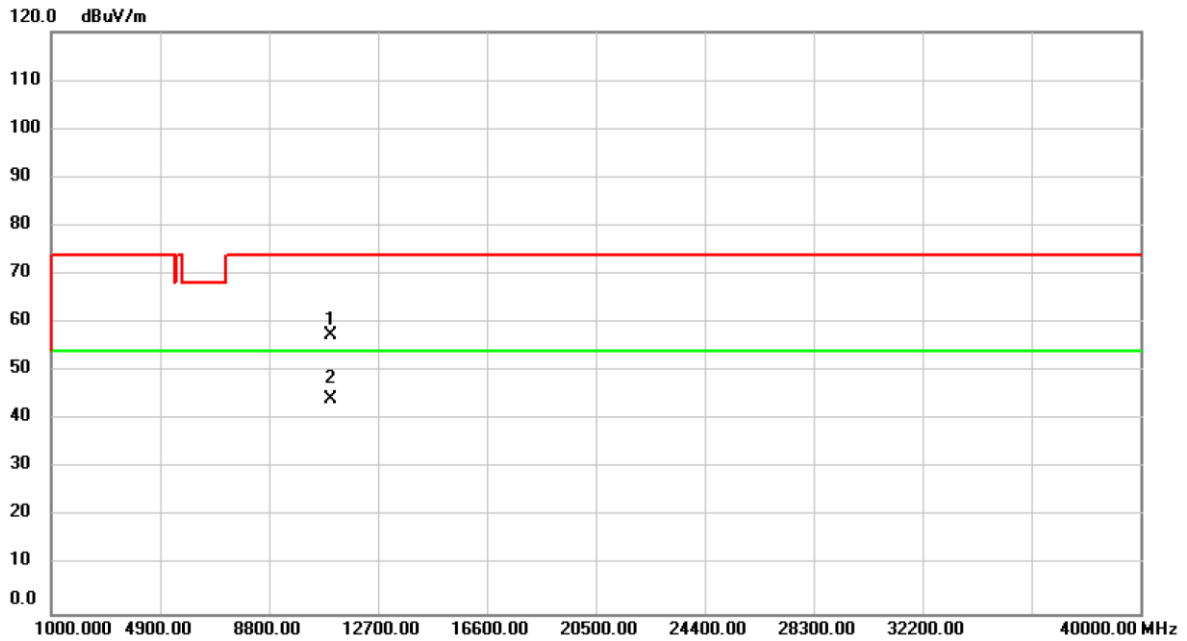
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		11000.00	54.94	2.62	57.56	74.00	-16.44	peak	
2	*	11000.00	41.73	2.62	44.35	54.00	-9.65	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH116: 5580 MHz	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		11160.00	54.78	3.03	57.81	74.00	-16.19	peak	
2	*	11160.00	42.35	3.03	45.38	54.00	-8.62	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11a	Tested Date	2019/11/14
Test Frequency	CH116: 5580 MHz	Polarization	Horizontal
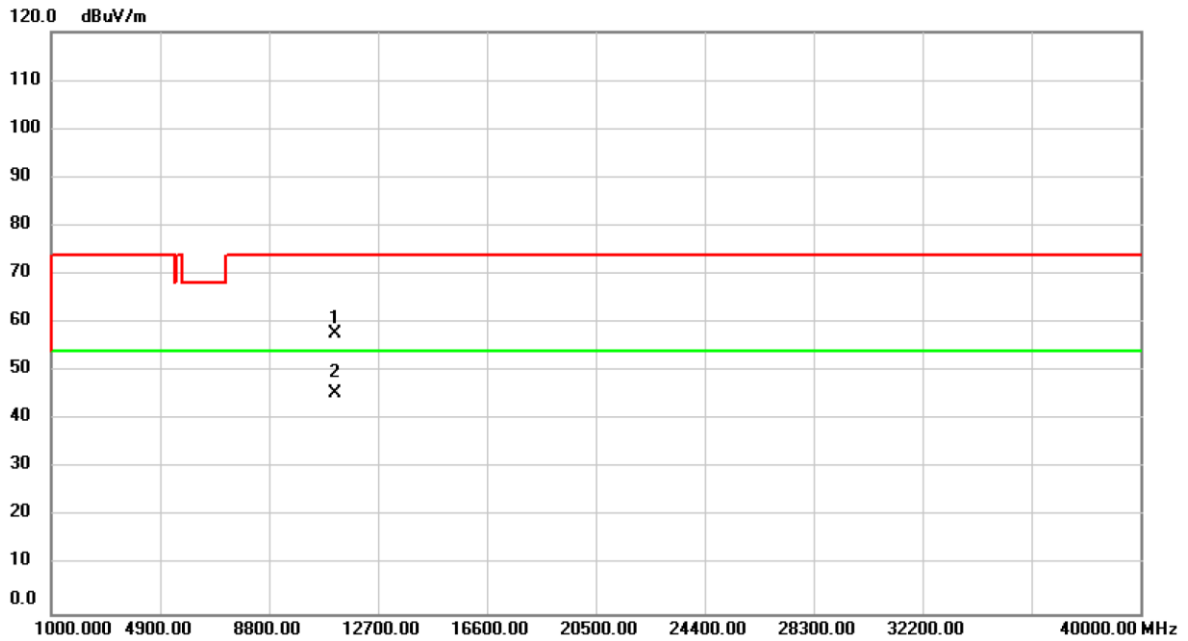
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		11160.00	54.96	3.03	57.99	74.00	-16.01	peak	
2	*	11160.00	41.37	3.03	44.40	54.00	-9.60	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.