CO-LOCATION TEST REPORT

For

Integrated video conference terminal

MODEL NUMBER: UC S10, MS10B, MS**, UC******

FCC ID: 2AFG6-MS10B

REPORT NUMBER: 4789822671.2-14

ISSUE DATE: April 08, 2021

Prepared for

Guangzhou Shirui Electronics Co Ltd
192 Kezhu Road, Scientech Park, guangzhou Economic Technology Development District Guangzhou China

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	04/08/2021	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Guangzhou Shirui Electronics Co Ltd
Address:	192 Kezhu Road, Scientech Park, guangzhou Economic Technology Development District Guangzhou China

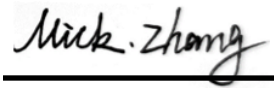
Manufacturer Information

Company Name:	Guangzhou Shirui Electronics Co Ltd
Address:	192 Kezhu Road, Scientech Park, guangzhou Economic Technology Development District Guangzhou China

EUT Information

EUT Name:	Integrated video conference terminal
Model:	UC S10
Series Model:	MS10B, MS****, UC****
Model difference:	There are no difference except the model name. (*=A-Z, a-z, 0-9 "-" or blank, no other difference but model number and color just for marketing purpose)
Sample Received Date:	February 7, 2021
Sample Status:	Normal
Sample ID:	3689328
Date of Tested:	February 7, 2021~ April 7, 2021

Prepared By:



Mick Zhang
Project Engineer

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo
Laboratory Manager

2. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules **ISED (Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction Emission	3.62dB
Radiated Emission (Included Fundamental Emission) (9kHz ~ 30MHz)	2.2dB
Radiated Emission (Included Fundamental Emission) (30MHz ~ 1GHz)	4.00dB
Radiated Emission (Included Fundamental Emission) (1GHz to 40GHz)	5.78dB (1GHz ~ 18GHz)
	5.23dB (18GHz ~ 26GHz)
	5.64dB (26GHz-40GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

EUT Name	Integrated video conference terminal
Model	UC S10
Series Model:	MS10B, MS****, UC****
Model difference:	There are no difference except the model name. (*=A-Z, a-z, 0-9 “-” or blank, no other difference but model number and color just for marketing purpose)

4.2. THE TEST CASE CONFIGURATIONS

Note: The EUT have two wireless modules, one is called module RTL8821CU-CG and the other one called module RTL8822CU-CG.

Simultaneously transmission condition.

Condition	Technology		Support (YES/NO)
1 (Module RTL8821CU-CG)	WLAN(2.4G)	WLAN(5G)	NO
2 (Module RTL8822CU-CG)	WLAN(2.4G)	WLAN(5G)	NO

Co-Location condition.

Condition	Technology (Module RTL8821CU-CG)	Technology (Module RTL8822CU-CG)	Support (YES/NO)
1	WLAN(2.4G)	WLAN (2.4G)	YES
2	WLAN(2.4G)	WLAN (5G)	YES
3	WLAN (5G)	WLAN (2.4G)	YES
4	WLAN (5G)	WLAN (5G)	YES

Note: All the Conditions have been tested, only the worst data for Condition 1 and Condition 4 was recorded in the report.

For the detailed test description, please refer to the below report number.

Wireless Module	Technology	Report Number
Module RTL8821CU-CG	WLAN (2.4G)	4789822671.2-8
	WLAN (5G)	4789822671.2-6
Module RTL8822CU-CG	WLANc (2.4G)	4789822671.2-9
	WLAN (5G)	4789822671.2-7

5. MEASURING INSTRUMENT AND SOFTWARE USED

Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Nov. 12, 2020	Nov. 11, 2021
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Aug. 11, 2018	Aug. 10, 2021
☑	Preamplifier	HP	8447D	2944A09099	Nov. 12, 2020	Nov. 11, 2021
☑	EMI Measurement Receiver	R&S	ESR26	101377	Nov. 12, 2020	Nov. 11, 2021
☑	Horn Antenna	TDK	HRN-0118	130939	Sept. 17, 2018	Sept. 17, 2021
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00067	Nov. 20, 2020	Nov. 19, 2021
☑	Horn Antenna	Schwarzbeck	BBHA9170	#691	Aug. 11, 2018	Aug. 11, 2021
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Nov. 12, 2020	Nov. 11, 2021
☑	Loop antenna	Schwarzbeck	1519B	00008	Jan.17, 2019	Jan.17,2022
☑	Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Nov. 12, 2020	Nov. 11, 2021
☑	Preamplifier	Mini-Circuits	ZX60-83LN-S+	SUP01201941	Nov. 20, 2020	Nov. 19, 2021
☑	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	Nov. 12, 2020	Nov. 11, 2021
☑	Band Reject Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	4	Nov. 12, 2020	Nov. 11, 2021
☑	Band Reject Filter	Wainwright	WRCJV20-5120-5150-5350-5380-60SS	2	Nov. 12, 2020	Nov. 11, 2021
☑	Highpass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	Nov. 12, 2020	Nov. 11, 2021
☑	High Pass Filter	Wi	WHKX10-2700-3000-18000-40SS	23	Nov. 12, 2020	Nov. 11, 2021
Software						
Used	Description		Manufacturer	Name		Version
☑	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1

6. RADIATED TEST RESULTS

LIMITS

Refer to CFR 47 FCC §15.205, §15.209 and §15.407 (b).

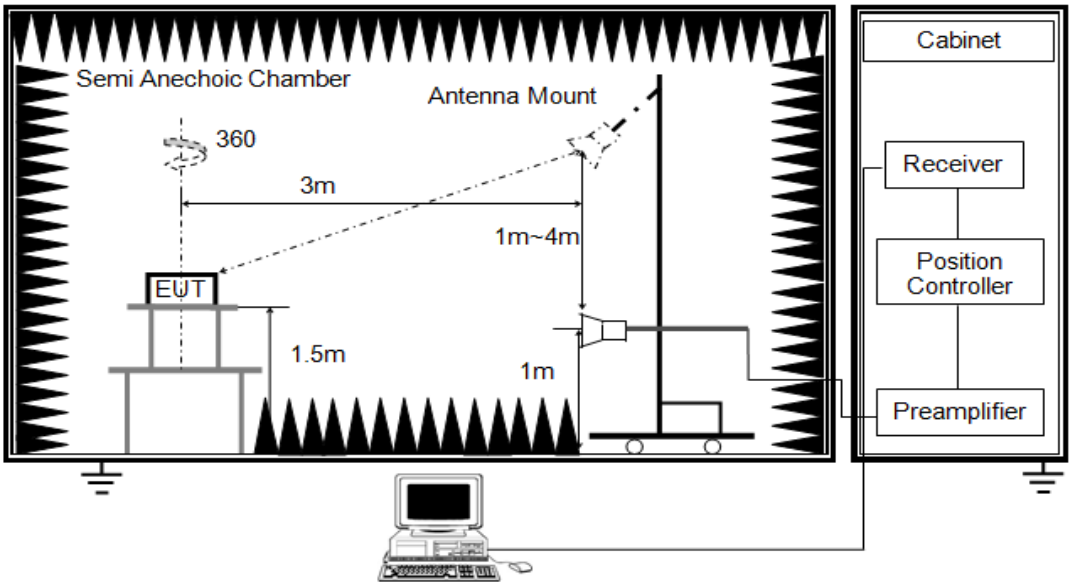
Refer to ISED RSS-GEN Clause 8.9, Clause 8.10 and ISED RSS-247 6.2.

Emissions radiated outside of the specified frequency bands above 30MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

Limits of unwanted/undesirable emission out of the restricted bands refer to CFR 47 FCC §15.407 (b) and ISED RSS-247 6.2.

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1GHz)		
Frequency Range (MHz)	EIRP Limit	Field Strength Limit (dBuV/m) at 3 m
5150~5250 MHz	PK: -27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz		
5470~5725 MHz		
5725~5850 MHz	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK: 105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK: 122.2 (dBµV/m) *4
Note: *1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

Above 1GHz



The setting of the spectrum analyser

RBW	1MHz
VBW	PEAK: 3MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 11.11 and 11.12.

2. The testing follows the guidelines in KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.G.3 ~ II.G.6.

2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements.

TEST ENVIRONMENT

Temperature	23.2 °C	Relative Humidity	56 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V/60 Hz

RESULTS

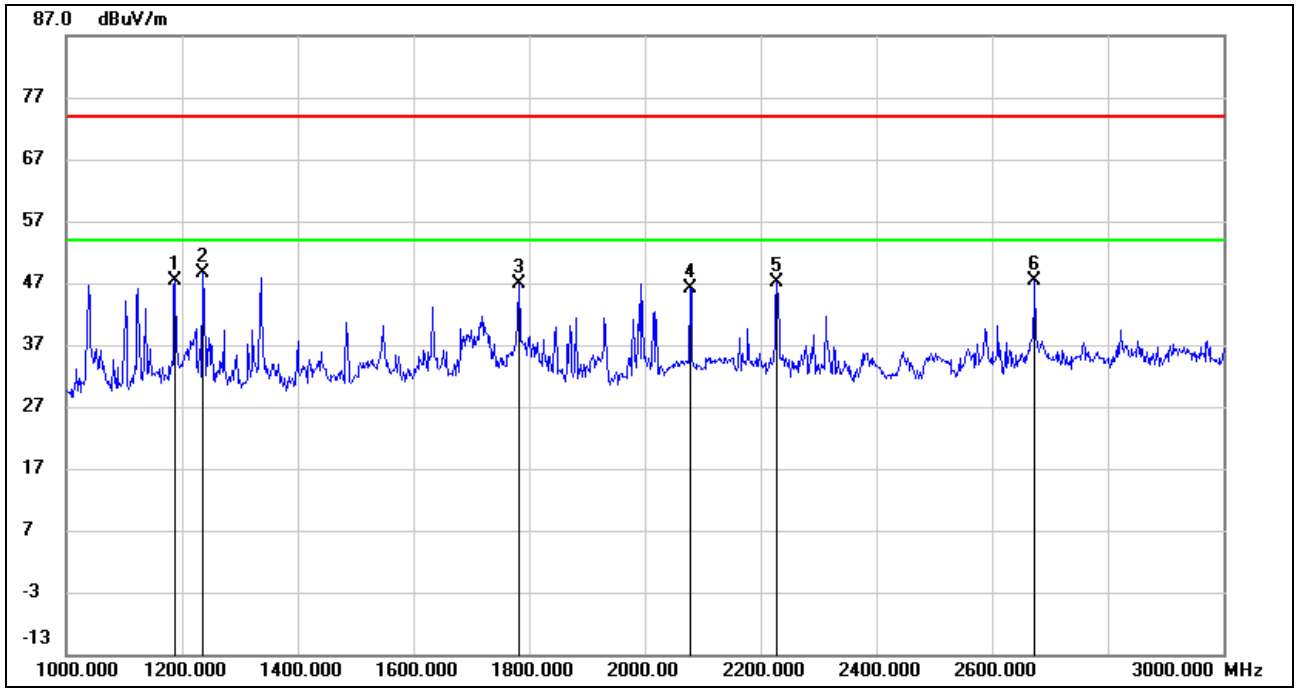
6.1. WORST-CASE CO-LOCATION

6.1.1. Condition 1

Module RTL8821CU-CG 802.11b SISO MODE & Module RTL8822CU-CG 802.11b SISO MODE

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

1-3GHz

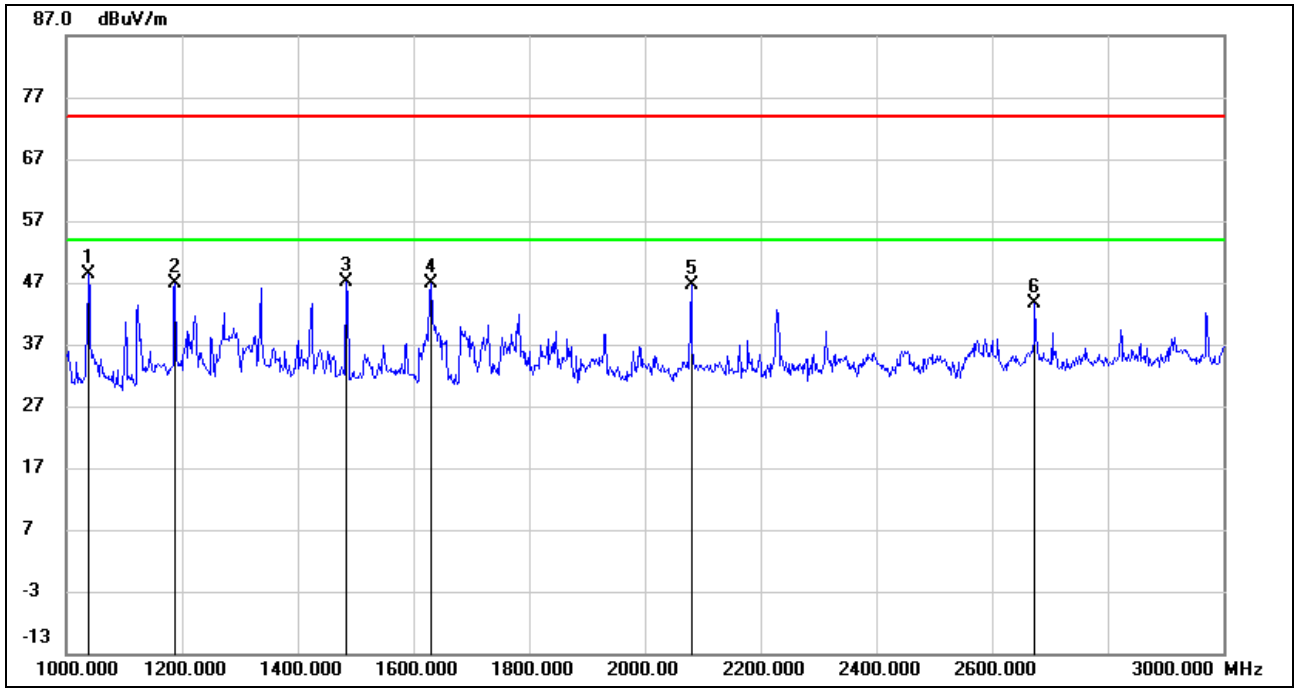


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1188.000	60.32	-13.05	47.27	74.00	-26.73	peak
2	1236.000	61.48	-12.95	48.53	74.00	-25.47	peak
3	1782.000	56.95	-10.18	46.77	74.00	-27.23	peak
4	2078.000	55.91	-9.75	46.16	74.00	-27.84	peak
5	2228.000	56.07	-8.96	47.11	74.00	-26.89	peak
6	2674.000	54.64	-7.37	47.27	74.00	-26.73	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

1-3GHz

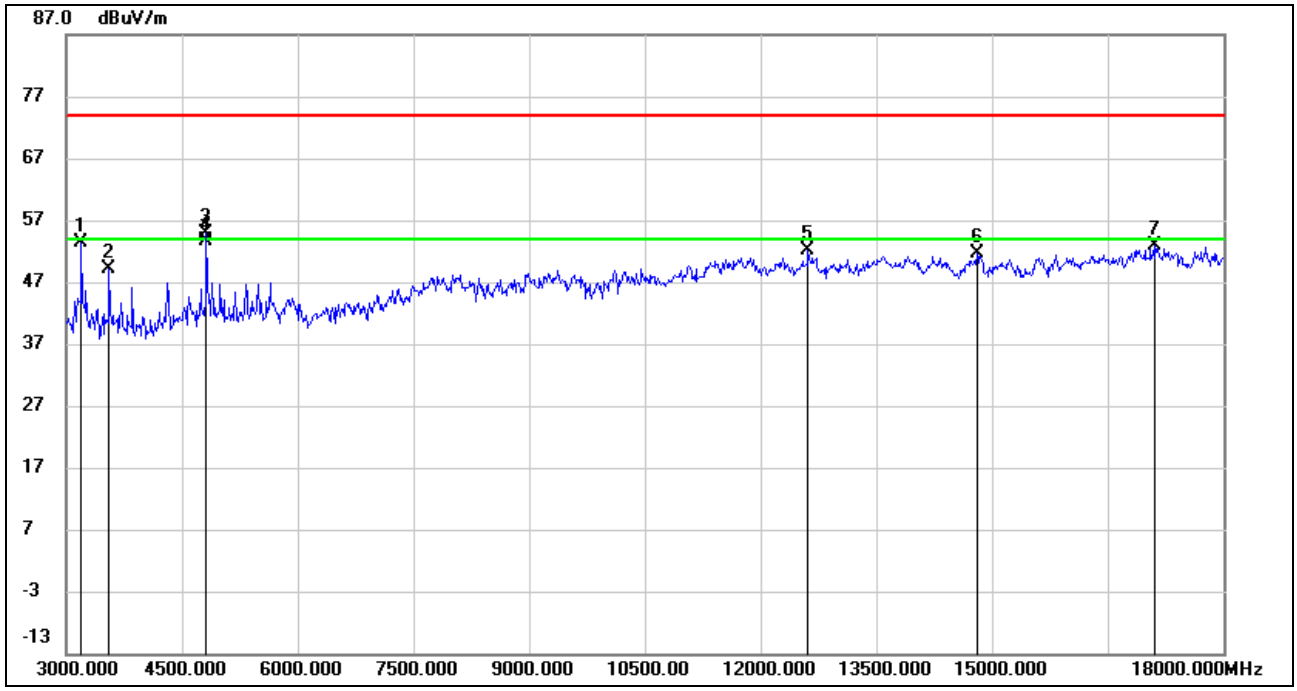


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1038.000	62.08	-13.79	48.29	74.00	-25.71	peak
2	1188.000	60.02	-13.05	46.97	74.00	-27.03	peak
3	1484.000	59.38	-12.31	47.07	74.00	-26.93	peak
4	1630.000	58.17	-11.33	46.84	74.00	-27.16	peak
5	2080.000	56.35	-9.73	46.62	74.00	-27.38	peak
6	2674.000	51.03	-7.37	43.66	74.00	-30.34	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

3-18GHz

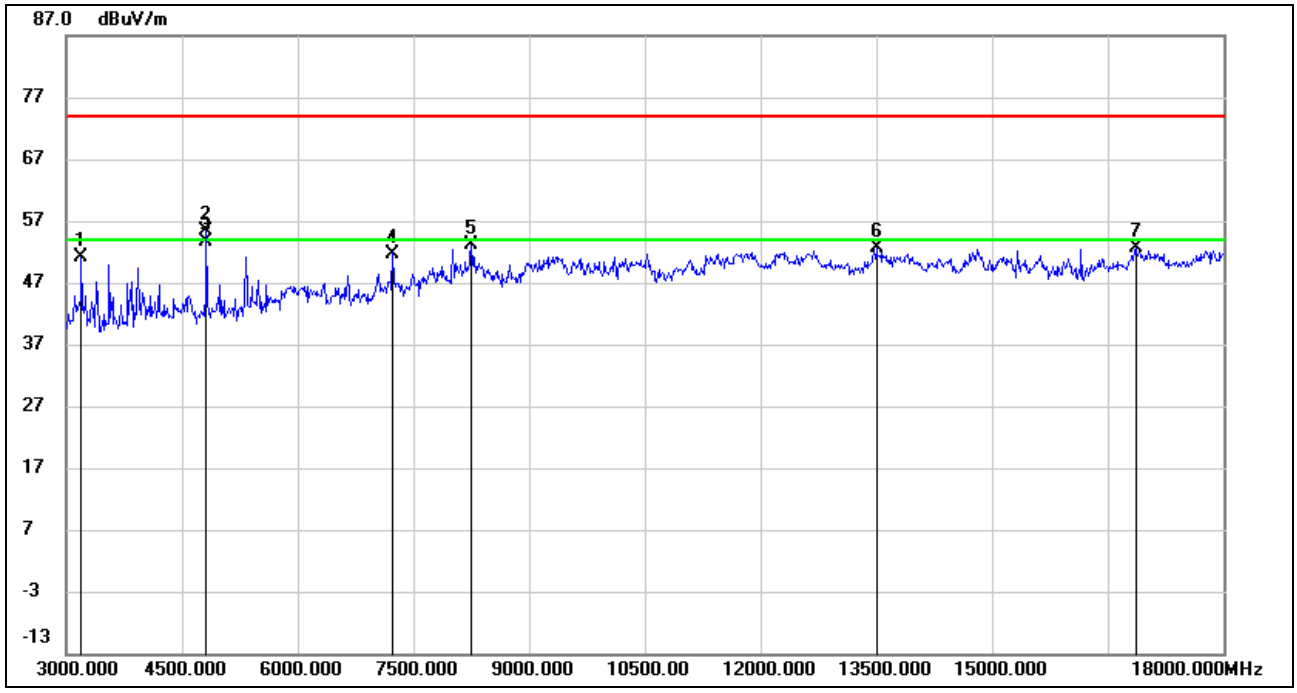


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3195.000	57.29	-3.91	53.38	74.00	-20.62	peak
2	3555.000	52.62	-3.46	49.16	74.00	-24.84	peak
3	4815.000	53.51	1.38	54.89	74.00	-19.11	peak
4	4815.000	52.18	1.38	53.56	54.00	-0.44	AVG
5	12615.000	36.33	15.75	52.08	74.00	-21.92	peak
6	14805.000	33.55	18.00	51.55	74.00	-22.45	peak
7	17100.000	30.99	21.90	52.89	74.00	-21.11	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

3-18GHz

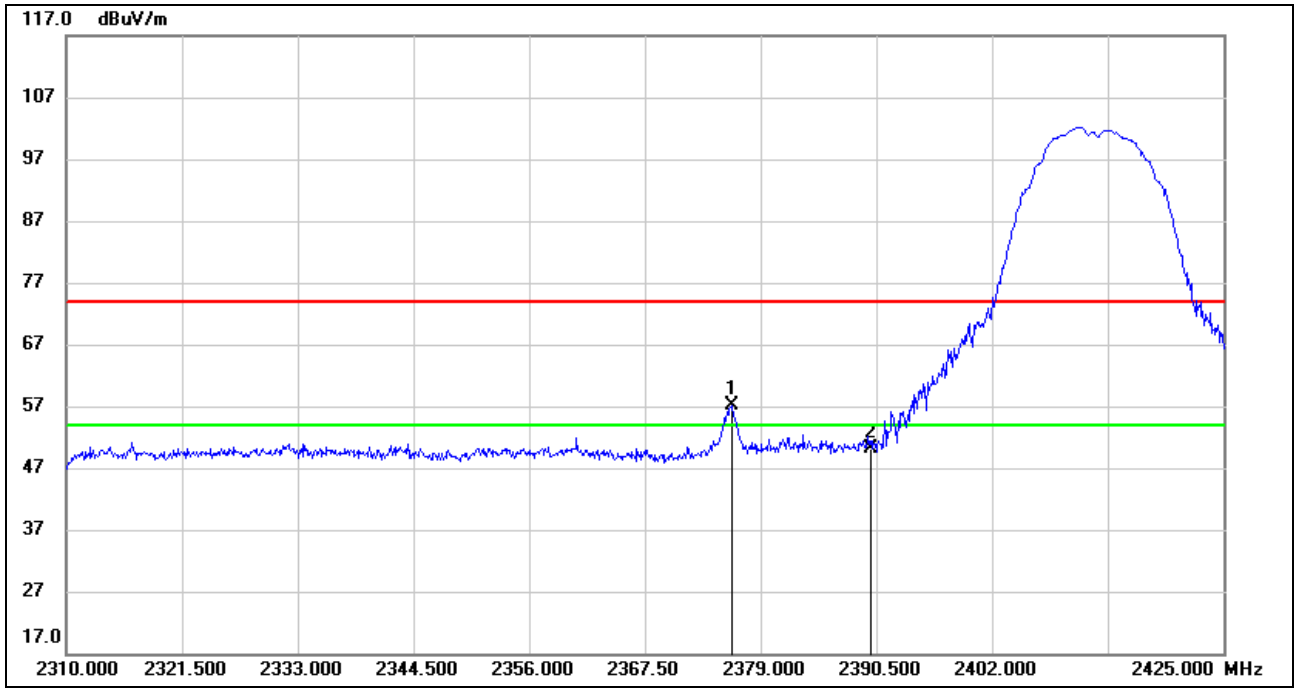


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3195.000	55.11	-3.91	51.20	74.00	-22.80	peak
2	4815.000	53.95	1.38	55.33	74.00	-18.67	peak
3	4815.000	52.30	1.38	53.68	54.00	-0.32	AVG
4	7230.000	44.47	7.28	51.75	74.00	-22.25	peak
5	8250.000	43.39	9.75	53.14	74.00	-20.86	peak
6	13500.000	35.33	17.22	52.55	74.00	-21.45	peak
7	16860.000	31.40	21.22	52.62	74.00	-21.38	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.1 of the main report.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

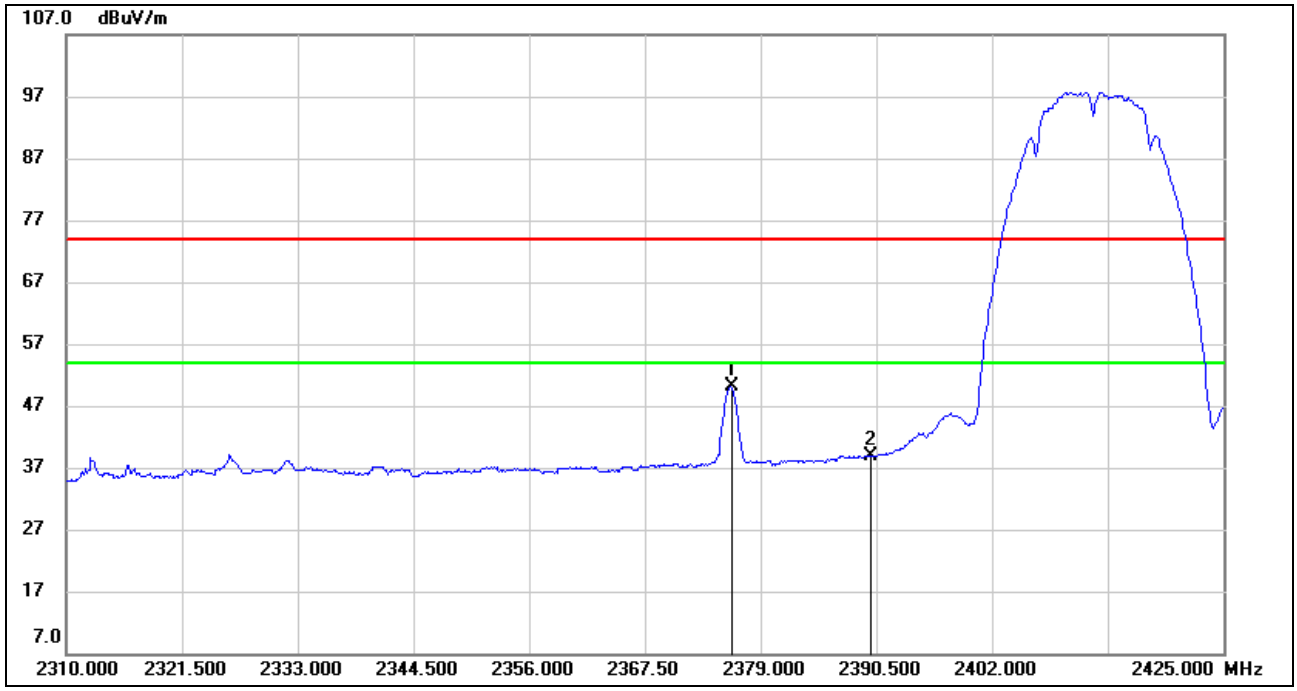
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2376.125	23.89	33.25	57.14	74.00	-16.86	peak
2	2390.000	16.68	33.35	50.03	74.00	-23.97	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

AVG



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2376.125	16.96	33.25	50.21	74.00	-23.79	peak
2	2390.000	5.44	33.35	38.79	74.00	-35.21	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. AVG: VBW=1/Ton, where: Ton is the transmitting duration.
4. For the transmitting duration, please refer to clause 7.1.
5. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

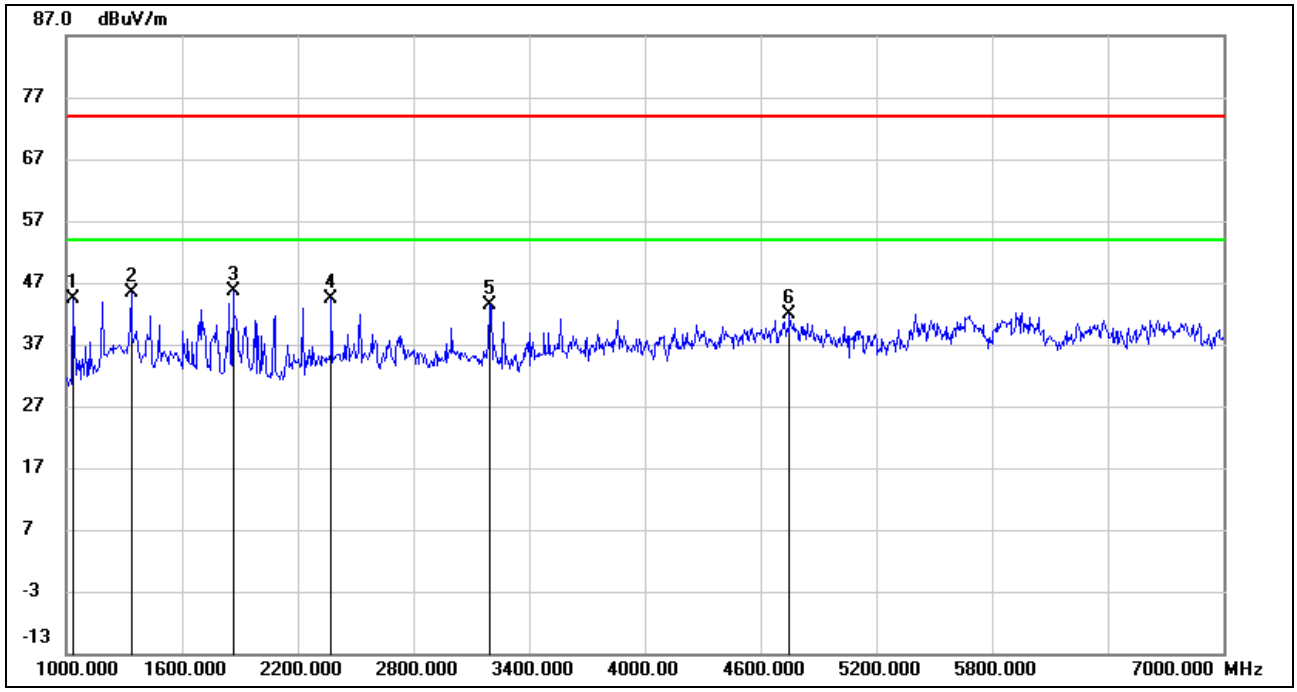
Note: All the test modes and combination have been considered. Only the worst data record in the report.

6.1.2. Condition 4

Module RTL8821CU-CG 802.11a SISO MODE & Module RTL8822CU-CG 802.11a SISO MODE

SPURIOUS EMISSIONS (UNII-1 LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

1-7GHz

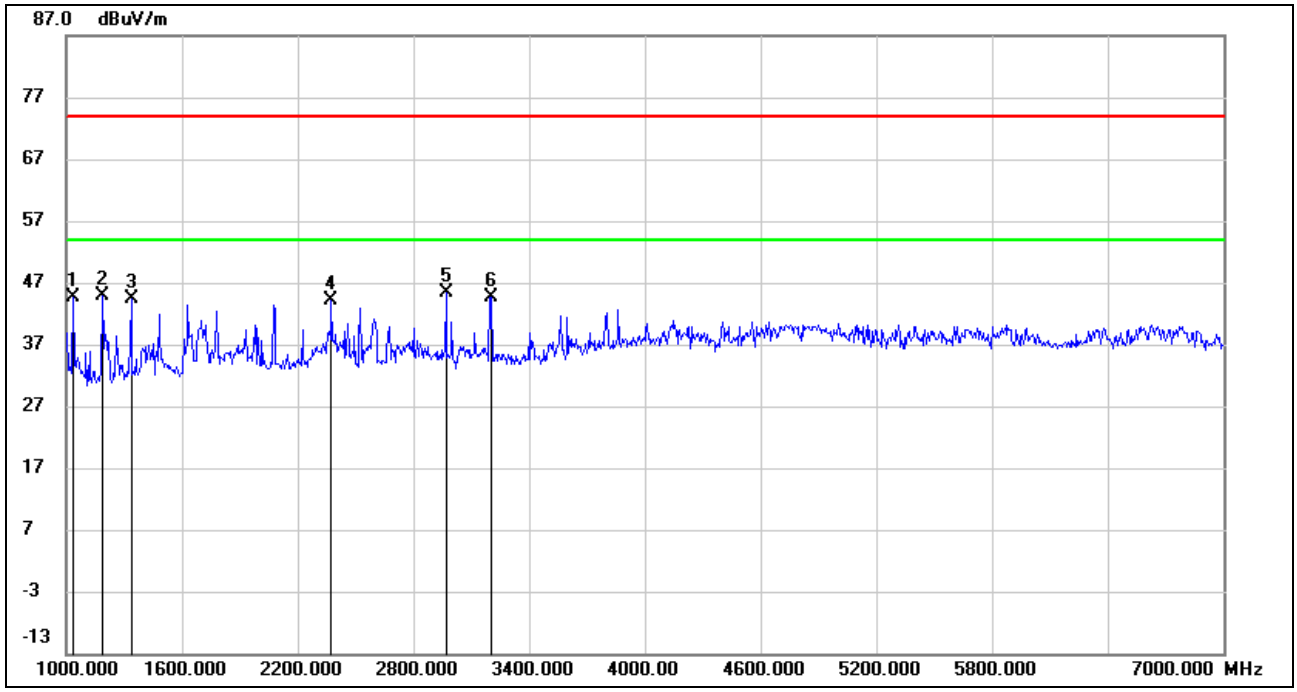


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1036.000	58.25	-13.81	44.44	74.00	-29.56	peak
2	1336.000	58.20	-12.80	45.40	74.00	-28.60	peak
3	1864.000	55.65	-10.10	45.55	74.00	-28.45	peak
4	2374.000	52.91	-8.48	44.43	74.00	-29.57	peak
5	3196.000	48.63	-5.25	43.38	74.00	-30.62	peak
6	4750.000	41.67	0.30	41.97	74.00	-32.03	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

SPURIOUS EMISSIONS (UNII-1 LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

1-7GHz

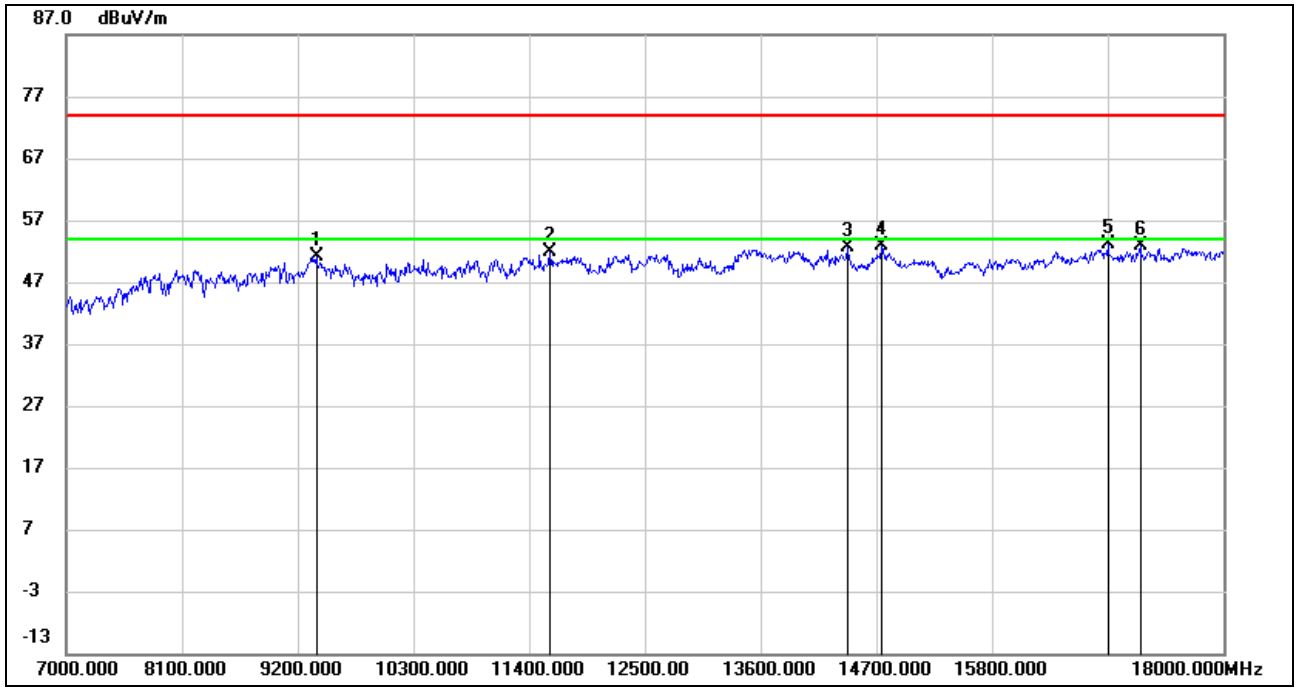


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1036.000	58.51	-13.81	44.70	74.00	-29.30	peak
2	1186.000	57.91	-13.07	44.84	74.00	-29.16	peak
3	1336.000	57.12	-12.80	44.32	74.00	-29.68	peak
4	2374.000	52.58	-8.48	44.10	74.00	-29.90	peak
5	2968.000	51.13	-5.75	45.38	74.00	-28.62	peak
6	3202.000	49.98	-5.25	44.73	74.00	-29.27	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

SPURIOUS EMISSIONS (UNII-1 LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

7-18GHz

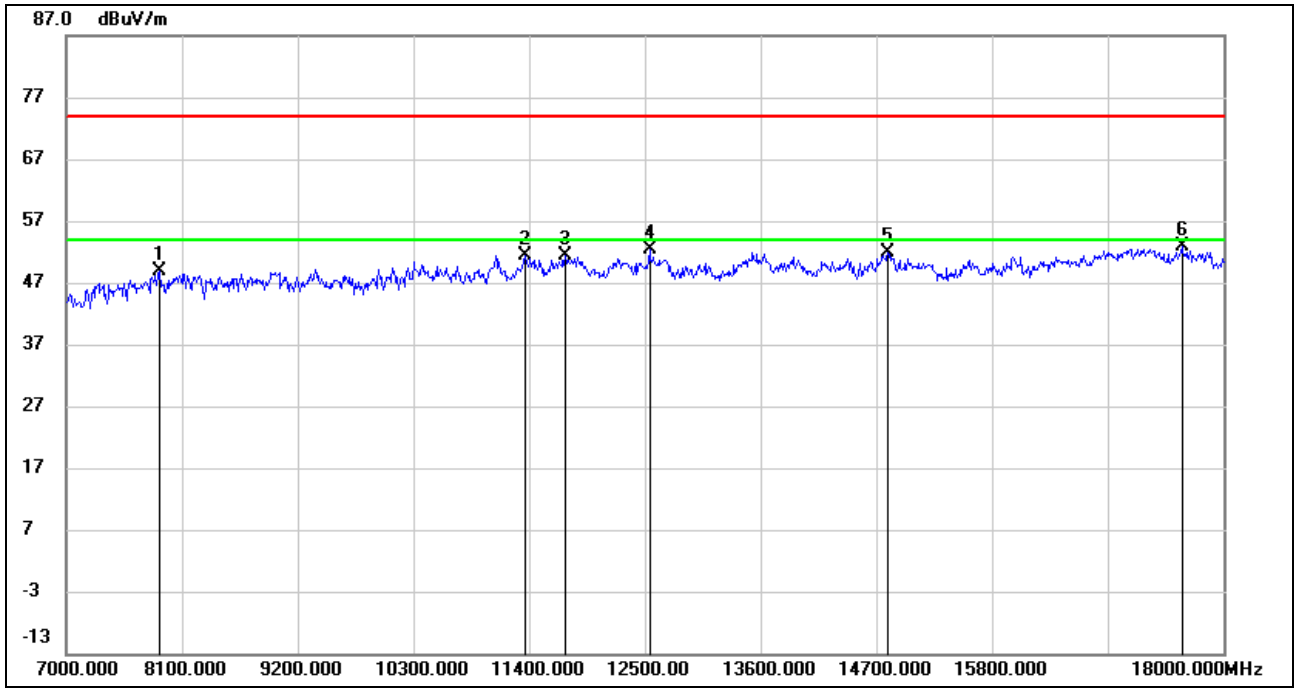


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9376.000	40.29	10.84	51.13	74.00	-22.87	peak
2	11598.000	37.23	14.72	51.95	74.00	-22.05	peak
3	14425.000	35.22	17.34	52.56	74.00	-21.44	peak
4	14755.000	34.99	17.88	52.87	74.00	-21.13	peak
5	16900.000	31.63	21.57	53.20	74.00	-20.80	peak
6	17208.000	30.75	22.04	52.79	74.00	-21.21	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

SPURIOUS EMISSIONS (UNII-1 LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

7-18GHz

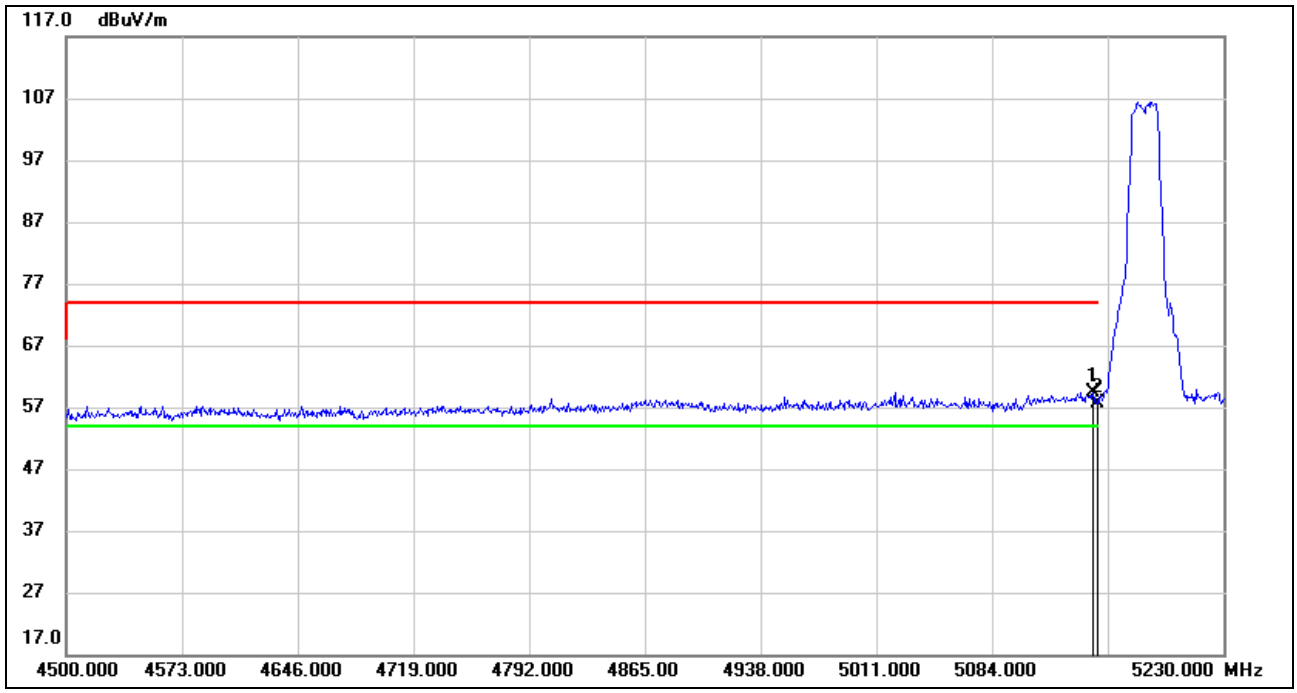


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7891.000	40.08	8.90	48.98	74.00	-25.02	peak
2	11356.000	37.10	14.35	51.45	74.00	-22.55	peak
3	11741.000	36.17	15.30	51.47	74.00	-22.53	peak
4	12544.000	36.63	15.72	52.35	74.00	-21.65	peak
5	14810.000	33.87	17.97	51.84	74.00	-22.16	peak
6	17604.000	30.08	22.76	52.84	74.00	-21.16	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

RESTRICTED BANDEDGE (UNII-1 LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

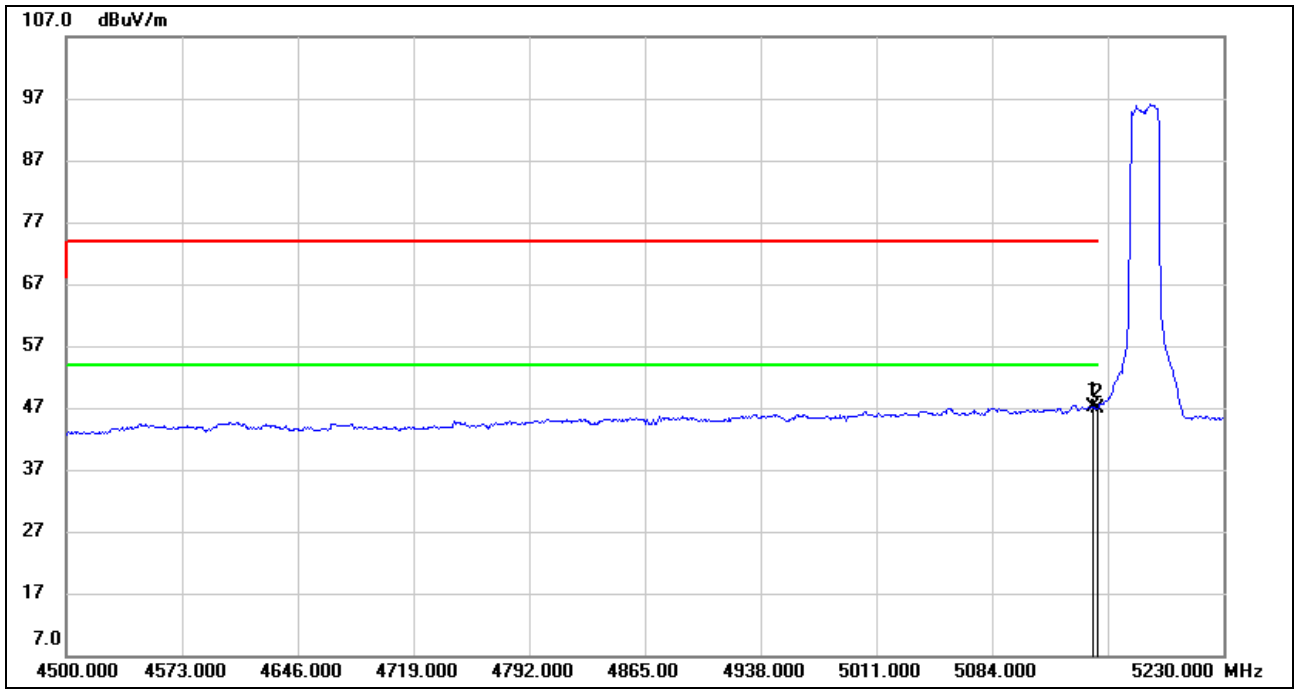
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5147.510	18.20	41.17	59.37	74.00	-14.63	peak
2	5150.000	16.53	41.19	57.72	74.00	-16.28	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

AVG



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5147.510	5.87	41.17	47.04	54.00	-6.96	AVG
2	5150.000	5.78	41.19	46.97	54.00	-7.03	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. AVG: VBW=1/Ton where: ton is transmit duration.
4. For transmit duration, please refer to clause 7.1 of the main report.
5. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Note: All the test modes and combination have been considered. Only the worst data record in the report.

END OF REPORT