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Project No.: 12CA66728
File No.: MC16901
Report No.: 12CA66728-2-FCC
Date: February 14, 2013
Model No.: 1417WGA
FCC ID.: QIIRY1417WGA
IC: 10742A-1417WGA

RF Test Report

in accordance with
FCC Part 15 Subpart C §15.247 and IC RSS-210 Issue 8

for

Medical Image Processing Unit
(Telemetry System Transmitter)

Rayence Co., Ltd
1F, 2F, 3F, #402, 14, Samsung 1ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea

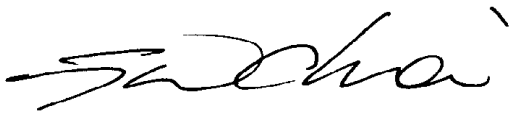
Summary of Test Results:

The following tests were performed on a sample submitted for evaluation of compliance with FCC Part 15 C Section 15.247 and IC RSS-210 Issue 8				
No	Reference Clause No.	FCC Part15 Subpart C Conformance Requirements	Result Verdict	Remark
1	15.205(a)	Restricted bands of operation	Complied	-
2	15.209(a)	Radiated emission limits, general requirements	Complied	-
3	15.247(a)(2)	6 dB Bandwidth	N/T	*Note [2]
4	15.247(b)(3)	Maximum peak output power	N/T	*Note [2]
5	15.247(d)	Transmitter radiated spurious emissions (Band edge)	Complied	-
6	15.247(b)(3)	Maximum peak output power	N/T	*Note [2]
7	15.207	Transmitter AC power line conducted emission	N/T	*Note [3]
8	1.1307(b)(1)	Maximum Permissible Exposure (Exposure of Humans to RF Fields)	N/A	-
*Note [1]: N/T=Not Tested, N/A=Not Applicable *Note [2]: Test was performed by modular transmitter (FCC ID: PPD-AR5BHB116, Test Report no. FR080603A issued on Sep.16,2010 by Sporton International Inc.) *Note [3]: The EUT is battery operating only.				

Conclusion:

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

Witnessed By:
Sung Hoon Baek, Senior Project Engineer
UL Verification Services- 3014ASEO
UL Korea Ltd.
February 14, 2013



Reviewed by
Jeawoon Choi, WiSE Engineering Leader
UL Verification Services – 3014ASEO
UL Korea Ltd.
February 14, 2013

Test Report Details

Witnessed By:	UL Korea Ltd. 33rd FL. GFC Center, 737 Yeoksam-dong, Gangnam-gu, Seoul, 135-984, Korea
Test Site:	CTK Co., Ltd. 386-1, Ho-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, Korea The test facility was deemed to have the environment and capabilities necessary to perform the tests included in the test package.
Applicant:	Rayence Co., Ltd 1F, 2F, 3F, #402, 14, Samsung 1ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea
Manufacturer:	Rayence Co., Ltd 1F, 2F, 3F, #402, 14, Samsung 1ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea
Applicant Contact:	Keedock, Kim
Title:	Quality Manager
Phone:	82.31.80156459
E-mail:	Kevin.kim@rayence.com
Product Type:	Medical Image Processing Unit (Telemetry System Transmitter)
Model Number:	1417WGA
Multiple Model Name	N/A
Trademark	RAYENCE
Test standards:	FCC Part 15 C Section 15.247 and IC RSS-210 Issue 8
Sample Serial Number:	N/A
Sample Receive Date:	January 7, 2012
Testing Start Date:	January 7, 2012
Date Testing Complete:	February 14, 2013
Overall Results:	**Pass**

UL Korea Ltd. reports apply only to the specific test samples and test results submitted for UL's review. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or any agency of the National Authorities. This report may contain test results that are not covered by the NVLAP or KOLAS accreditation.

Report Directory

1. General Product Information

1.1. Equipment Description:

1417WGA is the module that integrates Wireless LAN (WLAN). This embedded module is optimized for WLAN enabled handheld mobile device.

1.2. Details of Test Equipment (EUT):

- Equipment Type : Medical Image Processing Unit
  - Model No. : 1417WGA
- Trade name : N/A
- Type of test Equipment : Portable type
- Operating characteristic : Short range wireless device operating in the 2412 – 2462 MHz ISM frequency band
- Manufacturer : Rayence Co., Ltd
  1F, 2F, 3F, #402, 14, Samsung 1ro 1-gil, Hwaseong-si, Gyeonggi-do, 445-170, Korea

1.3. Equipment Configuration:

The EUT is consisted of the following component provided by the manufacturer.

Use*	Product Type	Manufacturer	Model	Comments
EUT	Medical Image Processing Unit (Telemetry System Transmitter)	Rayence Co., Ltd	1417WGA	-
EUT	Battery Pack	NPTECH CO.,LTD	RB37WH	
Note: Use = EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment. SIM - Simulator (Not Subjected to Test)				

1.4. Technical Data:

Item	1417WGA
Chipset	AR5BHB116 / Manufacturer : ATHERO
Module	WPEA-121N/W (FCC ID : PPD-AR5BHB116) Manufacturer: ANATEL
IEEE Standard	802.11a 802.11g 802.11n (2TX/2RX Bandwidth in 2.4GHz, 5GHz)
Security	WPA Personal
*Note: All the technical data described above were provided by the manufacturer.	

1.5. Antenna Information:

Model	AEi-2450/5500DP-C1.13 [Rayence]
(MHz)	2.4~2.5GHz / 5.2~5.8GHGz
V.S.W.R	LESS THAN 1 : 5.0
GAIN(dBi) - 2.4GHz	2.8dBi (MIMO Gain : 2.8+10log[2] = 5.81dBi)
GAIN(dBi) - 5.8GHz	3.66dBi (MIMO Gain : 3.66+10log[2] = 6.67dBi)
Radiation Pattern	OMNI-DIRECTIONAL
POLARIZATION	VERTICAL

1.6. Equipment Type:

☒ Radio and ancillary equipment for fixed or semi-fixed use
☐ Radio and ancillary equipment for vehicular mounted use
☐ Radio and ancillary equipment for portable or handheld use

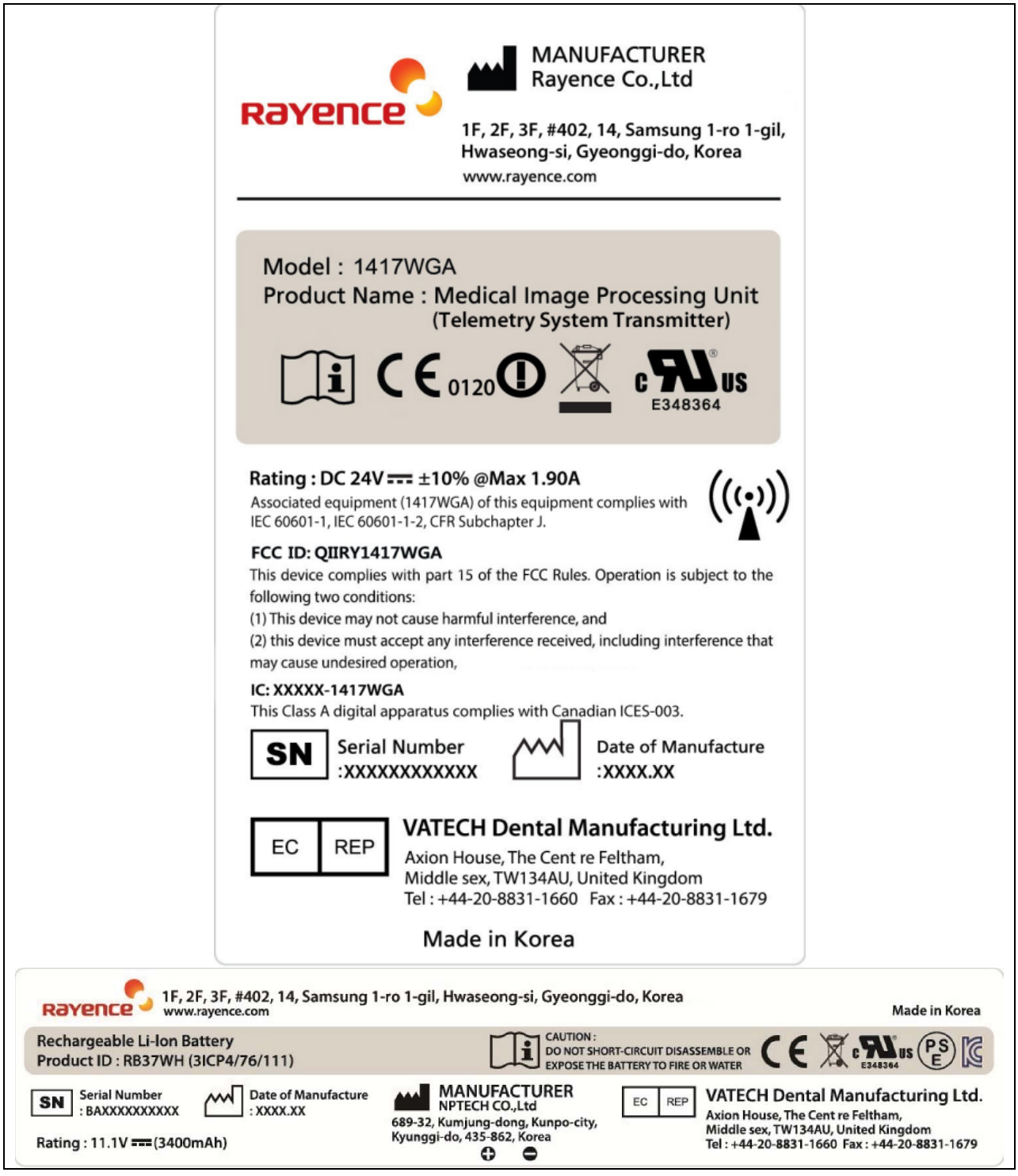
☒ Stand alone ☐ Host connected

☐ Self contained single unit ☒ Module with associated connection or interface

1.7. Technical description and documents:

No.	Document Title and Description
1	User Manual
2	Product Specification for Antenna / RODEM MICROSYSTEM CO., LTD.
*****Note: The following documents were provided by the manufacturer.	

1.8. Equipment Marking Plate



1.9. Description of additional model name

Model name	Model name Designation	Description of design
N/A	N/A	N/A

2. Test Specification

The following test specifications and standards have been applied and used for testing.

1) FCC Part 15 C Section 15.247

2) ANSI C63.10:2009

3. Test Conditions

3.1. Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	Medical Image Processing Unit (Telemetry System Transmitter)	Rayence Co., Ltd	1417WGA	-
EUT	Battery Pack	NPTECH CO.,LTD	RB37WH	-
Note: Use = EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment. SIM - Simulator (Not Subjected to Test)				

3.2. Input/ Output Ports

No	Port Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
1	Power Input	DC	N	N	Connected to Battery

Note:
*AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

3.3. Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	11.1V	720mA	-	DC	-	-

3.4. Operating Frequencies

Mode #	Frequency tested
1	Operating frequency range: 2 412 ㎒ ~ 2 462 ㎒ (11g & n_HT20) 3 channels in the Transmitter modes of 11g/n-HT20 are tested. - Low : 2412 MHz - Mid : 2437 MHz - Top : 2462 MHz Operating frequency range: 5 745 ㎒ ~ 5 825 ㎒ (11a & n_HT20) 3 channels in the Transmitter modes of 11g/n-HT20 are tested. - Low : 5745 MHz - Mid : 5785 MHz - Top : 5825 MHz
2	Operating frequency range: 2 422 ㎒ ~ 2 452 ㎒ (11n_HT40) 3 channels in the Transmitter modes of 11n-HT40 are tested. - Low : 2422 MHz - Mid : 2437 MHz - Top : 2452 MHz Operating frequency range: 5 755 ㎒ ~ 5 795 ㎒ (11n_HT40) 2channels in the Transmitter modes of 11n-HT40 are tested. - Low : 5755 MHz - Top : 5795 MHz

3.5. Operation Modes

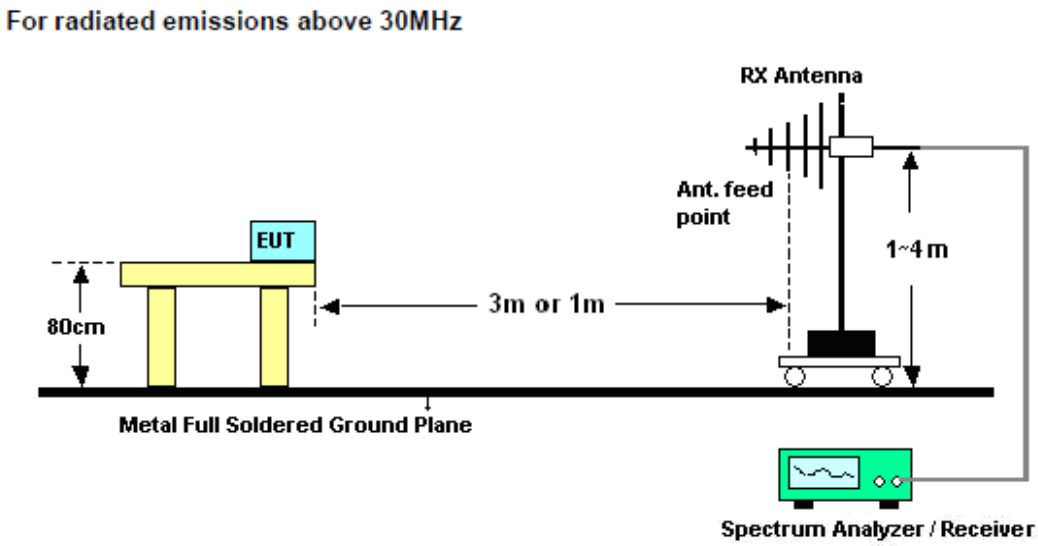
Mode #	Description
1	Carrier on mode: Signal from the RF module was generated continuously for the representative channels (Low, Mid, High) by the test program incorporated.
2	Carrier off (Idle) mode: RF carrier was not activated by the RF module.

***Note:**

1. The worst-case condition is determined by the baseline measurement of RF output power of the modular transmitter test report. The worst-case channel was determined as the channel with highest output power.
   - 802.11g mode, 20MHz Channel Bandwidth, 9 Mb/s, OFDM Modulation
   - 802.11a mode, 20MHz Channel Bandwidth, 9 Mb/s, OFDM Modulation
   - 802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS0,6.5 Mb/s, OFDM Modulation
   - 802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS0,13.5 Mb/s, OFDM Modulation

2. Output power from the device during the radiated spurious measurements are within expected tolerance of the module test results to justify using the original conducted antenna port measurements for the module(average power).

3.6. Test Configurations

Mode #	Description
1	

3.7. List of Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2013-11-08
2	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2013-12-13
3	Trilog Broadband Antenna	SCHWARZBECK	VULB 9161 SE	9161-4133	2014-06-11
4	6dB Attenuator	R&S	DNF	272.4110.50	2013-11-09
5	AMPLIFIER	Sonoma Instrument Co.	310	291721	2013-03-27
6	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2013-06-29
7	Horn Antenna	ETS-Lindgren	3115	00078894	2013-03-22
8	Horn Antenna	ETS-Lindgren	3115	00078895	2013-03-22
9	PREAMPLIFIER	Agilent	8449B	3008A02307	2013-11-09
10	SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2013-11-08
11	Horn Antenna	ETS-Lindgren	3116	00062916	2013-03-22
12	Horn Antenna	ETS-Lindgren	3116	00062504	2013-03-22
13	Signal Generator	Rohde & Schwarz	SMB100A	175528	2013-10-08

4. Overview of Technical requirements

No	Reference Clause No.	FCC Part15 Subpart C Conformance Requirements	Reported
1	15.205(a)	Restricted bands of operation	[X]
2	15.209(a)	Radiated emission limits, general requirements	[X]
3	15.247(d)	Transmitter radiated spurious emissions	[X]
4	15.207	Transmitter AC power line conducted emission	[X]
5	1.1307(b)(1)	Maximum Permissible Exposure (Exposure of Humans to RF Fields)	Replaced by modular report
6	15.203	Antenna Requirement	[X]

Note 1: The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 MHz (ANSI C63.10:2009), the guidance provided in KDB 558074 and KDB 662911 were used in the measurement of the DUT.

Note 2: This device use already certified module so that the below specified test items are not tested in the end product evaluation. (TX Module FCC ID : PPD-AR5BHB116, Test Report no. FR080603A issued on Sep.16,2010 by Sporton International Inc.)
-. 6dB bandwidth
-. Tx Output Power
-. Band edge
-. Tx Spectral Power Density

4.1. Antenna Requirement

4.1.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section § 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.

4.1.2. Antenna Connected Construction

The antenna used of this product is dipole Antenna Assembly and peak max gain of each antennas as below. Antenna is permanently installed in the end product enclosure and no user exchange is allowed.

Band	2.4~2.5GHz	5.2~5.8GHGz
Antenna Gain (dBi)	-9.8dBi (MIMO Total Antenna Gain = 2.27 dBi).	-3.35dBi (MIMO Total Antenna Gain = 3.17 dBi)

5. Test Results

5.1. Transmitter radiated spurious emissions

TEST: Transmitter radiated spurious emissions		
Method	Radiated emissions from the EUT were measured according to ANSI C63.10:2009 procedure. 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation. The antenna is is varied from 1 to 4 meters above the ground to find the maximum field strength. Measurement are made with both horizontal and vertical polarizations For dundamental investigation, the EUT was positioned for 3 orthogonal orientations. 2. For measurement below 1GHz, the resolution bandwidth is set to 100 kHz for peak detection or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak. 3. For measurement above 1GHz, the resolution bandwidth is set to 1 MHz and video bandwidth is set to 1 MHz for peak measurement and 10 Hz for average measurement. 4. For 2.4GHz transmitter measurement, the spectrum from 30 MHz to 26GHz is investigated for Low, Mid and High channels. For 5 GHz transmitter measurement, the spectrum from 30 MHz to 40GHz is investigated for Low, Mid and High channels.	
Supplementary information: Radiated emission which fall in the restricted bands must also comply with FCC section 15.209.		
Reference Clause	Part15 C Section 15.247 (d)	
Parameters recorded during the test	Laboratory Ambient Temperature	24 °C
	Relative Humidity	40 %
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz to 10th harmonics	Enclosure Port (3 meter distance)

Configuration Settings

Test Item	Power Interface Mode # (See Section 3.3)	Test Configurations Mode # (See Section 3.6)	EUT Operation Mode # (See 3.5)
Radiated Spurious emission	1	1	1
Conducted Spurious emission	N/A	N/A	N/A
Supplementary information: None			

Limits

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval , as permitted under paragraph(b)(3) of this section , the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.209(a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Distance (meters)	Field Strength (dBuV/m)	Field Strength (uV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

5.1.1. Radiated Spurious Emissions for Below 1 GHz

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Continuous Wave

Table 1. Test data for Radiated emission for Below 1 GHz_2.4GHz

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	31.576	H	41.6	-14.8	26.8	40.0	13.2	400.0	296.0
2	64.314	V	39.1	-14.0	25.1	40.0	14.9	400.0	231.0
3	81.410	V	44.0	-17.8	26.2	40.0	13.8	400.0	231.0
4	162.526	H	33.9	-5.2	28.7	43.5	14.8	400.0	0.0
5	866.383	H	36.8	2.8	39.6	46.0	6.4	100.0	268.0
6	866.383	V	33.3	2.8	36.1	46.0	9.9	100.0	0.0
7	874.627	H	30.2	2.9	33.1	46.0	12.9	100.0	268.0
8	875.112	V	28.9	2.9	31.8	46.0	14.2	100.0	0.0

Table 2. Test data for Radiated emission for Below 1 GHz_5 GHz

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	733.008	V	32.6	0.3	32.9	46.0	13.1	100.0	183.0
2	866.383	H	34.2	2.8	37.0	46.0	9.0	100.0	118.0
3	866.383	V	33.4	2.8	36.2	46.0	9.8	100.0	70.0
4	874.627	H	28.3	2.9	31.2	46.0	14.8	100.0	80.0
5	874.627	V	27.9	2.9	30.8	46.0	15.2	100.0	70.0
6	924.704	V	26.8	4.4	31.2	46.0	14.8	100.0	70.0
7	932.949	V	28.3	4.6	32.9	46.0	13.1	100.0	0.0
8	932.949	H	26.7	4.6	31.3	46.0	14.7	305.0	253.0

Supplementary information:
-. The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB. All reading values are peak values.

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

5.1.2. Radiated Spurious Emissions for Above 1 GHz

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Continuous Wave
Power setting : Max. Power condition declared by the manufacturer

802.11g

Table 3. Low Channel (2412 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1826.92	37.74	47.74	V	27.4	-23.69	54.00	74.00	41.49	51.49	12.51	22.51
2500.00	34.95	48.14	V	28.8	-22.14	54.00	74.00	41.59	54.78	12.42	19.23

Table 4. Middle Channel (2437 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1173.07	34.50	51.46	V	24.21	-26.32	54.00	74.00	32.39	49.35	21.61	24.65
1467.94	33.17	49.10	V	25.59	-25.20	54.00	74.00	33.56	49.49	20.44	24.51

Table 5. High Channel (2462 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1826.92	37.18	49.28	V	27.44	-23.69	54.00	74.00	40.93	53.03	13.07	20.97
4929.48	25.95	41.25	V	32.95	-18.95	54.00	74.00	39.95	55.25	14.05	18.75

802.11n_HT20_2.4GHz

Table 6. Low Channel (2412 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1474.35	33.70	50.21	V	25.59	-25.20	54.00	74.00	34.09	50.60	19.91	23.40
1826.92	34.81	48.71	V	27.44	-23.69	54.00	74.00	38.56	52.46	15.44	21.54

Table 7. Middle Channel (2437 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1461.53	33.73	50.48	V	25.59	-25.20	54.00	74.00	34.12	50.87	19.88	23.13
1826.92	37.98	49.02	V	27.44	-23.69	54.00	74.00	41.73	52.77	12.27	21.23

Table 8. High Channel (2462 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1826.92	36.98	48.40	V	27.44	-23.69	54.00	74.00	40.73	52.15	13.27	21.85
4929.48	27.86	41.15	V	32.95	-18.95	54.00	74.00	41.86	55.15	12.14	18.85

802.11n_HT40_2.4GHz

Table 9. Low Channel (2422 MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
1455.12	33.88	49.23	V	25.59	-25.20	54.00	74.00	34.27	49.62	19.73	24.38
1826.92	36.05	49.34	V	27.44	-23.69	54.00	74.00	39.80	53.09	14.20	20.91

Table 10. Middle Channel (2437 MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
1179.48	33.06	49.41	V	24.21	-26.32	54.00	74.00	30.95	47.30	23.05	26.70
1467.94	33.49	49.95	V	25.59	-25.20	54.00	74.00	33.88	50.34	20.12	23.66

Table 11. High Channel (2452 MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
1076.92	33.58	50.44	V	23.75	-26.81	54.00	74.00	30.52	47.38	23.48	26.62
1185.89	33.46	50.25	V	24.21	-26.32	54.00	74.00	31.35	48.14	22.65	25.86

802.11a

Table 12. Low Channel (5745 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1163.46	31.55	49.41	V	24.21	-26.32	54.00	74.00	29.44	47.30	24.56	26.70
11461.53	19.39	32.59	V	38.65	-12.62	54.00	74.00	45.42	58.62	8.58	15.38

Table 13. Middle Channel (5785 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1435.89	31.97	49.47	V	25.59	-25.20	54.00	74.00	32.36	49.86	21.64	24.14
11570.51	20.79	37.52	V	38.63	-12.63	54.00	74.00	46.79	63.52	7.21	10.48

Table 14. High Channel (5805 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1463.14	31.92	48.72	V	25.59	-25.20	54.00	74.00	32.31	49.11	21.69	24.89
11625.00	20.56	33.95	V	38.62	-12.21	54.00	74.00	46.97	60.36	7.03	13.64

802.11n_HT20_5GHz

Table 15. Low Channel (5745 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1463.14	32.08	50.11	V	25.59	-25.20	54.00	74.00	32.47	50.50	21.53	23.50
11488.78	19.23	34.72	V	38.65	-12.62	54.00	74.00	45.26	60.75	8.74	13.25

Table 16. Middle Channel (5785 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1054.48	32.37	49.65	V	23.75	-26.81	54.00	74.00	29.31	46.59	24.69	27.41
11570.51	20.68	33.66	V	38.63	-12.63	54.00	74.00	46.68	59.66	7.32	14.34

Table 17. High Channel (5805 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1054.48	32.00	50.87	V	23.75	-26.81	54.00	74.00	28.94	47.81	25.06	26.19
11597.75	19.82	35.62	V	38.63	-12.63	54.00	74.00	45.82	61.62	8.18	12.38

802.11n_HT40_5GHz

Table 18. Low Channel (5755 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Ant	CL+Amp						
1054.48	32.08	50.29	V	23.75	-26.81	54.00	74.00	29.02	47.23	24.98	26.77
11488.79	20.97	33.04	V	38.65	-12.62	54.00	74.00	47.00	59.07	7.00	14.93

Table 19. Middle Channel (5795 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Ant	CL+Amp						
1163.46	31.91	50.40	V	24.21	-26.32	54.00	74.00	29.80	48.29	24.20	25.71
11597.75	20.14	33.05	V	38.63	-12.63	54.00	74.00	46.14	59.05	7.86	14.95

5.1.3. Radiated Restricted Band Edge Measurements

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Continuous Wave

Table 20. Measurement for restricted band of 11g
Measured frequency range: 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2389.61	40.37	51.55	V	28.61	-22.40	54.00	74.00	46.58	57.76	7.42	16.24
2484.29	39.19	50.92	V	28.69	-22.38	54.00	74.00	45.50	57.23	8.50	16.77

Table 21. Measurement for restricted band of 11n (HT20_2.4GHz)
Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2389.61	36.40	44.58	V	28.61	-22.40	54.00	74.00	42.61	50.79	11.39	23.21
2489.92	37.32	45.32	V	28.69	-22.38	54.00	74.00	43.63	51.63	10.37	22.37

Table 22. Measurement for restricted band of 11n (HT40_2.4GHz)
Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor [dB] Ant	Correction Factor [dB] CL+Amp	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2387.56	44.61	52.35	V	28.61	-22.40	54.00	74.00	50.82	58.56	3.18	15.44
2483.52	41.47	49.14	V	28.69	-22.38	54.00	74.00	47.78	55.45	6.22	18.55

Measurement for restricted band of 802.11a
Measured frequency range : 4500-5150 MHz, 5350-5460 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 23. Measurement for restricted band of 802.11a_HT20_5GHz
Measured frequency range : 4500-5150 MHz, 5350-5460 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 24. Measurement for restricted band of 802.11a_HT40_5GHz
Measured frequency range : 4500-5150 MHz, 5350-5460 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

5.14 Receiving mode Radiated Spurious Emissions for Below 1 GHz

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Receiving mode

Table 25. Test data for Radiated emission for Below 1 GHz_2.4GHz

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	162.526	V	32.6	-5.2	27.4	43.5	16.1	100.0	221.0
2	574.776	V	32.7	-2.8	29.9	46.0	16.1	195.0	0.0
3	733.008	V	33.4	0.3	33.7	46.0	12.3	100.0	221.0
4	799.695	H	28.5	1.5	30.0	46.0	16.0	100.0	82.0
5	866.383	H	33.9	2.8	36.7	46.0	9.3	100.0	7.0
6	866.383	V	33.4	2.8	36.2	46.0	9.8	195.0	0.0
7	874.627	V	27.6	2.9	30.5	46.0	15.5	100.0	108.0
8	932.949	V	27.9	4.6	32.5	46.0	13.5	100.0	0.0

Table 26. Test data for Radiated emission for Below 1 GHz_5 GHz

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	574.776	V	33.5	-2.8	30.7	46.0	15.3	195.0	0.0
2	733.008	V	33.9	0.3	34.2	46.0	11.8	100.0	182.0
3	866.383	H	34.1	2.8	36.9	46.0	9.1	100.0	80.0
4	866.383	V	33.2	2.8	36.0	46.0	10.0	100.0	70.0
5	874.627	H	29.4	2.9	32.3	46.0	13.7	100.0	268.0
6	874.627	V	27.2	2.9	30.1	46.0	15.9	100.0	107.0
7	932.949	V	27.7	4.6	32.3	46.0	13.7	100.0	70.0
8	932.949	H	26.6	4.6	31.2	46.0	14.8	100.0	193.0

Supplementary information:
-. The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB. All reading values are peak values.

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

5.1.2. Receiving modeRadiated Spurious Emissions for Above 1 GHz

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Receiving mode

802.11g

Table 27. Low Channel (2412 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 28. Middle Channel (2437 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 29. High Channel (2462 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

802.11n_HT20_2.4GHz

Table 30. Low Channel (2412 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 31. Middle Channel (2437 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 32. High Channel (2462 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

802.11n_HT40_2.4GHz

Table 33. Low Channel (2422 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 34. Middle Channel (2437 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 35. High Channel (2452 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

802.11a

Table 36. Low Channel (5745 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 37. Middle Channel (5785 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 38. High Channel (5825 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

802.11n_HT20_5GHz

Table 39. Low Channel (5745 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 40. Middle Channel (5785 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 41. High Channel (5825 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

802.11n_HT40_5GHz

Table 42. Low Channel (5755 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Table 43. High Channel (5795 MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							