ONE WORLD DOUR APPROVAL



## Wireless test report – 392986-2TRFWL

Applicant:

Eurotech SpA

Product name:

DYGATE-20-30

Model:

### DynaGATE-20-30-22

Model variant:

# DynaGATE-20-30-00, DynaGATE-20-30-10, DynaGATE-20-30-20

FCC ID:

### UKMDG2030

IC Registration number: 21442-DG2030

Specifications:

### FCC 47 CFR Part 15 Subpart C, §15.247 (Partial test)

Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz

### RSS-247, Issue 2, Feb 2017, Section 5 (Partial test)

Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices 5) Standard specifications for frequency hopping systems and digital transmission systems operating in the bands 902–928 MHz, 2400–2483.5 MHz and 5725–5850 MHz

Date of issue: July 07, 2020

Tested by (name, function and signature) D. Guarnone (project handler) Signature: Double Guarnone Reviewed by (name, function and signature) P. Barbieri (verifier) Signature: Bauton This test report may not be partially reproduced, except with the prior written permission of Nemko Spa The test report merely corresponds to the tested sample. The phase of sampling / collection of equipment under test is carried out by the customer.



### Test location(s)

Company name	Nemko Spa
Address	Via del Carroccio, 4
City	Biassono
Province	MB
Postal code	20853
Country	Italy
Telephone	+39 039 220 12 01
Facsimile	+39 039 220 12 21
Website	www.nemko.com
Site number	FCC: 682159; IC: 9109A (10 m semi anechoic chamber)

#### Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report. This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Spa ISO/IEC 17025 accreditation.

#### Copyright notification

Nemko Spa authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Spa accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.



### Table of contents

Table of contents		
Section 1	. Report summary	4
1.1	Applicant and manufacturer	4
1.2	Test specifications	4
1.3	Test methods	4
1.4	Statement of compliance	4
1.5	Exclusions	4
1.6	Test report revision history	4
Section 2	. Summary of test results	5
2.1	FCC Part 15 Subpart C, general requirements test results	5
2.2	FCC Part 15 Subpart C, intentional radiators test results for frequency hopping spread spectrum systems	5
2.3	FCC Part 15 Subpart C, intentional radiators test results for digital transmission systems (DTS)	5
2.4	ISED RSS-Gen, Issue 5, test results	6
2.5	ISED RSS-247, Issue 2, test results for frequency hopping spread spectrum systems (FHSS)	6
2.6	ISED RSS-247, Issue 2, test results for digital transmission systems (DTS)	6
Section 3	. Equipment under test (EUT) details	7
3.1	Sample information	7
3.2	EUT information	7
3.3	Technical information	7
3.4	EUT setup diagram	8
3.5	Product description and theory of operation	8
3.6	EUT sub assemblies	8
3.7	EUT exercise details	8
Section 4	. Engineering considerations	9
4.1	Modifications incorporated in the EUT	9
4.2	Technical judgment	9
4.3	Deviations from laboratory tests procedures	9
Section 5	. Test conditions	10
5.1	Atmospheric conditions	10
5.2	Power supply range	10
Section 6	. Measurement uncertainty	11
6.1	Uncertainty of measurement	11
Section 7	. Test equipment	13
7.1	Test equipment list	13
Section 8	. Testing data	14
8.1	FCC 15.31(e) Variation of power source	14
8.2	FCC 15.31(m) and RSS-Gen 6.9 Number of frequencies	15
8.3	FCC 15.203 and RSS-Gen, section 6.8 Antenna requirement	16
8.4	FCC 15.207(a) and RSS-Gen 8.8 AC power line conducted emissions limits	17
8.5	FCC 15.247(b) and RSS-247 5.4 (d) Transmitter output power and e.i.r.p. requirements for DTS in 2.4 GHz	21
8.6	FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions	51
Section 9	. Block diagrams of test set-ups	112
9.1	Radiated emissions set-up for frequencies below 1 GHz	112
9.2	Radiated emissions set-up for frequencies above 1 GHz	112
9.3	Conducted emissions set-up	113
9.4	Antenna port set-up	113
Section 1	0. Photos	114
10.1	Photos of the test set-up	114
10.2	Photos of the EUT	116



### Section 1. Report summary

### 1.1 Applicant and manufacturer

-	
Company name	Eurotech SpA
Address	Via Fratelli Solari 3/a 33020 Amaro, UD, Italy

### 1.2 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
RSS-247, Issue 2, Feb 2017, Section 5	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

### 1.3 Test methods

558074 D01 15.247 Meas Guidance v05r02	Guidance for compliance measurements on digital transmission system, frequency hopping spread
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-Gen, Issue 5, Mar 2019, Amendment 1	General Requirements for Compliance of Radio Apparatus

### 1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

### 1.5 Exclusions

None

### 1.6 Test report revision history

Revision #	Date of issue	Details of changes made to test report	
392986-2TRFWL	July 7, 2020		



### Section 2. Summary of test results

### 2.1 FCC Part 15 Subpart C, general requirements test results

### Table 2.1-1: FCC general requirements results

Part	Test description	Verdict
§15.207(a)	Conducted limits	Pass
§15.31(e)	Variation of power source	Pass
§15.31(m)	Number of tested frequencies	Pass
§15.203	Antenna requirement	Pass

Notes: EUT is an AC powered device.

### 2.2 FCC Part 15 Subpart C, intentional radiators test results for frequency hopping spread spectrum systems

### Table 2.2-1: FCC 15.247 results for FHSS

Part	Test description	Verdict
§15.247(a)(1)(i)	Requirements for operation in the 902–928 MHz band	Not applicable
§15.247(a)(1)(ii)	Requirements for operation in the 5725–5850 MHz band	Not applicable
§15.247(a)(1)(iii)	Requirements for operation in the 2400–2483.5 MHz band	Not applicable
§15.247(b)(1)	Maximum peak output power in the 2400–2483.5 MHz band and 5725–5850 MHz band	Not applicable
§15.247(b)(2)	Maximum peak output power in the 902–928 MHz band	Not applicable
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Not applicable
§15.247(d)	Spurious emissions	Not applicable
§15.247(f)	Time of occupancy for hybrid systems	Not applicable

### 2.3 FCC Part 15 Subpart C, intentional radiators test results for digital transmission systems (DTS)

### Table 2.3-1: FCC 15.247 results for DTS

Part	Test description	Verdict
§15.247(a)(2)	Minimum 6 dB bandwidth	Not performed
§15.247(b)(3)	Maximum peak output power in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands	Pass
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Not applicable
§15.247(d)	Spurious emissions	Pass
§15.247(e)	Power spectral density	Not performed
§15.247(f)	Time of occupancy for hybrid systems	Not applicable



### 2.4 ISED RSS-Gen, Issue 5, Amendment 1, test results

### Table 2.4-1: RSS-Gen results

Part	Test description	Verdict
7.3	Receiver radiated emission limits	Not applicable
7.4	Receiver conducted emission limits	Not applicable
6.9	Operating bands and selection of test frequencies	Pass
8.8	AC power-line conducted emissions limits	Pass

Notes: <sup>1</sup> According to sections 5.2 and 5.3 of RSS-Gen, Issue 5, Amendment 1 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

EUT is an AC powered device.

### 2.5 ISED RSS-247, Issue 2, test results for frequency hopping spread spectrum systems (FHSS)

Part	Test description	Verdict
5.1 (a)	Bandwidth of a frequency hopping channel	Not applicable
5.1 (b)	Minimum channel spacing	Not applicable
5.1 (c)	Systems operating in the 902–928 MHz band	Not applicable
5.1 (d)	Systems operating in the 2400–2483.5 MHz band	Not applicable
5.1 (e)	Systems operating in the 5725–5850 MHz band	Not applicable
5.3	Hybrid Systems	
5.3 (a)	Digital modulation turned off	Not applicable
5.3 (b)	Frequency hopping turned off	Not applicable
5.4	Transmitter output power and e.i.r.p. requirements	
5.4 (a)	Systems operating in the 902–928 MHz band	Not applicable
5.4 (b)	Systems operating in the 2400–2483.5 MHz band	Not applicable
5.4 (c)	Systems operating in the 5725–5850 MHz	Not applicable
5.4 (e)	Point-to-point systems in 2400–2483.5 MHz and 5725–5850 MHz band	Not applicable
5.4 (f)	Transmitters which operate in the 2400–2483.5 MHz band with multiple directional beams	Not applicable
5.5	Unwanted emissions	Not applicable

### Table 2.5-1: RSS-247 results for FHSS

Notes: None

### 2.6 ISED RSS-247, Issue 2, test results for digital transmission systems (DTS)

### Table 2.6-1: RSS-247 results for DTS

Part	Test description	Verdict
5.2 (a)	Minimum 6 dB bandwidth	Not performed
5.2 (b)	Maximum power spectral density	Not performed
5.3	Hybrid Systems	
5.3 (a)	Digital modulation turned off	Not applicable
5.3 (b)	Frequency hopping turned off	Not applicable
5.4	Transmitter output power and e.i.r.p. requirements	
5.4 (d)	Systems employing digital modulation techniques	Pass
5.4 (e)	Point-to-point systems in 2400–2483.5 MHz and 5725–5850 MHz band	Pass
5.4 (f)	Transmitters which operate in the 2400–2483.5 MHz band with multiple directional beams	Not applicable
5.5	Unwanted emissions	Pass

Notes: None



### Section 3. Equipment under test (EUT) details

### 3.1 Sample information

Receipt date	May 18, 2020
Nemko sample ID number	392986 sample 1/12 and sample 1/1

### 3.2 EUT information

Product name	DYGATE-20-30
Model	DynaGATE-20-30-22
Model variant	DynaGATE-20-30-00, DynaGATE-20-30-10, DynaGATE-20-30-20
Serial number	H120CRA0003, H120CRA0005

### 3.3 Technical information

RSS number and Issue number	RSS-247 Issue 2, Feb 2017
Frequency band	2400 to 2483.5 MHz
Frequency Min (MHz)	2412 (2402 BT)
Frequency Max (MHz)	2462 (2480 (BT)
RF power Min (W), Conducted	N/A
RF power Max (W), Conducted/ERP/EIRP	77.6 mW (18.9 dBm, measured @802.11n HT20, 2462 MHz, ch.1)
Field strength, Units @ distance	N/A
Measured BW (kHz) (6 dB)	-
Calculated BW (kHz), as per TRC-43	N/A
Type of modulation	802.11 a/b/g/n
Emission classification (F1D, G1D, D1D)	W7D
Transmitter spurious, dBμV/m @3 m	63.88 (@17964 MHz)
Power requirements	24 V <sub>DC,</sub>
Antenna information	The EUT uses a unique antenna coupling, peak gain = 1.7 dBi



### 3.4 EUT setup diagram



### 3.5 Product description and theory of operation

The DynaGATE 20-30 is an IoT Edge Gateway, E-Mark certified, that addresses the challenges of the next-generation applications for smart transportation and fleet management. It combines hardware, software and connectivity to bridge the vehicle with leading Cloud services. Based on the Intel® Atom™ x5 and x7 (E39xx) processor, with up to 8GB of ECC RAM and 32GB of eMMC, the DynaGATE 20-30 is a fanless, compact unit designed to exceed the requirements of automotive applications: it features extended operating temperature range, IP54 ingress protection, a wide range automotive power supply and a 6-axis sensor (accelerometer + gyroscope). It provides protected USB 2.0 and 3.0, one configurable RS-232/422/485, DI/DOs, and dual CAN bus interfaces - plus, a wide range of connectivity capabilities including two Gigabit Ethernet on M12, up to two LTE Cat 4/6 cellular modem, Wi-Fi, Bluetooth Low Energy, and a GPS with Untethered Dead Reckoning; two mPCle and one M.2 slots can be reconfigured to host custom expansions and peripherals (Factory Option). Sophisticated power saving and management capabilities include: power monitoring, Wake-On-Ring/SMS and Wake-On-RTC. Radio modules:

WiFi-Bluetooth module Eurotech DG2030 GPS module, U45 U-BLOX, NEO-M8U-0-10 LTE module: QUECTEL, EG25-G

### 3.6 EUT sub assemblies

Table 3.6-1: EUT sub assemblies						
Description Brand name Model/Part number Serial number						

### 3.7 EUT exercise details



EUT was set to continuously transmit mode during tests, by test software provided by client.

The EUT runs a Linux operating system which allows for the testing to be performed using engineering test tools and scripts. Communication with the EUT is via a serial console or Ethernet connection which provides a Linux command line interface for execution of the test tools/scripts. These tools/scripts configure the radio modules to enable continuous transmission with the ability to adjust modulation, frequency and output power as required.

Linux operating system version: 4.9.57-eurotech-ti.

### Section 4. Engineering considerations

### 4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

### 4.2 Technical judgment

The EUT has three WIFI 2.4 GHz standard; 802.11b standard is chosen to be the representative worst-case due to higher output power.

### 4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.



### Section 5. Test conditions

### 5.1 Atmospheric conditions

In the laboratory, the following ambient conditions are respected for each test reported below:

Temperature	18 – 33 °C
Relative humidity	25 – 70 %
Air pressure	860 – 1060 mbar

The following instruments are used to monitor the environmental conditions:

Equipment	Manufacturer	Model no.	Asset no.	Cal date	Next cal.
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305	2019-01	2021-01
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703	2019-01	2021-01
Barometer	Castle	GPB 3300	072015	2019-12	2020-12

### 5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.



### Section 6. Measurement uncertainty

### 6.1 Uncertainty of measurement

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002.

The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:

P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.

F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Hereafter Nemko's measurement uncertainties are reported:

EUT	Туре	Test	Range	Measurement Uncertainty	Notes
		Frequency error	0.001 MHz ÷ 40 GHz	0.08 ppm	(1)
			0.009 MHz ÷ 30 MHz	1.1 dB	(1)
		Carrier power	30 MHz ÷ 18 GHz	1.5 dB	(1)
		RF Output Power	18 MHz ÷ 40 GHz	3.0 dB	(1)
			40 MHz ÷ 140 GHz	5.0 dB	(1)
		Adjacent channel power	1 MHz ÷ 18 GHz	1.4 dB	(1)
			0.009 MHz ÷ 18 GHz	3.0 dB	(1)
		Conducted spurious emissions	18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)
		Intermodulation attenuation	1 MHz ÷ 18 GHz	2.2 dB	(1)
		Attack time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Attack time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
	Conducted	Release time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Release time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
Transmitter		Transient behaviour of the transmitter– Transient frequency behaviour	1 MHz ÷ 18 GHz	0.2 kHz	(1)
Tansmitter		Transient behaviour of the transmitter – Power level slope	1 MHz ÷ 18 GHz	9%	(1)
		Frequency deviation - Maximum permissible frequency deviation	0.001 MHz ÷ 18 GHz	1.3%	(1)
		Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz	0.001 MHz ÷ 18 GHz	0.5 dB	(1)
		Dwell time	-	3%	(1)
		Hopping Frequency Separation	0.01 MHz ÷ 18 GHz	1%	(1)
		Occupied Channel Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
		Modulation Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
			0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
		Radiated spurious emissions	26.5 GHz ÷ 66 GHz	8.0 dB	(1)
	Padiatod		66 GHz ÷ 220 GHz	10 dB	(1)
	Naulated		10 kHz ÷ 26.5 GHz	6.0 dB	(1)
		Effective radiated power transmitter	26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)



EUT	Туре	Test	Range	Measurement Uncertainty	Notes
			0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
	Radiated Receiver	Radiated spurious emissions	26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
Receiver		Sensitivity measurement	1 MHz ÷ 18 GHz	6.0 dB	(1)
				0.009 MHz ÷ 18 GHz	3.0 dB
Conducted	Conducted	Conducted spurious emissions	18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)
NOTES					

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %

### Section 7. Test equipment

### 7.1 Test equipment list

Table 7.1-1: Equipment list					
Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESU8	100202	2020-01	2021-01
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESW44	101620	2019-08	2020-08
Trilog Antenna (30 MHz ÷ 7 GHz)	Schwarzbeck	VULB 9162	9162-025	2018-07	2021-07
Bilog antenna (1 ÷ 18 GHz)	Schwarzbeck	STLP 9148	9148-123	2018-07	2021-07
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck	BBV 9718	9718-137	2019-09	2020-09
Horn antenna (18 ÷ 40 GHz)	A.H. System	SAS-574	558	2020-01	2023-01
Preamplifier (18 ÷ 40 GHz)	Miteq	JS44-18004000-35-8P-R	1.627	2019-09	2020-09
Controller	Maturo	FCU3.0	10041	NCR	NCR
Tilt antenna mast	Maturo	TAM4.0-E	10042	NCR	NCR
Turntable	Maturo	TT4.0-5T	2.527	NCR	NCR
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	2019-09	2021-09
Shielded room	Siemens	10m control room	1947	NCR	NCR
LISN three phase (9 kHz ÷30 MHz)	Rohde & Schwarz	ESH2-Z5	872 460/041	2019-09	2020-09
Shielded room	Siemens	Conducted emission test room	1862	NCR	NCR

Note: NCR - no calibration required, VOU - verify on use





### Section 8. Testing data

### 8.1 FCC 15.31(e) Variation of power source

### 8.1.1 Definitions and limits

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 8.1.2 Test date

Start date April 9, 2020

### 8.1.3 Observations, settings and special notes

None

### 8.1.4 Test data

EUT Power requirements:	🖂 AC	□ DC	□ Battery
If EUT is an AC or a DC powered, was the noticeable output power variation observed?	🗆 YES	🖾 NO	🗆 N/A
If EUT is battery operated, was the testing performed using fresh batteries?	🗆 YES	🗆 NO	🖾 N/A
If EUT is rechargeable battery operated, was the testing performed using fully charged batteries?	□ YES	□ NO	🖾 N/A



### 8.2 FCC 15.31(m) and RSS-Gen 6.9 Number of frequencies

### 8.2.1 Definitions and limits

#### FCC:

Measurements on intentional radiators or receivers shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table.

#### ISED:

Except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, with the device operating at the frequencies in each band of operation shown in table below. The frequencies selected for measurements shall be reported in the test report.

### Table 8.2-1: Frequency Range of Operation

Frequency range over which the device operates (in each band)	Number of test frequencies required	Location of measurement frequency inside the operating frequency range
1 MHz or less	1	Center (middle of the band)
1–10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near center and 1 near low end

Note: "near" means as close as possible to or at the centre / low end / high end of the frequency range over which the device operates.

### 8.2.2 Test date

Start date April 9, 2020

### 8.2.3 Observations, settings and special notes

None

### 8.2.4 Test data

Table 8.2-1: Test channels selection						
Start of Frequency End of Frequency Frequency range Modulation range, MHz range, MHz bandwidth, MHz Low channel, MHz Mid channel, MHz Hig						High channel, MHz
BT	2400	2483.5	83.5	2402	2441	2480
BLE	2400	2483.5	83.5	2402	2441	2480

### Table 8.2-2: Test channels selection

Modulation	Start of Frequency range, MHz	End of Frequency range, MHz	Frequency range bandwidth, MHz	Low channel, MHz	Mid channel, MHz	High channel, MHz
wifi 802.11 a/b/g/n	2400	2483.5	83.5	2412	2437	2462
wifi 802.11 anHT40	2400	2483.5	83.5	2422	2437	2452



### 8.3 FCC 15.203 and RSS-Gen, section 6.8 Antenna requirement

### 8.3.1 Definitions and limits

#### FCC:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

#### ISED:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report.

### 8.3.2 Test date

date April 9, 2020		
	Start date	April 9, 2020

### 8.3.3 Observations, settings and special notes

None

### 8.3.4 Test data

Must the EUT be professionally installed?	□ YES	🛛 NO	
Does the EUT have detachable antenna(s)?	🖾 YES	□ NO	
If detachable, is the antenna connector(s) non-standard?	🖾 YES		🗆 N/A



### 8.4 FCC 15.207(a) and RSS-Gen 8.8 AC power line conducted emissions limits

### 8.4.1 Definitions and limits

#### FCC:

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50  $\Omega$  line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

#### IC:

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz, shall not exceed the limits in table below.

Unless the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in table below. The more stringent limit applies at the frequency range boundaries.

### Table 8.4-1: Conducted emissions limit

Frequency of emission,	Conducted limit, dBµV				
MHz	Quasi-peak	Average**			
0.15–0.5	66 to 56*	56 to 46*			
0.5–5	56	46			
5–30	60	50			
Note: * - The level decreases linearly with the	logarithm of the frequency.				
** - A linear average detector is required	J.				

### 8.4.2 Test date

Start date June 04, 2020



#### 8.4.3 Observations, settings and special notes

The EUT was set up as tabletop configuration.

The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance.

A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver settings for preview measurements:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Peak and Average
Trace mode	Max Hold
Measurement time	100 ms

Receiver settings for final measurements:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	Quasi-Peak and Average
Trace mode	Max Hold
Measurement time	100 ms



### 8.4.4 Test data



### Plot 8.4-1: Conducted emissions on phase line

Frequency	Level	Limit	Margin	Detector
(MHz)	(dBµV)	(dBµV)	(dB)	

Testing data FCC 15.407(b)(6) and RSS-Gen 8.8 AC power line conducted emissions limits FCC Part 15 Subpart E and RSS-Gen, Issue 4





Plot 8.4-2: Conducted emissions on neutral line

Frequency	Level	Limit	Margin	Detector
(MHz)	(dBµV)	(dBµV)	(dB)	



### 8.5 FCC 15.247(b) and RSS-247 5.4 (d) Transmitter output power and e.i.r.p. requirements for DTS in 2.4 GHz

#### 8.5.1 Definitions and limits

FCC:

- (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:
  - (3) For systems using digital modulation in the 2400–2483.5 MHz band: 1 W (30 dBm). As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
  - (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (c) Operation with directional antenna gains greater than 6 dBi.
- (1) Fixed point-to-point operation:

(i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

(iii) Fixed, point-to-point operation, as used in paragraphs (c)(1)(i) and (c)(1)(i) of this section, excludes the use of point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum or digitally modulated intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

(2) In addition to the provisions in paragraphs (b)(1), (b)(3), (b)(4) and (c)(1)(i) of this section, transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(i) Different information must be transmitted to each receiver.

(ii) If the transmitter employs an antenna system that emits multiple directional beams but does not do emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (b)(1) or (b)(3) of this section, as applicable. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as follows:

(A) The directional gain shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

(B) A lower value for the directional gain than that calculated in paragraph (c)(2)(ii)(A) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beamforming.

(iii) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels, the power supplied to each emission beam is subject to the power limit specified in paragraph (c)(2)(ii) of this section. If transmitted beams overlap, the power shall be reduced to ensure that their aggregate power does not exceed the limit specified in paragraph (c)(2)(ii) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (c)(2)(ii) of this section by more than 8 dB.

(iv) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (c)(1) of this section.



### ISED:

d. For DTSs employing digital modulation techniques operating in the 2400–2483.5 MHz band, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

e. Fixed point-to-point systems in the 2400–2483.5 MHz band are permitted to have an e.i.r.p. higher than 4 W provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. Point-to-multipoint systems, omnidirectional applications and multiple co-located transmitters transmitting the same information are prohibited from exceeding an e.i.r.p. of 4 W.

f. Transmitters operating in the band 2400–2483.5 MHz, may employ antenna systems that emit multiple directional beams simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers, provided that the emissions comply with the following:

#### i Different information must be transmitted to each receiver.

ii If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output power limit specified in sections 5.4(b) and 5.4(d). However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

iii If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels, the power supplied to each emission beam is subject to the applicable power limit specified in sections 5.4(b) and 5.4(d). If transmitted beams overlap, the power shall be reduced to ensure that their aggregate power does not exceed the applicable limit specified in sections 5.4(b) and 5.4(d). In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the applicable limit specified in sections 5.4(b) and 5.4(d) by more than 8 dB. iv Transmitters that transmit a single directional beam shall operate under the provisions of sections 5.4(b), 5.4(d) and 5.4(e).

### 8.5.1 Test date

Start date June 03, 2020



### 8.5.2 Observations, settings and special notes

The test was performed using Integrated band power method. Tests were performed with highest and lowest data rates, only the worst cases were presented.

#### 8.5.3 Test data

	Modulation	ion Conducted of Frequency, dE		tput power, n		Antenna gain.	EIRP,	EIRP limit,	FIRP margin.	
		MHz	Measured	Limit	Margin, dB	dBi	dBm	dBm	dB	
		2412	17.48	30	-12.52	1.7	19.18	36	-16.82	
	802.11b, 1 Mbns single	2437	16.99	30	-13.01	1.7	18.69	36	-17.31	
Mbps, single chain	2462	17.77	30	-12.23	1.7	19.47	36	-16.53		

#### Output power measurements results SINGLE CHAIN

Modulation	Frequency,	Conducted output power, Frequency, dBm			Antenna gain.	EIRP,	EIRP limit,	EIRP margin.	
	MHz	Measured	Limit	Margin, dB	dBi	dBm	dBm	dB	
	2412	16.33	30	-13.67	1.7	18.03	36	-17.97	
802.11g, 6 Mbns single	2437	16.33	30	-13.67	1.7	18.03	36	-17.97	
chain	2462	17.16	30	-12.84	1.7	18.86	36	-17.14	



### Output power measurements results Multiple chain

#### Calculation:

- Measured ch.0: 16.5 dBm = 44.7 mW
- Measured ch.1: 18.7 dBm = 74.1 mW
- Sum ch.0 + ch.1 = 44.7 mW + 74.1 mW = 118.8 mW → 20.7 dBm

Modulation										
	Frequency,		Conducted outpu	ıt power, dBm			Antenna gain.	EIRP,	EIRP limit,	EIRP margin.
	MHz	Measured ch 0	Measured ch1	Sum ch0 + ch1	Limit	Margin, dB	dBi	dBm	dBm	dB
802.11b, 1 Mbps	2412	16.5	18.7	20.7	30.0	-9.3	1.7	22.4	36.0	-13.6
multiple chain	2437	16.7	18.0	20.4	30.0	-9.6	1.7	22.1	37.0	-14.9
	2462	17.0	18.8	21.0	30.0	-9.0	1.7	22.7	38.0	-15.3

Modulation	Frequency,		Conducted outpu		Antenna gain.	EIRP,	EIRP limit,	EIRP margin,		
	MHz	Measured ch 0	Measured ch1	Sum ch0 + ch1	Limit	Margin, dB	dBi	dBm	dBm	dB
802.11g, 6 Mbps	2412	16.7	17.7	20.2	30.0	-9.8	1.7	21.9	36.0	-14.1
multiple chain	2437	15.4	17.9	19.8	30.0	-10.2	1.7	21.5	37.0	-15.5
	2462	17.0	17.7	20.4	30.0	-9.6	1.7	22.1	38.0	-15.9

Modulation	Frequency,	Conducted output power, dBm					Antenna gain,	EIRP,	EIRP limit,	EIRP margin,
	MHz	Measured ch 0	Measured ch1	Sum ch0 + ch1	Limit	Margin, dB	dBi	dBm	dBm	dB
	2412	16.9	18.3	20.7	30.0	-9.3	1.7	22.4	36.0	-13.6
802.11 Nht20										
multiple chain	2437	16.2	18.5	20.5	30.0	-9.5	1.7	22.2	37.0	-14.8
	2462	17.2	18.9	21.1	30.0	-8.9	1.7	22.8	38.0	-15.2

Modulation										
	Frequency,	Conducted output power, dBm					Antenna gain.	EIRP,	EIRP limit,	EIRP margin.
	MHz	Measured ch 0	Measured ch1	Sum ch0 + ch1	Limit	Margin, dB	dBi	dBm	dBm	dB
802.11 nHT40	2422	16.4	15.5	19.0	30.0	-11.0	1.7	20.7	36.0	-15.3
multiple chain	2437	16.4	18.1	20.4	30.0	-9.6	1.7	22.1	37.0	-14.9
	2452	17.2	18.5	20.9	30.0	-9.1	1.7	22.6	38.0	-15.4





Output power TX 2412 MHz, 802.11b, 1 Mbps, single chain



Output power TX 2437 MHz, 802.11b, 1 Mbps, single chain





Output power TX 2462 MHz, 802.11b, 1 Mbps, single chain





Output power TX 2412 MHz, 802.11g, 6 Mbps, single chain



Output power TX 2437MHz, 802.11g, 6 Mbps, single chain





Output power TX 2462MHz, 802.11g, 6 Mbps, single chain





Output power TX 2412 MHz, 802.11b, 1 Mbps, multiple chain, chain 0



Output power TX 2412 MHz, 802.11b, 1 Mbps, multiple chain, chain 1





Output power TX 2437MHz, 802.11b, 1 Mbps, multiple chain, chain 0



Output power TX 2437MHz, 802.11b, 1 Mbps, multiple chain, chain 1





Output power TX 2462 MHz, 802.11b, 1 Mbps, multiple chain, chain 0



Output power TX 2462 MHz, 802.11b, 1 Mbps, multiple chain, chain 1





Output power TX 2412 MHz, 802.11g, 6 Mbps, multiple chain, chain 0



Output power TX 2412 MHz, 802.11g, 6 Mbps, multiple chain, chain 1





Output power TX 2437MHz, 802.11g, 6 Mbps, multiple chain, chain 0



Output power TX 2437MHz, 802.11g, 6 Mbps, multiple chain, chain 1

Testing data FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions FCC Part 15 Subpart C and RSS-247, Issue 2









Output power TX 2462 MHz, 802.11g, 6 Mbps, multiple chain, chain 1





Output power TX 2412 MHz, 802.11 nHT20 6.5 Mbps, multiple chain, chain 0



Output power TX 2412 MHz, 802.11 nHT20 6.5 Mbps, multiple chain, chain 1





Output power TX 2437 MHz, 802.11 nHT20 6.5 Mbps, multiple chain, chain 0



Output power TX 2437 MHz, 802.11 nHT20 6.5 Mbps, multiple chain, chain 1
Section 8

Test name

Specification





Output power TX 2462 MHz, 802.11 nHT20 6.5 Mbps, multiple chain, chain 0



Output power TX 2462 MHz, 802.11 nHT20 6.5 Mbps, multiple chain, chain 1





Output power TX 2422 MHz, 802.11 nHT40 13.5 Mbps, multiple chain, chain 0



Output power TX 2422 MHz, 802.11 nHT40 13.5 Mbps, multiple chain, chain 1





Output power TX 2437MHz, 802.11 nHT40 13.5 Mbps, multiple chain, chain 0



Output power TX 2437 MHz, 802.11 nHT40 13.5 Mbps, multiple chain, chain 1





Output power TX 2452MHz, 802.11 nHT40 13.5 Mbps, multiple chain, chain 0



Output power TX 2452 MHz, 802.11 nHT40 13.5 Mbps, multiple chain, chain 1



### Bluetooth output power

Standard	Channel	RF measured (dBm)	Limit	MARGIN	Antenna gain	eirp	eirp limit	Margin
		()	иып	uв	иы	ивт	авт	uв
GFSK LE	LOW	3.2	30	-26.8	1.7	4.9	36	-31.1
GFSK LE	MDDLE	4.2	30	-25.8	1.7	5.9	36	-30.1
GFSK LE	HIGH	4.6	30	-25.4	1.7	6.3	36	-29.7

Standard	Channel	RF measured	Limit	MARGIN	Antenna gain	eirp	eirp limit	Margin
		(dBm)	dBm	dB	dBi	dBm	dBm	dB
BT GFSK	LOW	3.1	30	-26.9	1.7	4.8	36	-31.2
BT GFSK	MDDLE	4.2	30	-25.8	1.7	5.9	36	-31.1
BT GFSK	HIGH	4.7	30	-25.3	1.7	6.4	36	-29.6

Standard	Channel	RF measured	Limit	MARGIN	Antenna gain	eirp	eirp limit	Margin
		(dBm)	dBm	dB	dBi	dBm	dBm	dB
8PSK	LOW	5.1	30	-24.9	1.7	6.8	36	-29.2
8PSK	MDDLE	5.9	30	-24.1	1.7	7.6	36	-28.4
8PSK	HIGH	4.7	30	-25.3	1.7	6.4	36	-29.6





Output power TX 2402MHz, BT GFSK





Output power TX 2441MHz, BT GFSK





Output power TX 2480MHz, BT GFSK











Output power TX 2441MHz, BT 8DPSK





Output power TX 2480MHz, BT 8DPSK





Output power TX 2402MHz, GFSK(LE mode)





Output power TX 2441MHz, GFSK(LE mode)





Output power TX 2480MHz, GFSK(LE mode)



## 8.6 FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions

#### 8.6.1 Definitions and limits

#### FCC:

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### ISED:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

## Table 8.6-1: FCC §15.209 and RSS-Gen – Radiated emission limits

Frequency,	Field streng	gth of emissions	Measurement distance, m
MHz	μV/m	dBµV/m	
0.009–0.490	2400/F	67.6 – 20 × log10(F)	300
0.490-1.705	24000/F	87.6 – 20 × log <sub>10</sub> (F)	30
1.705-30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.

For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

## Table 8.6-2: ISED restricted frequency bands

MHz	MHz	MHz	GHz
0.090-0.110	12.57675-12.57725	399.9–410	7.25–7.75
0.495-0.505	13.36–13.41	608–614	8.025-8.5
2.1735-2.1905	16.42–16.423	960–1427	9.0–9.2
3.020-3.026	16.69475-16.69525	1435-1626.5	9.3–9.5
4.125-4.128	16.80425-16.80475	1645.5-1646.5	10.6–12.7
4.17725-4.17775	25.5-25.67	1660–1710	13.25–13.4
4.20725-4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677-5.683	73–74.6	2200-2300	15.35-16.2
6.215-6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775-6.26825	108–138	2483.5-2500	22.01-23.12
6.31175-6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291-8.294	156.52475-156.52525	3260-3267	31.2-31.8
8.362-8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625-8.38675	162.0125-167.17	3345.8-3358	
8.41425-8.41475	167.72–173.2	3500–4400	Above 28 C
12.29–12.293	240–285	4500–5150	Above 38.6
12.51975-12.52025	322–335.4	5350-5460	

Note: Certain frequency bands listed in Table 8.6-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.



## Table 8.6-3: FCC restricted frequency bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9–410	4.5-5.15
0.495-0.505	16.69475-16.69525	608–614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960–1240	7.25–7.75
4.125-4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725-4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725-4.20775	73–74.6	1645.5-1646.5	9.3–9.5
6.215-6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291-8.294	149.9–150.05	2310-2390	15.35–16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7–21.4
8.37625-8.38675	156.7–156.9	2690–2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975-12.52025	240–285	3345.8–3358	36.43–36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36–13.41			

## 8.6.1 Test date

Start date April 14, 2020



#### 8.6.2 Observations, settings and special notes

#### The spectrum was searched from 30 MHz to the 10<sup>th</sup> harmonic.

EUT was set to transmit continuously. Tests were performed with EUT set to highest and lowest data rate, different antenna configurations and modulation schemes were investigated, only the worst case are presented. Radiated measurements were performed at a distance of 3 m. Since fundamental power was tested using the maximum peak conducted output power procedure to demonstrate compliance, the spurious emissions limit is -20 dBc/100 kHz.

Spectrum analyzer settings for conducted spurious emissions measurements:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer settings for average conducted measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	power averaging (RMS)
Trace mode:	averaging (RMS)

Spectrum analyzer settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Detector mode:	Peak
Trace mode:	Max Hold



#### 8.6.4 Test data



Radiated spurious emissions 30 to 1000 MHz, Mid channel with antenna in horizontal polarization

TX 2437 MHz CH 06, 802.11g, 6Mbps, single chain configuration

Frequency	Level	Limit	Margin	Detector
(MHz)	(dBµV/m)	(dBµV/m)	(dB)	





## Radiated spurious emissions 30 to 1000 MHz, Mid channel with antenna in vertical polarization

Frequency (MHz)Level (dBμV/m)Limit (dBμV/m)Margin (dB)Detector30.600030.340.0-9.7QP39.480031.240.0-8.8QP40.110029.440.0-10.6QP50.430027.440.0-12.6QP58.710030.940.0-9.1QP68.970031.040.0-9.0QP77.190036.340.0-3.7QP81.210032.640.0-7.4QP98.490027.043.5-16.5QP106.710023.643.5-19.9QP138.390027.043.5-16.5QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP					
30.6000 30.3 40.0 -9.7 QP   39.4800 31.2 40.0 -8.8 QP   40.1100 29.4 40.0 -10.6 QP   50.4300 27.4 40.0 -12.6 QP   58.7100 30.9 40.0 -9.1 QP   68.9700 31.0 40.0 -9.0 QP   77.1900 36.3 40.0 -9.0 QP   81.2100 32.6 40.0 -7.4 QP   98.4900 27.0 43.5 -16.5 QP   106.7100 23.6 43.5 -19.9 QP   138.3900 27.0 43.5 -16.5 QP   151.5600 30.9 43.5 -12.6 QP   500.0100 29.1 46.0 -25.2 QP   817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
39.4800 31.2 40.0 -8.8 QP   40.1100 29.4 40.0 -10.6 QP   50.4300 27.4 40.0 -12.6 QP   58.7100 30.9 40.0 -9.1 QP   68.9700 31.0 40.0 -9.0 QP   77.1900 36.3 40.0 -3.7 QP   81.2100 32.6 40.0 -7.4 QP   98.4900 27.0 43.5 -16.5 QP   106.7100 23.6 43.5 -19.9 QP   138.3900 27.0 43.5 -16.5 QP   500.0100 29.1 46.0 -16.9 QP   706.8300 20.8 46.0 -25.2 QP   817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	30.6000	30.3	40.0	-9.7	QP
40.110029.440.0-10.6QP50.430027.440.0-12.6QP58.710030.940.0-9.1QP68.970031.040.0-9.0QP77.190036.340.0-3.7QP81.210032.640.0-7.4QP98.490027.043.5-16.5QP106.710023.643.5-19.9QP138.390027.043.5-16.5QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	39.4800	31.2	40.0	-8.8	QP
50.430027.440.0-12.6QP58.710030.940.0-9.1QP68.970031.040.0-9.0QP77.190036.340.0-3.7QP81.210032.640.0-7.4QP98.490027.043.5-16.5QP106.710023.643.5-19.9QP138.390027.043.5-16.5QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	40.1100	29.4	40.0	-10.6	QP
58.710030.940.0-9.1QP68.970031.040.0-9.0QP77.190036.340.0-3.7QP81.210032.640.0-7.4QP98.490027.043.5-16.5QP106.710023.643.5-19.9QP138.390027.043.5-16.5QP151.560030.943.5-12.6QP500.010029.146.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	50.4300	27.4	40.0	-12.6	QP
68.970031.040.0-9.0QP77.190036.340.0-3.7QP81.210032.640.0-7.4QP98.490027.043.5-16.5QP106.710023.643.5-19.9QP138.390027.043.5-16.5QP151.560030.943.5-12.6QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	58.7100	30.9	40.0	-9.1	QP
77.190036.340.0-3.7QP81.210032.640.0-7.4QP98.490027.043.5-16.5QP106.710023.643.5-19.9QP138.390027.043.5-16.5QP151.560030.943.5-12.6QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	68.9700	31.0	40.0	-9.0	QP
81.2100 32.6 40.0 -7.4 QP   98.4900 27.0 43.5 -16.5 QP   106.7100 23.6 43.5 -19.9 QP   138.3900 27.0 43.5 -16.5 QP   151.5600 30.9 43.5 -12.6 QP   500.0100 29.1 46.0 -16.9 QP   706.8300 20.8 46.0 -25.2 QP   817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	77.1900	36.3	40.0	-3.7	QP
98.4900 27.0 43.5 -16.5 QP   106.7100 23.6 43.5 -19.9 QP   138.3900 27.0 43.5 -16.5 QP   138.3900 27.0 43.5 -16.5 QP   151.5600 30.9 43.5 -16.5 QP   500.0100 29.1 46.0 -16.9 QP   706.8300 20.8 46.0 -25.2 QP   817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	81.2100	32.6	40.0	-7.4	QP
106.710023.643.5-19.9QP138.390027.043.5-16.5QP151.560030.943.5-12.6QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	98.4900	27.0	43.5	-16.5	QP
138.390027.043.5-16.5QP151.560030.943.5-12.6QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	106.7100	23.6	43.5	-19.9	QP
151.560030.943.5-12.6QP500.010029.146.0-16.9QP706.830020.846.0-25.2QP817.440022.246.0-23.8QP904.860023.546.0-22.5QP	138.3900	27.0	43.5	-16.5	QP
500.0100 29.1 46.0 -16.9 QP   706.8300 20.8 46.0 -25.2 QP   817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	151.5600	30.9	43.5	-12.6	QP
706.8300 20.8 46.0 -25.2 QP   817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	500.0100	29.1	46.0	-16.9	QP
817.4400 22.2 46.0 -23.8 QP   904.8600 23.5 46.0 -22.5 QP	706.8300	20.8	46.0	-25.2	QP
904.8600 23.5 46.0 -22.5 QP	817.4400	22.2	46.0	-23.8	QP
	904.8600	23.5	46.0	-22.5	QP

TX 2437 MHz CH 06, 802.11g, 6Mbps, single chain configuration





Radiated spurious emissions 1 to 5 GHz, Low channel with antenna in horizontal polarization, TX 2412 MHz, CH01, 802.11b, 1Mbps, multiple chain





## : Radiated spurious emissions 1 to 5 GHz, Low channel with antenna in vertical polarization, TX 2412 MHz, CH01, 802.11b, 1Mbps, multiple chain



2 Scan						🚊 1Pk Max 💿 2Av Max
110 dBuV/m	-				<u>M1</u>	[1] 106.20 dBµV/m
		M	1			2.438000000 GHz
		N	2		M2	[2] 103.80 dBµV/m
		1				2,438000000 GHz
100 dBµv/m						
90 dBµV/m						
80 dBµV/m						
FCC 15 209 PK						
70 dBuV/m						
i o obpitym						
60 dBµV/m						r*
						When a
FCC 15 209 AV						- Lange Millight W
		1	N.		Moundard	Mr. Carrows
50 dBµ∀/m				an mound white has	war	
			and have been and			
		Mar Manung Mallade at				
	weller to obright an an anter the topological	· · · · · · · · · · · · · · · · · · ·				$\sim$
40 dBµV/m-	march when a special states			1 1 1		part -
in and an unreached to when we want			1		and the second s	
when my man we have a second of the second o			1 minum			
		$\sim$	Y	1		
30 dBuV/m		~				
and the second sec						
		Range 1	1		1	
IStart 1.0 GHz						Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2437 MHz, CH06, 802.11b, 1Mbps, multiple chain with antenna in horizontal polarization,

,



2 Scan						● 1Pk Max ● 2Av Max
					M1	[1] 95.02 dBµV/m
		M1				2,438000000 GHz
		M2			M2	2 428000000 CH7
						21438000000 0H2
90 dBµ∀/m						
80 dBµ∀/m						
FCC 15 209 PK						
70 dBµV/m						
60 dBuV/m						
						, (
ECC 15 200 AV						when
FCC 15 209 AV					A STANKING	mych man mo wall
					ward approved	
SU @Bµ∨/m			MA even presenter	fr. Mathematica		
		monument	(V ananana) a			
	was when when	New Parts				
, bat	when we want want and a start of the					
40 dBµV/m	Press Parts					
wand and no want have been a server a s						
			A			
30 dBµV/m	- And a start of the start of t					
		Paper 1				
Start 1.0 GHz		Kanye i				Stop 5.0 GHz

Radiated spurious emissions 1 to 3.6 GHz, TX 2437 MHz, CH06, 802.11b, 1Mbps, multiple chain in vertical polarization



2 Scan						●1Pk Max●2Av Max
110 dBµV/m					<u>M2</u>	[2]103.88 dBµV/m
		м	1			2.461500000 GHz
		M	2		M1	[1] 106.42 dBµV/m
						2,461250000 GHz
100 dвµV/m						
90 dBµV/m						
80 dBµ∀/m						
FCC 15 209 PK						
70 dBµV/m						
60 dBµ∀/m						
						L . (
FCC 15 209 AV		n"				man
					11 Marthal	month marker of the second
50 dBµV/m				a wellete Martin broke	la a la contra	
			molen a montality	Went Vand, in here		
		M. Martin Martin and Martin				
	and a show when a work here been	Jun (				$\sim$
40 dBµV/m	and the state of the					
and when the hard bound the share and the state of the st					-	
Muther Marsh patron and and a contraction of the			hann			
		mand				
30 dBµV/m		~~~				
	and the second s					
and the second						
Stort 1.0 CHz		Range 1				Stop 5.0 CHa
פומו ב הט טרוב						Stop Stop BHZ

# Radiated spurious emissions 1 to 5 GHz, TX 2462 MHz, CH11, 802.11b, 1Mbps, multiple chain High channel with antenna in horizontal polarization



2 Scan					●1Pk Max●2Av Max
110 dBµV/m				<u>M2</u>	[2]96.97 dBµV/m
					2.463000000 GHz
				M1	[1] 99.34 dBµV/m
					2,463000000 GHz
100 dBµV/m		Mi	L		
		Ma Y	2		
90 dBµV/m					
80 dBµV/m					
FCC 15 209 PK					
70 dBµV/m					
60 dBuV/m					
					( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (
ECC 15 209 AV					Month and
				A way AN	AN ALGONATION AND AND AND AND AND AND AND AND AND AN
50 dBuV/m			t to do didd/ 4	yunan	
		. 1	Mul a Jour Mangher Mark many marker of the		
		port and a port of the	An extension of		
	in in the show market	+⁄ 1			$\sim$
40 dBuV/m-	manuful the way of the second				
a drawbar all the prover and				Jan Maria	
Marting Maring grand a					
30 dBuV/m					
		Range 1		•	0. F.O. 511
Start 1.0 GHz					Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2462 MHz, CH11, 802.11b, 1Mbps, multiple chain High channel with antenna with antenna in vertical polarization





Radiated spurious emissions 1 to 5 GHz, X 2412 MHz, CH01, 802.11g, 6Mbps, multiple chain with antenna in vertical polarization



2 Scan						🗢 1Pk Max 🌢 2Av Ma	ах
110 dBuV/m					<u>M1</u>	[1]106.13 dBµV/	/m
		M	1			2.410500000 G	Hz
		1			M2	[2] 97.43 dBµV/	/m
						2,410250000 G	Hz
100 dBµv/m		N.	2				
90 dBµV/m							
80 dBµV/m							
FCC 15 209 PK							
70 dBµV/m							
60 dBµV/m							N
						1.0.6	
FCC 15 209 AV						Anton V	4
					1 Jude mer	Mr. Markon and .	
50 dBµV/m		/			Holly all and a second second		
			With man a proper from	MDAAD CONTRACTOR OF C			
		4 million mudeling	A Charles and a second				
	he was watter while me	CM and the state					1
40 d0.40 /m	M. M. Market Market Providence						
40 UBDV/m	A configuration of the contract of the contrac	<u> </u>					
when when a har had a for the start when the start							
		~	hanne				
30 dBµV/m		1					
and the second s							
							_
Start 1.0 GHz		Range 1				Stop 5.0 G	Hz

Radiated spurious emissions 1 to 5 GHz, TX 2412 MHz, CH01, 802.11g, 6Mbps, multiple chain with antenna in horizontal polarization



2 Scan						●1Pk Max●2Av Max
110 dBµV/m					<u>M2</u>	[2]97.43 dBµV/m
		1	11			2.439750000 GHz
					M1	[1] 106.38 dBµV/m
						2,440000000 GHz
100 dbull (m						
100 dBµv/m-		I	12			
			1			
90 dBµV/m						
80 dBµ∀/m						
FCC 15 209 PK						
70 dBuV/m						
60 αθμν/m-						M
						Monte
FCC 15 209 AV						La manufactor and the
			N.		1. Martin Martin Prod	Monda .
50 dBµV/m				aduly yester wood and	- WAR	
		. 410	Maple and another and	· 9-		~
		Mr. War How How allow				
	may way way way way have	· /				
40 dBµV/m-	warmen have					
have been the wind ray which a fat me					~~~	
approver and a second			man	and the second second		
		m	T .			
30 dBuV/m		~				
	<u> </u>	Range 1		<u>.</u>	<u></u>	<u>.                                    </u>
Start 1.0 GHz						Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2437MHz, CH06, 802.11g, 6Mbps, multiple chain with antenna in horizontal polarization



2 Scan							🔍 1 Pk Max (	2Av Max
110 dBµV/m						<u>M2</u>	[2]97.2	2 dBµV/m
			M1				2,44000	0000 GHz
			í I			M1	[1] 106.8	4 dBµV/m
			1				2,44000	0000 GHz
100 -0.41/6								
100 dBµv/m			M2					
			1					
			1					
90 dBµV/m							1	
80 dBµ∀/m			1					-
			1					
FCC 15 209 PK								
70 dBuV/m								
70 upp */ m								
							8 8 8	
							1 1 1	
							1	
60 dBµ∀/m							1 1 1	ph.
								Au
FCC 15 209 AV			4					aul Mar March
						Munn	Muhamman and and	
50 dBµ∀/m					a hugh the	granne		
				work Ald Marshall will	My low			
		wohn margaretter					1	l l
	1. Adams man providence	and the second s	٦					$\sim$
40 dBuV/m-	11 reality Martin and						harris	~
1. Annality Marken and Contraction	and the second se					- And a start of the		
Whith have been able to be and the second				a and				
зи ивруут								
	<u>.</u>	Range 1						
Start 1.0 GHz							Sto	p 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2437 MHz, CH06, 802.11g, 6Mbps, multiple chain with antenna in vertical polarization



2 Scan						●1Pk Max●2A	v Мах
110 dBuV/m-					M1	[1] 102.81 df	BµV/m
						2.4650000	00 GHz
					M2	[2] 94.08 dE	BµV/m
			†			2,46450000	00 GHz
100 00.000							
100 dBµv/m							
		M	2				
90 dBµV/m							
80 dBµV/m							
FCC 15 209 PK							
70 dBuV/m							
60 dBµV/m							M
FCC 15 209 AV						1 min more with	And all all
		J			where all lander	Augured a trade of the state of	
50 dBµV/m				H. Marsharth	physical and the second second		
			Unmanuth hall make	ANACIO			_
		10 MM Mark Muskely hund					Г Î
	11 where an work the work	w <sup>hy</sup> w <sup>hy</sup>					$\sim$
40 dBuV/m	Margar Margarian In the same				~	and the second s	
to approximity to make when the many when the	NAME -	l l					
www.unewhyter			1				
			1 million				
30 dBµV/m							
Mun							
		Dance 1					
Start 1.0 GHz		Kange I				Stop 5.	0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2462 MHz, CH11, 802.11g, 6Mbps, multiple chain with antenna in vertical polarization



2 Scan						😐 1Pk Max (	2Av Max
110 dBuV/m-					<u>M1</u>	[1]106.8	0 dBµV/m
110 (00) */		M	1			2,46525	0000 GHz
					M2	[2] 97.7	3 dBµV/m
						2,46500	0000 GHz
100 dBµV/m		1	2				
90 dBµV/m							
80 dBuV/m							
FCC 15 209 PK							
70 dBµ∀/m							
60 dBµ∨/m							M
		J.					
FCC 15 209 AV		l l					1 WMM AN
					a sa ang ang ang ang ang ang ang ang ang an	house multimeters	N*
50 dBuV/m				to the sta	my twinter		
			I a population	and have been a service	Y W		
		. All has a surf	Man Marine and and a second of				$\sim$
		when the and the west of the state of the					
	were Market Market Market						
40 dBµV/m-	he would be the second						
a with a shride Application of the	nor -				~~~~		
whom have been and a stranger of the stand o			In mon				
30 авµv/m							
and the second sec							
Stort 1.0 CHz		Range 1				C+-	5 0 CH-
(Start 1.0 GHZ						510	ບ ວ.ບ GHZ

Radiated spurious emissions 1 to 5 GHz, TX 2462 MHz, CH11, 802.11g, 6Mbps, multiple chain with antenna in horizontal polarization



2 Scan						😐 1Pk Max 🛡 2Av Max
110 dBµV/m					<u>M2</u>	[2]98.67 dBµV/m
		IV.	11			2.411750000 GHz
					M1	[1] 106.39 dBµV/m
						2,411250000 GHz
100 dBuV/m		M	2			
100 0004711						
00 dBuV/m						
90 dBp*/m						
80 dBµ∨/m						
ECC 15 209 BK						
70 dBµV/m	1					
60 dBµV/m						jin.
						λ.dh.
FCC 15 209 AV						A MARINA
					1. Rethon Manual	Manun
50 dBµ∀/m		p"		un applications	A share and a share a s	
			Who Mar Work who who who who who who who who who was a start who who was a start who who who who who who who w	ellen		^
		water manufactured	4 m			~
	in the advertise address to the	per-				
40 dBµV/m-	Muthantenne					
- U. A. Molloway Manufactor		Γ.				
an applying the part of the second			1 million	1		
		James -	Ĭ			
30 dBµV/m		r				
ساسين						
Start 1.0 GHz		Range 1				Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2412 MHz, CH01, 802.11n (20MHz), 6.5Mbps, multiple chain with antenna in horizontal polarization



2 Scan		● 1Pk Max ● 2Av Max
110 dBµV/m		M2[2]97.03 dBµV/n
		2.412750000 GH
	M1	M1[1] 104.80 dBµV/n
		2.413500000 GH
100 dBuV/m		
	M2	
90 dBuV/m		
56 dbp+//m		
90 dBuV/m		
FCC 15 209 PK		
70 dBuV/m		
10 UBD4/m-		
50 dbull for		
		June 1
FCC 15 209 AV		a ward ward at
50 dBull (m		1 Are a hadres where we wanted
30 ubp v/m-		www. When Merty month and the second second
	when vous when	W man
	d de marger aber Alter	
40 dBull/m	New Jorde Martin and Martin	
40 UBDV/m		
approximation of the second of		
20 eBuilder	- American and the second s	
30 ubpv/m		
	Range 1	
Start 1.0 GHz		Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2412 MHz, CH01, 802.11n (20MHz), 6.5Mbps, multiple chain with antenna in vertical polarization



2 Scan						IPk Max 2Av Max
110 dBuV/m					<u>M1</u>	[1] 107.59 dBµV/m
		MI T		1		2.438500000 GHz
					M2	[2] 99.91 dBµV/m
						2,436500000 GHz
		M2				
100 dBµv/m						
90 dBµ∀/m						
80 dBµV/m				1		
FCC 15 209 PK						
70 d0uV/m						
60 dBµ∨/m						por a
		1				. Ma
FCC 15 209 AV						Mar Martin Martin
					We work years	(LAMPANNA ALL.
50 dBµ∀/m		1	· · · · · · · · · · · · · · · · · · ·	month		
			18 Million John Marshammer			~
		www.man. Manyon M.				
	41 Lim Mynuby Mohalan					
40 dBµ∨/m	two Art And a construction of the					
www.lwerthethethethethethethethethethethethethet						
how we also and the second sec		/ \	1 marine			
		$\sim$				
30 dBuV/m						
	L.					
and the second sec						
		: Range 1		1		
Start 1.0 GHz						Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2437 MHz, CH06, 802.11n (20MHz), 6.5Mbps, multiple chain with antenna in vertical polarization



2 Scan					🗢 1Pk Max	2Av Max
110 dBuV/m				<u>M1</u>	[1]106.8	2 dBµV/m
	M	1			2.43850	00000 GHz
	1			M2	[2] 99.4	₅5 dBµV/m
					2,43675	0000 GHz
100 deux/m	Market	2				
	1					
00 d0.00/m						
an apparent						
FCC 15 209 PK						
70 dBuV/m						
70 dBpv/m						
60 dBuV/m						
						phin
						where a
FCC 15 209 AV				· · · · · · · ·	maltinulyporter	NY C
			. Jack	. A Marana Mallora	A MA IN LA	
		We be a superburger of	white Mark M	NAME OF		
	Here was a well	Why when we are a				ŕ
a stranged	where the man and the second second					N
40 dBuy/m						
to approximate the second of t						
wind what me what will be water and the		Va am				
		4 ~~m				
20 dBuV/m	ender and the second					
As a manufacture of the second s						
	Range 1	- ·	•			5.0.011
Start 1.0 GHz					Sto	ρ 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2437 MHz, CH06, 802.11n (20MHz), 6.5Mbps, multiple chainwith antenna in horizontal polarization



2 Scan						●1Pk Max●2Av Max
110 dBµV/m			41		M2	[2] 99.24 dBµV/m
			Y			2.462750000 GHz
					M1	[1] 108.26 dBµV/m
						2.463500000 GHz
		1	2			
100 dBµV/m						
90 dBµV/m						
80 dBµ∀/m						
FCC 15 209 PK			t			
70 dBuV/m-						
70 UBD V/m						
60 dBμV/m						, dry
FCC 15 209 AV						Within
		L.			1 udrestlat	Mr. W.
50 dBµV/m		m		Alore to a second a low of the	N. M. Martin	
			approximate and a service of the	he was a second of the second		~
		1 dat at 497 m Marker Burkey				
	. In wate Anthousing	MMM				$\sim$
40 dBµV/m-	and the Way have been and the					
a and standard when man	and the second					
-Merender and a second second and a second second			hanne	4 million		
		min	0			
30 dBuV/m						
and the second sec						
menor and the second second						
		Range 1		1	1	
Start 1.0 GHz						Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2462 MHz, CH11, 802.11n (20MHz), 6.5Mbps, multiple chain with antenna in horizontal polarization


2 Scan						IPk Max • 2Av Max
110 dBuV/m					<u>M2</u>	[2]98.56 dBµV/m
			<b>V</b>			2.461500000 GHz
					M1	[1] 107.68 dBµV/m
						2.463500000 GHz
100 dBµV/m		1				
90 dBµV/m						
80 dBuV/m						
00 000000000000000000000000000000000000						
ECC 15 209 PK						
00 10 200 A						
70 dBμV/m					1	
		l l				
60 dBµ∀/m						
ECC 15 209 AV						March
00 10 20 1 1					in bearing	Mulandhuman shall
F0 dBuV/m		N		Area	waterward	·
so uspy/m			an mulathan	Julia for some for the boltometh		
		where the second	Marine Marine .			
	On about	with marph log ma				
	in the the gut and when the with the prover					
40 dBµV/m	C. AL ALLANT	لم			- market	
but the country when the way of					man	
e and erstandareday. an a			hann	T		
30 dBµV/m	have and have					
	,	Range 1	;		:	··
Start 1.0 GHz						Stop 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2462 MHz, CH11, 802.11n (20MHz), 6.5Mbps, multiple chain with antenna in vertical polarization



110 dkµ//m       9.460 dkµ//m         2.42050000 GHz       9.42050000 GHz         10 dkµ//m       2.42050000 GHz         90 dkµ//m       90 dkµ//m	2 Scan							●1Pk Max●2Av Max
2.42050000 GHz M2[3] 34.60 dHy/m 2.42050000 GHz 2.42050000 GHz 90 dBy/m 80 dBy/m 80 dBy/m 70 dBy/m 60 dBy/m 70	110 dBµV/m						M1	[1]92.46 dBµV/m
M2[2]     84.60 dBµ/m       50 dBµ/m     2.42050000 GHz       50 dBµ/m     2.4205000 GHz       50 dBµ/m     2.420500 GHz </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2.420500000 GHz</td>								2.420500000 GHz
100 dBµV/m     2.420500000 GHz       50 dDµV/m     100 dBµV/m       80 dDµV/m     100 dBµV/m       80 dDµV/m     100 dQµV/m       90 dDµV/m     100 dQµV/m							M2	[2] 84.60 dBµV/m
100 dBµV/m       Image: second s								2,420500000 GHz
90 dBµV/m     90 dBµV/m       80 dBµV/m     90 dBµV/m       80 dBµV/m     90 dBµV/m       80 dBµV/m     90 dBµV/m       90 dBµV/m     90 dBµV/m	100 dBuV/m			16				
90 dquv/m 80 dquv/m 80 dquv/m 60 dquv/m 60 dquv/m 60 dquv/m 50 dquv/m 50 dquv/m 50 dquv/m 60 dquv/m 60 dquv/m 60 dquv/m 60 dquv/m 60 dquv/m 70 dquv/m	100 00p 1/ 10			- M				
90 dbju/m 80 dbju/m FCC 15 200 PK 70 dbju/m 60 dbju/m 50 dbju/m 50 dbju/m 10 dbju				10				
90 dbu//m 80 dbu//m FCC 15 206 PK 70 dbu//m 60 dbu//m 50 dbu/				<b>₩</b>				
90 dbµ//m     80 dbµ//m       80 dbµ//m     90 dbµ//m       60 dbµ//m     90 dbµ//m       50 dbµ//m     90 dbµ//m       60 dbµ//m     90 dbµ//m       80 dbµ//m     90 dbµ//m       90 dbµ//m     90 dbµ//m	00 dBuV/m			M				
B0 dbµV/m     Image: Constraint of the second	90 0Bh4/m-			T				
B0 dBµV/m FCC 15 209 PK 70 dBµV/m 60 dBµV/m 50 dBµV/m 50 dBµV/m 30 dBµV/m 40 dBµV/m 10 dBµV				M				
80 dBµV/m FCC 15 209 PK 70 dBµV/m 60 dBµV/m 50 dBµV/m 40 dBµV/m 30 dBµV/m 30 dBµV/m CCC 15 209 AV CCC 15 200 AV CCC				11				
B0 dBµV/m     FCC 15 209 PK       FCC 15 209 PK     P       70 dBµV/m     P       60 dBµV/m     P       50 dBµV/m     P       40 dBµV/m     P       90 dBµV/m     P				/I N				
FCC 15 209 PK	80 dBµ∀/m							
FCC 15 209 PK 70 dBµV/m 60 dBµV/m 50 dBµV/m 40 dBµV/m 30 dBµV/m 30 dBµV/m				11-11				
70 dBµV/m     70 dBµV/m       60 dBµV/m     70 dBµV/m       50 dBµV/m     70 dBµV/m       90 dBµV/m     70 dBµV/m	ECC 15 200 PK			┦╂				
70 dBµV/m     60 dBµV/m       60 dBµV/m     60 dBµV/m       50 dBµV/m     90 dBµV/m       40 dBµV/m     90 dBµV/m       30 dBµV/m     90 dBµV/m	CC 13 209 PK			11				
60 dBµV/m FCC 15 209 AV 50 dBµV/m 40 dBµV/m 30 dBµV/m Build a build a bui	70 dBµV/m			1 1				
60 dBµV/m FCC 15 209 AV 50 dBµV/m 40 dBµV/m 30 dBµV/m 30 dBµV/m Builton and an				1				
60 dBµV/m FCC 15 209 AV 50 dBµV/m 40 dBµV/m 30 dBµV/m 30 dBµV/m Range 1								
60 dBµV/m FCC 15 209 AV 50 dBµV/m 40 dBµV/m 30 dBµV/m 30 dBµV/m Range 1								
FCC 15 209 AV 50 dBµV/m 40 dBµV/m 30 dBµV/m 30 dBµV/m Range 1	60 dBµ∀/m			$\left( \right)$				×
FCC 15 209 AV				$l \rightarrow$	Y			Adva.
S0 dBµV/m	FCC 15 209 AV							A Chia M Marine W
50 dBµV/m 40 dBµV/m 30 dBµV/m BµV/m Range 1			l ()				Munda	M-Marina Marina
40 dBµV/m 40 dBµV/m 30 dBµV/m Range 1	50 dBµV/m					- downtontontonthe	ph ph	
40 dBµV/m 40 dBµV/m 30 dBµV/m Range 1			1		montemportant	http://www.		
40 dBµV/m Muldaylyn/muldandaylyn/muldandaylyn/muldandaylyn/m 30 dBµV/m Range 1			White million and					
40 dBµV/m 30 dBµV/m Range 1		Mar allow high back where the	Jaw I					
Wildlagen Amarken Wenner Amarken Menner Amar	40 dBµV/m	Must he har when the state of t						h
30 dBµV/m Range 1					λ.		and the second	
30 dBµV/m	White have a service and the service of the service				han	and the second sec		
30 dBµV/m-			$\sim$					
Range 1	30 dBuV/m							
Range 1								
Range 1	indument -							
Range 1								
			Range 1					

Radiated spurious emissions 1 to 5 GHz, TX 2422 MHz, CH03, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization



2 Scan							😑 1Pk Max (	2Av Max
110 dBµV/m						<u></u> M1	[1]93.4	5 dBµV/m
							2.42050	0000 GHz
						M2	[2] 85.9	1 dBµV/m
							2,42050	0000 GHz
100 d0.41/m			/lt					
100 dBh4/m			ľ					
			1					
			₩					
			M					
90 dBµV/m			111					
			11					
80 dBµV/m			+++					
			11					
FCC 15 209 PK								
70 dBµ∀/m			$\left  \right $		1 1 1			
			/ N					
			11 [					
60 dBu∀/m								45
			// L	Ų				, pur
ECC 15 209 AV			ן ו					Ju Mully
					1 1 1	فيهيد للهريدين	mound	- <sup></sup>
50 dBuV/m					Land a day of	Hubby an Man water		
				Just - un un hours hours	White the way the superior			
		March March 19 and and		a confidence				ŕ
	he was the	West Hard Carlo						$\sim$
	a walker and any and						L	
40 asport	strate and a second							
Multimenter March March March		(		1				
		$\sim 1$		-				
		and the second						
30 dBµV/m								
	the second s							
		Rapper 1						
Start 1.0 GHz		Kanye I					Sto	p 5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2422 MHz, CH03, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in vertical polarization



2 Scan							😑 1Pk Max 🕯	2Av Max
110 dBuV/m						<u>M2</u>	[2] <u>90.0</u>	9 dBµV/m
							2.43450	0000 GHz
						M1	[1] 98.4	1 dBµV/m
							2,43450	0000 GHz
			<u>34</u>					
100 dBµV/m			¥.					
			al.					
90 dBµV/m								
			Ш					
			11					
80 авµ∨/m								
			Ш					
FCC 15 209 PK			'					
70 dBµ∀/m					-	1 1 1	<u>[]</u>	1 1
		(						
			L					
			1					
60 dBuild fee			- 1					
		8						pha
				1			1	Mary
FCC 15 209 AV			-	<u>}</u>				WW 10-
		()				a way had all and a	Alman	
50 dBµ∀/m					where where the put the state	A A A A A A A A A A A A A A A A A A A		
		da ull		munder warden				~
		www.www.www.						
	a some upper hard and we hall have			à			1	$\sim$
40 dBµV/m	when the way of the second						harris	
1 al a state warmen and the house the								
Mar Malan Mar Jan Mar				he man	and the second sec			
	August	-						
30 dBµV/m								
	1	Dance 1		<u> </u>				
Start 1.0 GHz		Range 1					Stor	p 5.0 GHz
							0.00	

Radiated spurious emissions 1 to 5 GHz, TX 2437 MHz, CH06, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in vertical polarization



2 Scan							🗢 1 Pk Max 🗕	2Av Max
110 dBµV/m						<u>M2</u>	[2] <u>89.2</u> 4	4 dBµV/m
							2,43425	0000 GHz
						M1	[1] 98.06	5 dBµV/m
							2,43375	0000 GHz
			AL.					
100 uBp4/m			M					
			11					
			64					
90 dBµV/m-								
			11					
80 dBµV/m			11		1	1		
			11 11					
			ЦЦ					
FCC 15 209 PK			M					
70 dBµV/m					1			
			14					
60 dBµV/m					1 1 1	-		
		j,	/					
FCC 15 209 AV			<u>```</u>				1	when we way
						A. A. Martin Martin	happentinender	ýr.
50 dBµV/m				4	1. A months when	aparter		
		[] []		When and my home have	whether an an			
		Windowship hat and						$\cap$
	has merely high hours	Wr i j						$\sim$
40 dBuV/m	and which appendiction							
the second the man and the man and the man and	wither			1	~			
an ana water the the for and				h				
30 uBpv/m								
		Range <u>1</u>	_	i	į	<u>.</u>		
Start 1.0 GHz							Stop	5.0 GHz

Radiated spurious emissions 1 to 5 GHz, TX 2437 MHz, CH06, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization





Radiated spurious emissions 1 to 5 GHz, TX 2452 MHz, CH09, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization



2 Scan					🗢 1Pk Max	2Av Max
110 dBµV/m				M2	[2]90.7	0 dBµV/m
					2.44750	0000 GHz
				M1	[1] 96.1	1 dBµV/m
					2,45400	0000 GHz
100 dBuY/m-						
					1	
		112				
90 dBµV/m		- 7				
		- 10				
		- 11				
		- 4 5			1	
80 dBµ∀/m		-11-11				
		11				
FCC 15 209 PK		11				
70 dBµV/m						
					) 	
60 dBµ√/m						
		ſ				W
FCC 15 209 AV						and Man
				when a burry wa	whiteman	y
50 dBµV/m		-	the second second	And the second s		
	{		The devine the bringer and			
	worked when and	}	A Mada at 1			n n
	1. 1. Marsh Marsh Marsh Marsh				1	$\sim$
40 dBμV/m-	LAND AND AND AND AND AND AND AND AND AND					-
1 Marshow Market Market	, max					
Any manufactory and a second a second a second	(					
					1	
30 dBµV/m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				1	
and the second sec						
Start 1.0 GHz	Range 1				Sto	n 5 0 GHz
					510	

Radiated spurious emissions 1 to 5 GHz, TX 2452 MHz, CH09, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in vertical polarization





Radiated spurious emissions 5 to 18 GHz, TX 2452 MHz, CH09, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector





Radiated spurious emissions 3.6 to 18 GHz, TX 2452 MHz, CH09, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in in vertical polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector





## Radiated spurious emissions 5 to 18 GHz, , TX 2437 MHz, CH06, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector





Radiated spurious emissions 5 to 18 GHz, , TX 2437 MHz, CH06, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in vertical polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector





: Radiated spurious emissions 5 to 18 GHz, TX 2422 MHz, CH03, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in vertical polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector





Radiated spurious emissions 5 to 18 GHz, TX 2422 MHz, CH03, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector



2 Scan								●1Pk	Max • 2Av Max		
80 dBµ∀/m———											
75 dBµ∨/m											
FCC 15 209 PK											
70 dBuilt (m											
70 uBµv/m											
65 dBµ∀/m											
60 dBµV/m											
					here i		have a h	. In Mary in	MALL & WEATHER .		
FEE dBy¥69 AV	, st setuti	. I	the ment working	and the work proved to	proprover and white with the	and white the property and	with the second states of the	and the state of t	Hardan		
with And	mound	ANNAMONAN	A A Marchae A	-Alouania,							
Away and Warning and Stranger											
00 dbp // m											
45 dBµ∀/m											
					(class).	5.144	. marches	and day man	manne		
	Adam	her annound	we mount	mangelyman	Non www.	when a wall a ward	water and the state of the stat				
40 dBµV/m	www. M. Showport	We conference .	(albana								
on drawing											
зз авµv/m———											
30 dBµV/m											
	<u> </u>		[		qe 1						
Start 18.0 GHz	Kange 1 tart 18.0 GHz Stop 25.0 GHz										

Radiated spurious emissions 18 to 25 GHz, TX 2422 MHz, CH03, 802.11n (40MHz), 13.5Mbps, multiple chain in horizontal polarization



2 Scan								1Pk	Max • 2Av Max
80 dBµ∀/m									
75 dBµ∀/m									
FCC 15 209 PK									
70 10 117									
/U dBµ∀/m									
65 dBuV/m-									
60 dBµ∀/m									
F&& d₽₽¥609 <u>av</u>					and the total		. 14 1	الاربغ المالين المراجع	No. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
	. Ash.s	all aller tom	and a real work the	Man Mary What Mary	MAN AND MANY AND	handleylogenadelylang	and population and for which with the	an wanter an	
with some state in WAN	MMMMMMMMMM	na sanatabilitari ana n	and more a	er trager		( <b>1</b>			
AAA ABH Kalingana									
45 dB⊔∀/m									
			santure	muningen	newannewanter	man	er warman with the me	mound	Welling and welling
40 dBµ∀/m	approximation and a second	When man appropriate Mar	Mr. Maryman Mark Mark Mark Mark	man the second s					
-unallowellowed - but									
35 dBµ∨/m									
зо авµ∨/m———									
	<u> </u>	<u> </u>				<u> </u>		<u> </u>	
Start 18.0 GHz				Ran	ye i				Stop 25.0 GHz

Radiated spurious emissions 18 to 25 GHz, TX 2422 MHz, CH03, 802.11n (40MHz), 13.5Mbps, multiple chain in vertical polarization





: Radiated spurious emissions 18 to 25 GHz, TX 2437 MHz, CH06, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in horizontal polarization



2 Scan								● 1Pk	Max • 2Av Max
80 dBµV/m———									
75 dBu∀/m									
FCC 15 209 PK									
70 dBµ∀/m									
65 dBuV/m									
03 08p*/11									
60 dBµ∨/m									
F&& 494 \$69 AV			1		. Marshiphila I. d	a	here Alberton Haters	with March Marchell	Martula William and
1.00	under Work W	Marth Mar warth	Madedurident	MANNAM mar on	adminent an and MARAda	ardedation of advances of a sec	a NAMANA I I AN I DIA MARANA ANA ANA ANA ANA ANA ANA ANA ANA AN	and an ensemblished.	and a start of
salabut mit the salar	ana nana Malata a								
e d'un									
45 dBuiltín									
45 UBD V/m									
				manufacture	montheman	montheman	ANN MARCHANNER	remallemment	Mulumman
40 dBµ∀/m	an the way to be the second	With many fat without	Mandred + Harrison Manager	workprove the		·····			
maynewant									
an In 117									
35 авµv/m———									
30 dBµV/m									
Chauth 10, 0, Cl.	1	1		ı Ran	ge 1	1		1	Chan DE O CL
ເອເລກະ ເອເບ GHZ									Stop ZSTO GHZ

Radiated spurious emissions 18 to 25 GHz, TX 2437 MHz, CH06, 802.11n (40MHz), 13.5Mbps, multiple chain with antenna in vertical polarization



2 Scan								●1Pk	Max • 2Av Max
80 dBµV/m									
75 dBµV/m-									
100 10 200 PK									
70 dBµ∀/m									
65 dBµ∀/m									
60 dBuV/m									
oo abpeyin									
ϝ┺ᢓᢄdᡛᢓ⊌᠑ᢓᡬ᠐᠑᠂᠊᠕ᢦ					11 1 1		a tar	in these the	dar to t
	idet stam	and the second sector	REAL AND AND MORE AND	and the second	AND AND MANY MANY MANY MANY MANY MANY MANY MANY	http://www.http://www.	phillipping and an and a series	Nur Callanthe Call	partitions
the white where	WWW. HUNWWWWW	hard alladar Arable no da o	water When a constant	Whee				· · ·	
Mathhamman and a second se									
45 dBµ∀/m									
									eta.
			antikhosta	www.whowhow	mannaman	monordyportun	www.enthewphrees	mullimen my and	10- Man war were higher
40 dBµV/m	man Maply and the	My mar Mar and a mar	white was added in the	Nershor 2					
and the second sector									
35 dBuV/m									
oo abpiyiii									
30 dBµV/m									
Start 18 0 CHz	•	•		Ran	ge 1	•		-	Stop 25.0 GHz

: Radiated spurious emissions 18 to 25 GHz, TX 2462 MHz, CH11, 802.11n (20MHz), 6.5Mbps, multiple chain with antenna in horizontal polarization



2 Scan								1Pk	Max • 2Av Max	
80 dBµV/m										
75 dBµ∀/m										
FCC 15 209 PK										
/U dBµV/m										
65 dBuV/m										
60 dBµ∨/m										
᠇ᢓᠧᡭᡛᢖᢧᢓᢅᡬᡃ᠍ᡃᠣ᠊ᢩᢌᢦ					n. tracki d	1 441 - 4 1 4	atra t	All the deal de	Matterial at a to	
· ·	we have the block	and an increase of the sta	Mr. Hannah when	Malan Mar Mar Maria Ala	NAM MANY MUNI	N/MAN/MAN/MAN/M	enthemps and all the fl	herba ada adda adda antachas		
HER HERV HIGHLAN	MININ WWWWWWW	energian hallen avlande av		(1) P (1)						
MBBL/MBR/WWW										
45 dBµ∀/m										
									(h) .	
				manum	mounderstay	monorallyppindenton	ann markanter	www.www.www.	and a word the word	
40 dBµ∀/m	Martin Martinger	where and a strain of the strain of	WAR majoin Alder Carls	November 11						
hand a start of the start of th										
2E dBuild for										
35 uspv/m										
30 dBµV/m										
		<u> </u>			ge 1	l				
Start 18.0 GHz	tart 18.0 GHz Stop 25.0 GHz									

Radiated spurious emissions 18 to 25 GHz, TX 2462 MHz, CH11, 802.11n (20MHz), 6.5Mbps, multiple chain with with antenna in vertical polarization





TX 2480 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
47.2500	23.5	40.0	-16.5	QP
60.7500	24.0	40.0	-16.0	QP
67.5000	23.7	40.0	-16.3	QP
74.2500	25.9	40.0	-14.1	QP
87.7500	31.6	40.0	-8.4	QP
94.5000	35.7	43.5	-7.8	QP
101.2500	35.2	43.5	-8.3	QP





## TX 2480 MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
47.2500	25.6	40.0	-14.4	QP
60.7500	25.0	40.0	-15.0	QP
67.5000	27.8	40.0	-12.2	QP
74.2500	27.3	40.0	-12.7	QP
87.7500	31.8	40.0	-8.2	QP
94.5000	33.8	43.5	-9.7	QP
101.2500	31.8	43.5	-11.7	QP





Radiated spurious emissions 1 to 3GHz, TX 2402 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization





17:40:13 05.05.2020

Radiated spurious emissions 1 to 3GHz, TX 2402 MHz, CH 00, 8DPSK MODULATION with antenna vertical polarization





Radiated spurious emissions 1 to 3GHz, TX 2441 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization



2 Scan								🕽 1Pk Max 🖲 2Av Max 🗋
							M1[1	] 88.04 dBµV/m
100 dBµV/m								-2.441000000 GHz
			1					
90 dBµV/m							MT	
							Ť	
80 dBµ∀/m								
FCC 15 209 PK								
70 dBµV/m			1 1 1	1 1 1				
60 dBµV/m								
FCC 15 209 AV								
50 dBuV/m								
							. A world	washingthe proposition of the
					1. workershippy	and with down	W W	
			<b>1</b> . 1	1. derland	PMV AMPA			
			ward with some bags	Mary Mary Mary Mary				
40. dBuV/m		unterstrangenter and	Arrada ar					
io obprym	who who have the service of the							
month all and all appears to the marked and the	man and							- man
						لبر	1 m	
					and the second			
			سيني پر ا					
30 авµv/m—		ىسىر						
	يتم يوا							
			1					
Start 1.0 GHz			Range 1					Stop 3.0 CHz
								atop ato drizij

Radiated spurious emissions 1 to 3GHz, TX 2441 MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization



2 Scan								🖲 1Pk Max 🖲 2Av Max 🗋
							M1[	1] 92.40 dBµV/m
100 dBµV/m								2.480000000 GHz
							M1	
							Ŧ	
90 dBµV/m			-				*	
80 dBuV/m								
FCC 15 209 PK								
70 авµv/m								
60 dBµ∨/m							-	
FCC 15 209 AV								
							t	
50 dBµV/m								ki dha a a
					1	10	La Verna	March
					wold when you	And mark of the		
			, he would have	approximation	5 M .			
40 d0.00/m		mandrer you be you al	Hural Philip and				ĭ	
	in shaper most maker all of the							
Mar Mar Jahn Mar	part of the					1		
							Office .	
30 dBµ∨/m								
	mulum							
	<u>i</u>	<u>.</u>	Range 1	<u>i</u>	<u>i</u>	<u> </u>		
Start 1.0 GHz								Stop 3.0 GHz

Radiated spurious emissions 1 to 3GHz, TX 2480 MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization



2 Scan								🔍 1Pk Max 🔍 2Av Max 🗋
							M1[	1] 94.34 dBµV/m
100 dBµV/m								2.48000000 GHz
							M1	
							Ŧ	
90 dBµV/m			1				-	
80 dBµ∨/m							-	
FCC 15 209 PK								
70 dBµV/m								
60 dBµV/m								
FCC 15 209 AV								
							+	
F0_dBuV/m								
50 0Bp*/m							N. A with	a stell both floor work and
					A. Marian	ary In All Walk	Mar Pares	44 4 F
				1 Normality	weeker	and Mohana	×	
			abant hypergeneral ale	MMM dearer .				
40. dBuV/m	يل د.	menter by Usper Man	wr:					
1. All mer shill we	Anna water water						N I	
And sweetly warness was been	<b>vy</b> 1 <b>v</b>							
							Un	
30 dBµV/m								
	em	~						
			Range 1		:	·		· · ·
Start 1.0 GHz								Stop 3.0 GHz

Radiated spurious emissions 1 to 3GHz, TX 2441 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization





Radiated spurious emissions 3 to 18GHz, TX 2480 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization





Radiated spurious emissions 3 to 18GHz, TX 2480 MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization





Radiated spurious emissions 3 to 18GHz, TX 2402 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization





Radiated spurious emissions 3 to 18GHz, TX 2402MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization





Radiated spurious emissions 3 to 18GHz, TX 2441 MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization





Radiated spurious emissions 3 to 18GHz, TX 2441MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization



2 Scan								🗢 1Pk	Max 🛛 2Av Max
80 dBµV/m									
75 dBµ∨/m									
FCC 15 209 PK									
70 dBµV/m									
65 dBµ∀/m									
60 dBuV/m									
00 0001011									
									<ul> <li>I</li> </ul>
EE dBuilder				the st	. July had a	ينت التحتيين	A DAMAGA AL	a thread the same	Mary Long Mary 1.
FCC 19 209 AV	, d salah	. I. e. e. I. she she e his	the man working	A A AND MAN	white a surface and the second	and the state of t	waalih ana matata malahi	hat the contraction of the second	and an and the
And	www.www.	WWWWWWW	AAAMmahaamaha	Monthly .					
Annumber Mary por	T								
50′dBµ∀/m———									
45 dBµ∀/m									
							and a set	and all and and and	man many
		1 . www.	in wanther	www.www.	Munimental	when a charman when the	and the second second second		
40 dBµV/m/₩	www. and with a	Man Man .	Montes 1. 1.						
manuella									
35 dBµV/m									
20. dBuV/m									
50 dbp*/m									
	1	I		Ran	ge 1		<u> </u>		
Start 18.0 GHz									Stop 25.0 GHz

Radiated spurious emissions 18 to 25 GHz, TX 2402MHz, CH 00, 8DPSK MODULATION with antenna in horizontal polarization



2 Scan								● 1Pk	Max • 2Av Max
80 dBµV/m									
75 dBuiltin									
75 dBµV/m FCC 15 209 PK									
70 dBµV/m									
65 dBµ∀/m									
60 dBuV/m									
r&&d£9-⊻69-⊼∨						1 1		L L	Bed and the black
	dub.s	the attact to ma	and a real work White	Many Mark Mark Mark	When with the first	namphanamanana	have a straight and the second straight and the	with with the line with the	a when the owner of the
AND AND MANY AND HOW	MANNALANTA	for even where the second of t	and the second			1 M .			
ARA OBLICK COMMAN									
45 dBµ∀/m									
									Max.
			manue	munhammen	heremandul	Martin Mallana	er warman marker	mannan	man man man
40 dBµ∀/m	and the deserver the and	With many with the caller of the							
- marthand									
35 dBuV/m									
30 dBµV/m									
Start 18.0 GHz	· ·	·		Ran	ge 1		·		Ston 25.0 GHz
0.01 1 1010 0112									2100 2010 0112

Radiated spurious emissions 18 to 25 GHz, TX 2402MHz, CH 00, 8DPSK MODULATION with antenna in vertical polarization



2 Scan								●1Pk	Max • 2Av Max
80 dBµ∀/m———									
75 dBµ∀/m									
FCC 15 209 PK									
70 dbuV/m									
70 ubµv/m									
65 dBµ∀/m									
60 dBµ∨/m									
F&& \$\$\$\$\$\$\$\$\$\$ <u>A</u> ∨			- I .		d above to the		Adada Lake	untralized has been	Million Landon
	war watter	Mr. no block	non headdam My	Mulmphillinnahow	KANDANA ALANA	squarman plan whe	MANANALANNAN LANK	When the baby many trans.	and AMS about MMAN
sh deburdene	MANA MANA	We do not not which have a	an de la contraction de la con	-					
NBULL CONCLUTION OF									
45 dBµ∀/m									
									hele.
		1.		manuthumante	An and the second	www.www.www.	mannenmyron	all makers and a second	" Munummulle with
40 dBµ∀/m	when we will a strategy	and the second state of th	waparethered and a second						
newsterens and									
or drugger									
35 aBhA/w									
30 dBu∀/m									
	<u> </u>	<u> </u>			qe 1				
Start 18.0 GHz Stop 25.0 GHz									

Radiated spurious emissions 18 to 25 GHz TX 2441MHz, 8DPSK MODULATION with antenna in horizontal polarization


2 Scan								● 1Pk	Max • 2Av Max
80 dBµV/m									
TE de dute									
75 dBµV/m FCC 15 209 PK									
70 dBµV/m									
65 dBµ∀/m									
60 dBuV/m									
00 app.,									
P&& dBy ≥69 AV				1			i al ha		CAL H L
	a contrata	he where was have	no. a. c. al was Willy	Leaven Marth M.	pycallov www.Willy.Jyr	humph have been a strength with the second str	Man We way that way	ant the second states and the second s	M.M. M.
	North Marker Marker	h waa waa waa waa waa waa waa waa waa wa	tar fi Aladh Mha fhairte 🖓 🖉 🖉	rwa, i					
ABAY ABAYA CO. adv.									
45 dBµV/m									
									hales
			ABAMAAA	and many working	mmmmmm	man mental marine	and the second second	all and the second was and	and a second and a second and a second and a second a sec
40 dBµ∀/m	and the state of t	Orthe - Bernard the grant of the start	Contraction and the second						
any and the second									
35 dBuV/m									
30 dBµV/m									
Start 18 0 GHz	·			Ran	ge 1	•		·	Stop 25 0 CHz
									500p 2510 0HZ

Radiated spurious emissions 18 to 25 GHz, TX 2441MHz, 8DPSK MODULATION with antenna in vertical polarization



80       Bull       Image: State St	2 Scan								● 1Pk	Max • 2Av Max
88 dbp//m										
B0 dBuV/m       Image: set of the set										
75 dbu//m       -	80 dBµ∀/m———									
75 Baply/m										
13 Jaby/m         13 Jaby/m         14 Jaby/m <t< td=""><td>75 dbullin</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	75 dbullin									
70 dBµ//m       1	FCC 15 209 PK									
70 dBpV/m										
65 dBµV/m 60 dBµV/m 55 dBµV/m 40 dBµV/m 40 dBµV/m 30 dBµV/m	70 dBµV/m									
65 dbµ//m 60 dbµ//m 55 dbµ//m 10 dbµ/m 10 dbµ//m 10 dbµ//m 10 dbµ//m 10 dbµ//m 10 dbµ//m 1										
65       dbµv/m       1 </td <td></td>										
60 dBµV/m       Image: Im	65 dBµ∀/m									
60 dby//m 50 dby//m 50 dby//m 50 dby//m 40 dby//m 10 dby/m 10 dby/m 10 dby/m 10 dby/m 10 dby/m 10 dby/m 10 dby										
55: CBU ½ 00 xv     0 <td>60 dBµV/m</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	60 dBµV/m									
55: 4Bu ½ (#) xv       -										
55. dbu² (db x)     1 <td></td>										
shippu h         -	F&EdBy¥69 ⊼∨									LAAS CHEEF
shippung		المعدد الأدري	and have a more there	MILLING MANY	and the second	and the work of the	all have been a strategy and the state	Multi In hope of pass	or work of the second	hon Martin Martin Martin
45 dBµV/m 45 dBµV/m 40 dBµV/m 35 dBµV/m 30 dBµV/m 30 dBµV/m AT 18 0 CHz AT 18 0 CHz	chlore which WW	an way and	why shake the day as the	Neithel Ball Method Action of A	Actin .					
45 dBµV/m 40 dBµV/m 35 dBµV/m 30 dBµV/m Brance 18 0.CHz A5 dBµV/m A5 dBµV/m Brance 18 0.CHz A5 dBµV/m Brance 18 0.CHz A5 dBµV/m Brance 18 0.CHz Brance 18 0.CHz Brance 18 0.CHz Brance 18 0.CHz	VSAVABHARMUL									
45 dBµV/m 40 dBµV/m 35 dBµV/m 30 dBµV/m The second sec										
40 dBμV/m 35 dBμV/m 30 dBμV/m and and and and and and and and and and	45 dBµ∀/m									
40 dBµV/m 35 dBµV/m 30 dBµV/m and and and and and and and and and and										Alex.
40 dBµV/m 35 dBµV/m 30 dBµV/m Exert 18 0 CHz Stop 25 0 CHz				Marina	mannether	mon wall when	monordellaman	www. Marchangelance	man white	a and a second second
35 dBµV/m- 30 dBµV/m- The second se	40 dBµ∨/m	man man share and a start of the	Mappine - March Contraction	and granter of code .						
35 dBμV/m- 30 dBμV/m- Start 18 0.CHz Start 18 0.CHz Start 18 0.CHz	and the second sec									
30 dBµV/m	35 dBµ∀/m									
30 dBµV/m										
30 dBµV/m II I										
Range 1 Start 18 0 CHz	30 dBµV/m									
Range 1 Stop 25 0 GHz										
Range 1 Stop 25 0 GHz										
30.017.10.02.017	Start 18.0 GHz				Ran	ge 1				Stop 25.0 GHz

Radiated spurious emissions 18 to 25 GHz, TX 2480MHz,8DPSK MODULATION with antenna in horizontal polarization



2 Scan								● 1Pk	Max • 2Av Max
80 dBµV/m									
75 dBuV/m									
FCC 15 209 PK									
70 dBµV/m									
65 dBµ∀/m									
60 dBµV/m									
F&& dBy ⊻619 AV									1
	and realized	. An anno dalar	Mr. H. word when the	Million Mr. Mr. Mille MM	Alder March March	n WWWWWWWWWW	Mar Almal Mar Mar All Mar Al	Perton and a strike and which have been been been been been been been be	. and the stand of
USO HEREY HIS WILL MAN	M MALLAN MANY MANY	www.hallan.achina.ac	a A Millith, allocation i	a na					
Mall Mall Charles and									
45 dBµ∀/m									
									Mu
		. siMe.es	Mar Marthan	monorman	mounderstand	monorphillipping	ann gand and	mannen	man marked and a
40 dBµV/m	me the way the state	A Marine Marine Marine Contraction of the Contracti	and the second sec						
have a second									
35 dBµV/m									
30 dBµV/m									

Radiated spurious emissions 18 to 25 GHz, TX 2480MHz,8DPSK MODULATION with antenna in vertical polarization



## Section 9. Block diagrams of test set-ups





### 9.2 Radiated emissions set-up for frequencies above 1 GHz





#### 9.3 Conducted emissions set-up



#### 9.4 Antenna port set-up





# Section 10. Photos

### 10.1 Photos of the test set-up



Radiated emission above 1 GHz

L G IL





Conducted emission on the antenna port



Conducted emission on the AC Mains



## 10.2 Photos of the EUT







(End of report)