T E S T R E P O R T
No.: 18-1-0086601T05a

According to:
FCC Regulations
Part 1.1310
Part 2.1091

IC-Regulations
RSS-102, Issue 5

for

Robert Bosch Car Multimedia GmbH

AIVIL42N0

FCC-ID: YBN-AIVIL42N0
IC: 9595A-AIVIL42N0

Laboratory Accreditation and Listings			
DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01	MRA US-EU 0003	Industry Canada Reg. No.: 3462D-2 Reg. No.: 3462D-3	Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2666 C-2914, T-1967, G-301
WiFi ALLIANCE AUTHORIZED RF LABORATORY	ctia Authorized™ Test Lab Lab Code: 20011130-00		
accredited according to DIN EN ISO/IEC 17025			

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1. Summary of test results

The test results apply exclusively to the test samples as presented in this Report. The CETECOM GmbH does not assume responsibility for any conclusions and generalizations taken in conjunction with other specimens or samples of the type of the item presented to tests.

The presented Equipment Under Test (in this report, hereinafter referred as EUT) integrates a BT BDR/EDR 2.4 GHz RF Transceiver (Hopping Mode), WLAN 2.4 GHz RF Transceiver and WLAN 5GHz RF Transceiver. Other implemented wireless technologies were not considered within this test report.
Following tests have been performed to show compliance with applicable FCC Part 2.1091 and FCC Part 1.1310 of the FCC CFR 47 Rules.

1.1. Summary of tests results

RF-Exposure Evaluation (separation distance user to RF-radiating element greater 20cm)								
Test cases	**Port**	**References & Limits**				**EUT set-up**	**EUT op. mode**	**Result**
		FCC Standard	Test Limit	RSS Standard	Test Limit			
Radio frequency radiation exposure Requirements	Cabinet + Inter-Connecting Cables (conducted)	§2.1091 §2.1093	RF-Field Strength Limits: FCC: "general population/ uncontrolled" environment	RSS-102, Issue 5	Chapter 4 Table4	1,2	1,2,3	Pass

Remark:

1.) See separate test reports & corresponding annexes for following installed technologies

FCC WLAN 2.4GHz:	BTL-FCCP-5-1808C227_2.4G_ AIVIL42N0 MDG1810008
FCC BT BDR/EDR:	BTL-FCCP-4-1808C227_BT_ AIVIL42N0 MDG1810008
FCC WLAN 5GHz	BTL-FCCP-6-1808C227_5G_ AIVIL42N0 MDG1810008
ISED WLAN 2.4GHz:	BTL-ISEDR-5-1808C227_2.4G_ AIVIL42N0 MDG1810008
ISED BT BDR/EDR:	BTL-ISEDR-4-1808C227_BT_ AIVIL42N0 MDG1810008
ISED WLAN 5GHz	BTL-ISEDR-6-1808C227_5G_ AIVIL42N0 MDG1810008

2.) Calculations based on Tune-Up Info delivered by applicant

Digital unterschrieben von Niels Jeß
DN: cn=Niels Jeß, o=CETECOM GmbH, ou=Branch Duesseldorf, email=niels.jess@cetecom.com, c=DE
Datum: 2018.10.16 11:37:54 +02'00'

Ninovic Perez
2018.10.16 10:34:55 +01'00'

.....
Dipl.-Ing. Niels Jeß
Responsible for test section

.....
Dipl.-Ing. Ninovic Perez
Responsible for test report

2. Administrative Data

2.1. Identification of the testing laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
Responsible for testing laboratory:	Dipl.-Ing. Rachid Acharkaoui
Deputy:	Dipl.-Ing. Niels Jeß

2.2. Test location

2.2.1. Test laboratory "CTC"

Company name:	see chapter 2.1. Identification of the testing laboratory

2.3. Organizational items

Responsible for test report:	Dipl.-Ing Ninovic Perez
Responsible for project:	Dipl.-Ing. Ninovic Perez
Receipt of EUT:	2018-08-29
Date(s) of test:	2018-09-03 – 2018-09-12
Date of report:	2018-10-12
Version of template: 13.02	

2.4. Applicant's details

Applicant's name:	Robert Bosch Car Multimedia GmbH
Address:	Robert-Bosch-Straße 200 31137 Hildesheim Germany
Contact person:	Mr. Salvatore Miraglia

2.5. Manufacturer's details

Manufacturer's name:	please see applicant's details
Address:	please see applicant's details

1.2 Summary of product description

FCC ID:	YBN-AIVIL42N0	
ISED:	9595A-AIVIL42N0	
Product name	AIVIL42N0	
Exposure category	☒ General population/uncontrolled environment ☐ Occupational exposure/controlled environment	
Output power	☒ Conducted ☐ ERP ☐ EIRP ☐ Peak ☒ Source-based time-averaging	
Antenna gain	details refer Chapter 1.5	
Technology	☐ MIMO	☐ 2T2R ☐ 3T3R ☐ 4T4R
	☒ non-MIMO	☒ 1T1R ☐ 1T2R ☐ 2T1R
Evaluation type	☒ Standalone ☐ Simultaneous transmission	
Evaluation distance	☒ 20 cm	
	☐ XXX cm	declares by manufacturer
EUT type	☒ Production Unit ☐ Engineering Unit	
Device type	☒ Mobile device ☐ Fixed device	
Refer rules	☒ CFR 47 FCC Part 2.1091 ☒ CFR 47 FCC Part 1.1310 ☒ KDB 447497 D01v06 October 23, 2015 ☒ KDB 865664 D01v01r02 October 23, 2015	

1.3 Refer Rules

ANSI C95.1–1999	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
KDB 447498 D01 v06 October 23, 2015	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
KDB 865664 D01v01r02 October 23, 2015	RF Exposure Compliance Reporting and Documentation Considerations.
CFR 47 FCC Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.
CFR 47 FCC Part 1.1310	Radiofrequency radiation exposure limits.

1.4 EUT Technologies

Wireless Technologies	Frequency bands	Operation mode			Duty cycle
☐GSM	☐850 ☐1900	Voice (GMSK)	1 slot		☐12.5%
	☐Support DTM (Dual Transfer Mode)				
☐GPRS	☐850 ☐1900	GPRS (GMSK) Multi – Slot Class	☐ 8	1 slot (1 Up, 4 Down)	☐12.5%
			☐ 10	2 slots (2 Up, 4 Down)	☐12.5% ☐ 25%
			☐ 12	4 slots (4 Up, 4 Down)	☐12.5% ☐ 25% ☐37.5%

					☐ 50%
☐EDGE	☐850 ☐1900	EDGE (8-PSK) Multi – Slot Class	☐ 8	1 slot (1 Up, 4 Down)	☐12.5%
			☐ 10	2 slots (2 Up, 4 Down)	☐12.5% ☐ 25%
			☐ 12	4 slots (4 Up, 4 Down)	☐12.5% ☐ 25% ☐37.5% ☐ 50%
☐WCDMA (UMTS)	☐Band II ☐Band IV ☐Band V	☐ UMTS Rel.99 (Voice & Data) ☐ HSDPA(Rel.5) ☐ HSUPA(Rel.6) ☐ DC-HSDPA(Rel.8) ☐ HSPA+(Rel.7)			☐100%
☐CDMA (CDMA2000)	☐BC0 ☐BC1 ☐BC10	☐ 1xRTT (Voice & Data) ☐ 1xEVDO Rel.0 ☐ 1xEVDO Rel.A ☐ 1xAdvanced			☐100%
	☐Support SV-DO (1xRTT-1xEVDO)				
☐LTE-FDD	☐Band 2 ☐Band 4 ☐Band 5 ☐Band 7 ☐Band 12 ☐Band 13 ☐Band 17 ☐Band 25 ☐Band 26 ☐Band 27 ☐Band 30	☐QPSK ☐16QAM			100%
		☐Rel.11 Carrier Aggregation	☐2 Uplinks 2 Downlinks ☐2 Uplinks 3 Downlinks ☐3 Uplinks 2 Downlinks ☐3 Uplinks 3 Downlinks		
	☐Supports SV-LTE (1xRTT-LTE)				
☐LTE-TDD	☐Band 38 ☐Band 39 ☐Band 40 ☐Band 41 ☐Band 42	☐QPSK ☐16QAM			63.3% This device supports uplink –downlink configuration 0-6. The configuration with highest duty cycle was used (configuration. 0 at 63.3%)
		☐Rel.11 Carrier Aggregation	☐2 Uplinks 2 Downlinks ☐2 Uplinks 3 Downlinks ☐3 Uplinks 2 Downlinks ☐3 Uplinks 3 Downlinks		
	☐Supports SV-LTE (1xRTT-LTE)				
☒Wi-Fi	☒2.4GHz	☒IEEE 802.11b	☒2412 – 2462 MHz ☐2412 – 2472 MHz		☒50%
		☒IEEE 802.11g	☒2412 – 2462 MHz ☐2412 – 2472 MHz		☒50%
		☒IEEE 802.11n HT20	☒2412 – 2462 MHz ☐2412 – 2472 MHz		☒50%
		☒IEEE 802.11n HT40	☒2422 – 2452 MHz		☒50%
	☐5GHz	☒IEEE 802.11a	☒5180 – 5240 MHz ☒5260 – 5320 MHz ☒5500 – 5700 MHz ☒5745 – 5825 MHz		☒50%
		☒IEEE 802.11n HT20	☒5180 – 5240 MHz ☒5260 – 5320 MHz ☒5500 – 5700 MHz ☒5745 – 5825 MHz		☒50%

		☒IEEE 802.11n HT40	☒5190 – 5230 MHz ☒5270 – 5310 MHz ☒5510 – 5670 MHz ☒5755 – 5795 MHz	☒50%
		☒IEEE 802.11ac VHT20	☒5180 – 5240 MHz ☒5260 – 5320 MHz ☒5500 – 5700 MHz ☒5745 – 5825 MHz	☒50%
		☒IEEE 802.11ac VHT40	☒5190 – 5230 MHz ☒5270 – 5310 MHz ☒5510 – 5670 MHz ☒5755 – 5795 MHz	☒50%
		☒IEEE 802.11ac VHT80	☒5210 – 5210 MHz ☒5290 – 5290 MHz ☒5530 – 5530 MHz ☒5775 – 5775 MHz	☒50%
	☐Supports Band gap channels			
☐Others	☐2.4GHz	☐ 1 MHz Bandwidth	☐2402 – 2472 MHz	☐100%
☐Bluetooth	☐2.4GHz	☐Version 2.1+EDR		☐77.5%
		☐Version 3.0+HS		☐77.5%
		☐Version 4.0		☐100%
		☐Version 4.1+EDR		☐77.5%
		☐Version 4.2+EDR		☐77.5%

1.5 Antenna Information

Wireless Technologies	Frequency bands	Antenna type	Maximum antenna gain	
☐GSM	☐850	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
☐GSM	☐1900	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
☐WCDMA (UMTS)	☐Band II	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band IV	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band V	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	

☐CDMA (CDMA2000)	☐CDMA800	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐CDMA1900	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
☐LTE-FDD	☐Band 2	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 4	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 5	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 7	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 12	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 13	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 17	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 25	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB	☐Antenna 1	

		☐		
	☐Band 26	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 27	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
☐LTE-TDD	☐Band 38	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 39	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 40	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 41	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
	☐Band 42	☐PIFA ☐PCB ☐	☐Antenna 0	
		☐PIFA ☐PCB ☐	☐Antenna 1	
☒Wi-Fi	☒2.4GHz	☐PIFA ☒PCB ☐	☒Antenna 0	5.3dBi gain max
		☐PIFA ☐PCB ☐	☐Antenna 1	
		☐PIFA ☐PCB ☐	☐Antenna 2	
	☒5GHz	☐PIFA ☒PCB ☐	☒Antenna 0	7.3dBi gain max
		☐PIFA ☐PCB ☐	☐Antenna 1	
		☐PIFA	☐Antenna 2	

		☐PCB ☐		
☐Others	☐2.4GHz	☐PIFA ☐PCB	☐Antenna 0	
		☐PIFA ☐PCB	☐Antenna 1	
		☐PIFA ☐PCB	☐Antenna 2	
☒Bluetooth	☐2.4GHz	☐PIFA ☒PCB	☒Antenna 0	-4.5dBi gain max

2.6. EUT, Auxiliary Equipment (AE) and EUT set-ups

Please refer to the following test reports:

FCC WLAN 2.4GHz:	BTL-FCCP-5-1808C227_2.4G_ AIVIL42N0 MDG1810008
FCC BT BDR/EDR:	BTL-FCCP-4-1808C227_BT_ AIVIL42N0 MDG1810008
FCC WLAN 5GHz	BTL-FCCP-6-1808C227_5G_ AIVIL42N0 MDG1810008
ISED WLAN 2.4GHz:	BTL-ISEDR-5-1808C227_2.4G_ AIVIL42N0 MDG1810008
ISED BT BDR/EDR:	BTL-ISEDR-4-1808C227_BT_ AIVIL42N0 MDG1810008
ISED WLAN 5GHz	BTL-ISEDR-6-1808C227_5G_ AIVIL42N0 MDG1810008

2.7. EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	WLAN 2.4 802.11b/g/n TX-Mode Fixed channel modulated	With help of special test firmware a continuous traffic mode. *2)
op. 2	TX-Mode hopping off	With help of special test firmware a continuous traffic mode could be established with help of a Bluetooth base simulator. (R&S CBT32)
op. 3	WLAN 5 GHz 802.11a/n TX-Mode Fixed channel modulated	The EUT was put to Fixed Channel (Modulated) Continuous transmissions mode with help of test software (Labtool)

*) EUT operating mode no. is used to simplify the test report.

2.8. Test mode software

Test software name: Dut labtool
SW version: 2.0.089
SW date: Mar. 09, 2016
Save location: Local test notebook Dell Inspiron 15-7559

3. Measurements

3.1. Radio Frequency Exposure Evaluation §2.1091

3.1.Test location

test location	☒ CETECOM Essen	☐	☐
	For Evaluation instruments are not needed. Results are determined by calculation based on applicants delivered Tune-Up procedure.		

3.2 Evaluation Rules for FCC Standard

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.
In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0. The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3.3 Limits for FCC Standard

Table 1: LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure				
Frequency range [MHz)	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [mW/cm²]	Averaging time [minutes]
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	$(900/f^2)$*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--		6
1500-100,000	--	--		6
(B) Limits for General Population/Uncontrolled Exposure				
Frequency range [MHz)	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [mW/cm²]	Averaging time [minutes]
0.3-3.0	614	1.63	*(100)	30
3.0-30	824/f	2.19/f	$*(180/f^2)$	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f=frequency in MHz
*Plane-wave equivalent power density

NOTE1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. These limits apply to amateur station licensees and members of their immediate household as discussed in the text.

NOTE2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. As discussed in the text, these limits apply to neighbours living near amateur radio stations.

3.4 Requirements and limits for RSS Standard

RSS-102, Issue 5	**2.5 Exemption Limits for Routine Evaluation** All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.1 or 2.5.2. **If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C)**. The information contained in the RF exposure technical brief may be limited to the value(s) of the maximum output power, the information that demonstrates how the maximum output power of the transmitter was derived and the rationale for the separation distances applied (see Table 1), which must be based on the most conservative exposure condition for the applicable module or host platform test procedure requirements.
	2.5.2 Exemption Limits for Routine Evaluation — RF Exposure Evaluation RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows: • below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance); • at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz; • at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance); • **at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;** • at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance). In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.
	2.6 User Manual Requirements The applicant is responsible for providing proper instructions to the user of the radio device, and any usage restrictions, including limits of exposure durations. The user manual shall provide installation and operation instructions, as well as any special usage conditions (e.g. proper accessory required, including the proper orientation of the device in the accessory, maximum antenna gain in the case of detachable antenna), in order to ensure compliance with SAR and/or RF field strength limits. For instance, compliance distance shall be clearly stated in the user manual. The user manual of devices intended for controlled use shall also include information relating to the operating characteristics of the device; the operating instructions to ensure compliance with SAR and/or RF field strength limits; information on the installation and operation of accessories to ensure compliance with SAR and/or RF field strength limits; and contact information where the user can obtain Canadian information on RF exposure and compliance. Other related information may also be included.

3.5 MPE Calculation method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{EIRP}{4\pi R^2} = \frac{P * G}{4\pi R^2}$$

$$G_{NUMERIC} = \frac{S * 4\pi R^2}{P}$$

Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the centre of radiation of the antenna

3.7 Evaluation Method

3.7.1 Standalone

Valid for WLAN/BT Mode:

• The peak power was checked on 3 frequencies (lowest/middle/highest) within each operable WiFi band and the results compared to applicant's declared power values (tune-up info).

• No duty-cycle correction factor is applicable

Please find in the following tables the calculations based on applicants tune-up information for the power values.

Results for FCC Standard

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Antenna Gain (dBi)	Declared maximum EIRP (Measured+ Tune-up) (dBm)	Duty cycle %	Declared Maximum conducted output power (W)	Equivalent conducted output power (output power x duty cycle) (mW)	MPE Limit (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to Limit: (mW/cm^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-LAN 2.4GHz	2412,0	9,9	5,3	15,2	100%	0,0331	33,1	1,0000	0,00659	0,9934	0,006588	0,0065876
	2437,0	9,9	5,3	15,2		0,0331	33,1	1,0000	0,00659	0,9934	0,006588	
	2462,0	9,9	5,3	15,2		0,0331	33,1	1,0000	0,00659	0,9934	0,006588	
Bluetooth BDR/ DER	2402,0	-3,7	-4,5	-8,2	100%	0,0002	0,2	1,0000	0,00003	1,0000	0,000030	0,0000301
	2442,0	-3,7	-4,5	-8,2		0,0002	0,2	1,0000	0,00003	1,0000	0,000030	
	2480,0	-3,7	-4,5	-8,2		0,0002	0,2	1,0000	0,00003	1,0000	0,000030	

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer 's tune-up info (dB)	Declared Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	EIRP (dBm)	Duty cycle (%)	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (mW)	MPE-Value (mW/cm^2)	MPE-Value (mW/cm^2)	Margin (mW/cm^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
W-LAN 5GHz (20MHZ BW)	5180,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5200,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5240,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (20MHZ BW)	5260,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5280,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5320,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (20MHZ BW)	5500,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5580,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5700,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (20MHZ BW)	5745,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5785,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5825,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (40MHz BW)	5190,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5230,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (40MHz BW)	5270,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5310,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (40MHz BW)	5510,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5550,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
	5670,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (40MHz BW)	5755,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5795,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (80MHz BW)	5270,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	0,0017
	5310,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	
W-LAN 5GHz (80MHz BW)	5510,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	0,0017
	5550,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	
	5670,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	
W-LAN 5GHz (80MHz BW)	5755,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	0,0017
	5795,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	

1. Output power including tune-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer;
4. Depending on output power and antenna gain only the worst case is reported;

Results for RSS Standard

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Antenna Gain (dBi)	Declared maximum EIRP (Measured+ Tune-up) (dBm)	Duty cycle %	Declared Maximum conducted output power (W)	Equivalent conducted output power (output power x duty cycle) (mW)	MPE Limit (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to Limit: (mW/cm^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-LAN 2.4GHz	2412,0	21,2	5,3	26,5	100%	0,4457	445,7	1,0000	0,08866	0,9113	0,088660	0,0886605
	2437,0	21,2	5,3	26,5		0,4457	445,7	1,0000	0,08866	0,9113	0,088660	
	2462,0	21,2	5,3	26,5		0,4457	445,7	1,0000	0,08866	0,9113	0,088660	
Bluetooth BDR/ DER	2402,0	5,08	-4,5	0,6	100%	0,0011	1,1	1,0000	0,00023	0,9998	0,000227	0,0002274
	2442,0	5,08	-4,5	0,6		0,0011	1,1	1,0000	0,00023	0,9998	0,000227	
	2480,0	5,08	-4,5	0,6		0,0011	1,1	1,0000	0,00023	0,9998	0,000227	

Maximum calculated MPE value:		
Lowest MPE-Limit:	1,0000	[mW/cm^2]
Highest MPE value:	0,0887	[mW/cm^2]
Lowest Margin to limit:	0,9113	[mW/cm^2]

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer 's tune-up info (dB)	Declared Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	EIRP (dBm)	Duty cycle (%)	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (mW)	MPE-Value (mW/cm^2)	MPE-Value (mW/cm^2)	Margin (mW/cm^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
W-LAN 5GHz (20MHZ BW)	5180,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5200,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5240,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (20MHZ BW)	5260,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5280,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5320,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (20MHZ BW)	5500,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5580,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5700,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (20MHZ BW)	5745,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	0,0046
	5785,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
	5825,0	6,80	0,00	7,30	0,50	13,60	100%	0,023	22,91	1,0000	0,00456	0,9954	0,0046	
W-LAN 5GHz (40MHz BW)	5190,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5230,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (40MHz BW)	5270,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5310,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (40MHz BW)	5510,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5550,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
	5670,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (40MHz BW)	5755,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	0,0038
	5795,0	6,00	0,00	7,30	0,50	12,80	100%	0,019	19,05	1,0000	0,00379	0,9962	0,0038	
W-LAN 5GHz (80MHz BW)	5270,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	0,0017
	5310,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	
W-LAN 5GHz (80MHz BW)	5510,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	0,0017
	5550,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	
	5670,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	
W-LAN 5GHz (80MHz BW)	5755,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	0,0017
	5795,0	2,60	0,00	7,30	0,50	9,40	100%	0,009	8,71	1,0000	0,00173	0,9983	0,0017	

Maximum calculated MPE value:		
5GHz		
Lowest MPE-Limit:	1,0000	[W/m^2]
Highest MPE-value:	0,0046	[W/m^2]
Margin to limit	0,9954	[W/m^2]

3.7.3 Simultaneous Transmission MPE

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations; ∑ of MPE ratios ≤ 1.0

		W-LAN 2.4GHz	Bluetooth BDR/DER	WLAN 5GHz
	Ratio of MPE-Value/Limit	0,006587644	3,01113E-05	0
W-LAN 2.4GHz	0,006587644	--	0,006617756	0,006587644
Bluetooth BDR/DER	3,01113E-05	0,006617756	--	3,01113E-05
WLAN 5GHz	0,000000000	0,006587644	0,000030111	0,000000000
Maximum-Value				0,00661776

3.8 Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

The measurement results comply with the RSS-102, Issue 5.

4. Measurement uncertainties, Instruments and Ancillary

Please refer to the following test reports:

FCC WLAN 2.4GHz:	BTL-FCCP-5-1808C227_2.4G_ AIVIL42N0 MDG1810008
FCC BT BDR/EDR:	BTL-FCCP-4-1808C227_BT_ AIVIL42N0 MDG1810008
FCC WLAN 5GHz	BTL-FCCP-6-1808C227_5G_ AIVIL42N0 MDG1810008
ISED WLAN 2.4GHz:	BTL-ISEDR-5-1808C227_2.4G_ AIVIL42N0 MDG1810008
ISED BT BDR/EDR:	BTL-ISEDR-4-1808C227_BT_ AIVIL42N0 MDG1810008
ISED WLAN 5GHz	BTL-ISEDR-6-1808C227_5G_ AIVIL42N0 MDG1810008

5. Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2018-10-12

END OF TEST REPORT