# FCC RF Exposure Evaluation

# 1. Product Information

FCC ID:2AVTH-HTLF1314Product nameHyFlipModel numberHTLF14INC4Z1SSGAdditional Model No.HTLF14INC4Z1ES, HTLF14INC4Z1ESGModel DeclarationPCB board, structure and internal of these model(s) are the same, so no additional models were tested.Power supplyDC 7.6V by Rechargeable Li-ion Battery(5000mAh) Recharged by 12V = 2000mA AdapterBluetoothPrequency Range2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BDR/EDR)Bluetooth Modulation TypeGFSK, rt/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Prequency Range2412MHz ~ 2462MHzBluetooth Modulation TypeGFSK for 20MHz bandwidth (2412MHz ~ 2462MHz)Channel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2452MHz)Channel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)Modulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BP						
Model number         HTLF14INC421SSG           Additional Model No.         HTLF14INC421SS, HTLF14INC421ES, HTLF14INC421ESG, HTLF13INC421ESG           Model Declaration         PCB board, structure and internal of these model(s) are the same, So no additional models were tested.           Power supply         DC 7.6V by Rechargeable Li-ion Battery(5000mAh) Recharged by 12V == 2000mA Adapter           Bluetooth         Prequency Range           2402MHz ~ 2480MHz           Bluetooth Version         V4.0           Bluetooth Channel Number         79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)           Bluetooth Modulation Type         GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 2HHz for Bluetooth V4.0 (BT LE)           Bluetooth Modulation Type         GFSK, for Bluetooth V4.0 (BT LE)           Channel Spacing         2412MHz ~ 2462MHz           Channel Number         11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channel Spacing           Modulation Type         IEEE 802.11b: DSSS (CCK, DQPSK, BPSK) IEEE 802.11b: DSSS (CCK, DQPSK, BPSK)           Modulation Type         IEEE 802.11b: DSSS (CCK, DQPSK, BPSK)	FCC ID:	2AVTH-HTLF1314				
Additional Model No.       HTLF14INC421SS, HTLF14INC421ES, HTLF14INC421ESG, HTLF13INC421ESG         Model Declaration       PCB board, structure and internal of these model(s) are the same, So no additional models were tested.         Power supply       DC 7.6V by Rechargeable Li-ion Battery(5000mAh) Recharged by 12V = 2000mA Adapter         Bluetooth       2402MHz ~ 2480MHz         Bluetooth Version       V4.0         Bluetooth Channel Number       79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)         Bluetooth Channel Spacing       2MHz for Bluetooth V4.0 (BT LE)         Bluetooth Modulation Type       GFSK, rt/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 2412MHz ~ 2462MHz         Channel Number       GFSK, rt/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 30Hz for Bluetooth V4.0 (BT LE)         Bluetooth Modulation Type       GFSK rt/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 30Hz         Channel Number       11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2412MHz ~ 2462MHz) 7 Channel Spacing         Modulation Type       IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)         IEEE 802.11b: DSSS (CCK, DQPSK, BPSK)         IEEE 802.11b: DSSS (CCK, DQPSK, BPSK)         IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BPSK)	Product name	HyFlip				
Additional Model No.HTLF13INC4Z1ES, HTLF13INC4Z1ESGModel DeclarationPCB board, structure and internal of these model(s) are the same, So no additional models were tested.Power supplyDC 7.6V by Rechargeable Li-ion Battery(5000mAh) Recharged by 12V == 2000mA AdapterBluetoothEduationFrequency Range2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, n/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeI1 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2412MHz ~ 2452MHz)Channel NumberSMHzChannel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, BPSK) IEEE 802.11b: DSSS (CCK, DQPSK, BPSK) IEEE 802.11b: DSSS (CCK, DQPSK, BPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, D	Model number	HTLF14INC4Z1SSG				
HTLF13INC4Z1ES, HTLF13INC4Z1ESGModel DeclarationPCB board, structure and internal of these model(s) are the same, So no additional models were tested.Power supplyDC 7.6V by Rechargeable Li-ion Battery(S000mAh) Recharged by 12V == 2000mA AdapterBluetoothFrequency Range2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzPrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2412MHz ~ 2452MHz)Channel NumberSMHzFrequency Range2412MHz ~ 2462MHz 2 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Additional Madel No	HTLF14INC4Z1SS, HTLF14INC4Z1ES, HTLF14INC4Z1ESG,				
Model DeclarationSo no additional models were tested.Power supplyDC 7.6V by Rechargeable Li-ion Battery(5000mAh) Recharged by 12V = 2000mA AdapterBluetoothZ402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BDR/EDR)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2.412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2412MHz ~ 2462MHz)Channel NumberSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit	Additional Model No.	HTLF13INC4Z1ES, HTLF13INC4Z1ESG				
So no additional models were tested.Power supplyDC 7.6V by Rechargeable Li-ion Battery(5000mAh) Recharged by 12V = 2000mA AdapterBluetoothFrequency Range2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2412MHz ~ 2462MHz)Channel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)Modulation TypePIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit		PCB board, structure and internal of these model(s) are the same,				
Power supplyRecharged by 12V == 2000mA AdapterBluetooth2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) 3MHz for Bluetooth V4.0 (BT LE)2.4G WLANEFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 200MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit	woder Declaration	So no additional models were tested.				
Recharged by 12V==2000mA AdapterBluetoothFrequency Range2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2412MHz ~ 2452MHz)Channel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit	Power supply	DC 7.6V by Rechargeable Li-ion Battery(5000mAh)				
Frequency Range2402MHz ~ 2480MHzBluetooth VersionV4.0Bluetooth Channel Number79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Number5MHzIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit	Power supply	Recharged by 12V == 2000mA Adapter				
Bluetooth Version       V4.0         Bluetooth Channel Number       79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)         Bluetooth Channel Spacing       1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)         Bluetooth Modulation Type       GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)         2.4G WLAN       Frequency Range       2412MHz ~ 2462MHz         Channel Number       11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)         Channel Spacing       SMHz         Modulation Type       IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)         IEEE 802.11b: OFDM (64QAM, 16QAM, QPSK, BPSK)       IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)         Antenna Description       PIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band         HrAdware version       A116U1-2 REV02         Software version       WINDOWS10         Exposure category       General population/uncontrolled environment         EUT Type       Production Unit	Bluetooth					
Bluetooth Channel Number       79 channels for Bluetooth V4.0 (BDR/EDR)         40 channels for Bluetooth V4.0 (BT LE)         Bluetooth Channel Spacing       1MHz for Bluetooth V4.0 (BT LE)         Bluetooth Modulation Type       GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR)         GFSK for Bluetooth V4.0 (BT LE)       GFSK for Bluetooth V4.0 (BT LE)         2.4G WLAN       Frequency Range       2412MHz ~ 2462MHz         Channel Number       11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz)         7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)       7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)         Channel Spacing       5MHz         Modulation Type       IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)         IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)       IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)         Antenna Description       PIFA Antenna(ANT 0), used for Bluetooth & WIFI         2.05dBi(Max.) for 2.4G band       PIFA Antenna(ANT 1), used for WIFI         2.05dBi(Max.) for 2.4G band       PIFA Antenna(ANT 1), used for WIFI         2.05dBi(Max.) for 2.4G band       PIFA Antenna(ANT 1)         Hardware version       A116U1-2 REV02         Software version       WINDOWS10         Exposure category       General population/uncontrolled environment         EUT Type       Production Unit	Frequency Range	2402MHz ~ 2480MHz				
Bluetooth Channel Number40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Bluetooth Version	V4.0				
40 channels for Bluetooth V4.0 (BT LE)Bluetooth Channel Spacing1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		79 channels for Bluetooth V4.0 (BDR/EDR)				
Bluetooth Channel Spacing2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel SpacingSMHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit	Bluetooth Channel Number	40 channels for Bluetooth V4.0 (BT LE)				
2MHz for Bluetooth V4.0 (BT LE)Bluetooth Modulation TypeGFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment EUT TypeEUT TypeProduction Unit	Divoto oth Charges! Coopies	1MHz for Bluetooth V4.0 (BDR/EDR)				
Bluetooth Modulation TypeGFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Biuetooth Channel Spacing	2MHz for Bluetooth V4.0 (BT LE)				
GFSK for Bluetooth V4.0 (BT LE)2.4G WLANFrequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz)Channel Spacing5MHzChannel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI2.05dBi(Max.) for 2.4G bandPIFA Antenna(ANT 1), used for WIFI2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Runtaath Madulation Tura	GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR)				
Frequency Range2412MHz ~ 2462MHzChannel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environment Production Unit	Bidetooth woodation type	GFSK for Bluetooth V4.0 (BT LE)				
Channel Number11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz) 7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzChannel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	2.4G WLAN					
Channel Number7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI2.05dBi(Max.) for 2.4G bandPIFA Antenna(ANT 1), used for WIFI2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Frequency Range	2412MHz ~ 2462MHz				
7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)Channel Spacing5MHzModulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI2.05dBi(Max.) for 2.4G bandPIFA Antenna(ANT 1), used for WIFI2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Channel Number	11 Channels for 20MHz bandwidth (2412MHz ~ 2462MHz)				
Modulation TypeIEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI2.05dBi(Max.) for 2.4G bandPIFA Antenna(ANT 1), used for WIFI2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		7 Channels for 40MHz bandwidth (2422MHz ~ 2452MHz)				
Modulation TypeIEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Channel Spacing	5MHz				
IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)				
Antenna DescriptionPIFA Antenna(ANT 0), used for Bluetooth & WIFI 2.05dBi(Max.) for 2.4G band PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Modulation Type	IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)				
2.05dBi(Max.) for 2.4G bandPIFA Antenna(ANT 1), used for WIFI2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)				
PIFA Antenna(ANT 1), used for WIFI 2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Antenna Description	PIFA Antenna(ANT 0), used for Bluetooth & WIFI				
2.05dBi(Max.) for 2.4G bandHardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		2.05dBi(Max.) for 2.4G band				
Hardware versionA116U1-2 REV02Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		PIFA Antenna(ANT 1), used for WIFI				
Software versionWINDOWS10Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit		2.05dBi(Max.) for 2.4G band				
Exposure categoryGeneral population/uncontrolled environmentEUT TypeProduction Unit	Hardware version	A116U1-2 REV02				
EUT Type Production Unit	Software version	WINDOWS10				
	Exposure category	General population/uncontrolled environment				
Device Type Portable Device	EUT Type	Production Unit				
	Device Type	Portable Device				

# 2. Evaluation method and Limit

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based

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time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.22 The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc.23 " [(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm)]  $\cdot$  [Vf (GHz)]  $\leq$  3.0 for 1-g SAR and  $\leq$  7.5 for 10-g extremity SAR, where:

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below
   The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for
   transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5
   mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.</p>

#### 3. Refer evaluation method

<u>ANSI C95.1–2019</u>: IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz

FCC KDB publication 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1093: Radiofrequency radiation exposure evaluation: portable devices

#### 4. Conducted Power Results

Mode	Channel	Frequency(MHz)	Peak Conducted Output Power (dBm)
	0	2402	4.549
GFSK	39	2441	4.910
	78	2480	4.347
	0	2402	1.014
π/4DQPSK	39	2441	1.472
	78	2480	0.931
	0	2402	1.263
8DPSK	39	2441	1.748
	78	2480	1.190
	0	2402	3.054
BT LE	19	2440	3.486
	39	2480	2.954

[2.4GWLAN Max Conducted Power]

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Mode	Channel Frequ		Peak Conducted Output Power (dBm)			
	Channel	Frequency(MHz)	Ant 0	Ant 1	Sum	
	1	2412	7.11	8.05	/	
IEEE 802.11b	6	2437	8.06	8.2	/	
	11	2462	7.81	7.98	/	
	1	2412	7.57	7.41	/	
IEEE 802.11g	6	2437	7.64	8.06	/	
	11	2462	7.81	8.47	/	
	1	2412	6	6.83	9.45	
IEEE 802.11n HT20	6	2437	6.34	6.52	9.44	
	11	2462	6.07	6.84	9.48	
IEEE 802.11n HT40	3	2422	6.49	6.35	9.43	
	6	2437	6.21	6.07	9.15	
	9	2452	6.1	6.66	9.40	

## [2.4GWLAN Max Conducted Power]

#### 5. Manufacturing tolerance

ΒT

GFSK (Peak)									
Channel	Channel 0	Channel 39	Channel 78						
Target (dBm)	4.0	4.0	4.0						
Tolerance ±(dB)	1.0	1.0	1.0						
	π/4DQPSK (Peak)								
Channel	Channel 0	Channel 39	Channel 78						
Target (dBm)	1.0	1.0	0.0						
Tolerance ±(dB)	1.0	1.0	1.0						
	8DPSK (Peak)								
Channel	Channel 0	Channel 39	Channel 78						
Target (dBm)	1.0	1.0	1.0						
Tolerance ±(dB)	1.0	1.0	1.0						

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D	LI	

BT LE (Peak)							
Channel Channel 0 Channel 19 Channel 39							
Target (dBm)	3.0	3.0	2.0				
Tolerance ±(dB)	1.0	1.0	1.0				

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			4GWIFI				
	IEEE 802.11b (Peak)						
Channel	Channel 1		Chan	nel 6	Channel 11		
Channel	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	
Target (dBm)	7.0	8.0	8.0	8.0	7.0	7.0	
Tolerance ±(dB)	1.	.0	1.	.0	1.	.0	
		IEEE 802	2.11g (Peak)				
Channel	Chan	inel 1	Chan	nel 6	Chan	nel 11	
Channel	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	
Target (dBm)	7.0	7.0	7.0	8.0	7.0	8.0	
Tolerance ±(dB)	1.	1.0 1.0			1.0		
		IEEE 802.1	1n HT20 (Peal	k)			
Channel	Channel 1		Chan	nel 6	Channel 11		
Channel	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	
Target (dBm)	6.0	6.0	6.0	6.0	6.0	6.0	
Tolerance ±(dB)	1.	1.0 1.0 1.0		.0			
		IEEE 802.1	1n HT40 (Peal	k)			
Channel	Channel 3		Channel 6		Channel 9		
Channel	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	
Target (dBm)	6.0	6.0	6.0	6.0	6.0	6.0	
Tolerance ±(dB)	1.0 1.0 1.0			.0			

#### 6. Evaluation Results

ANT 0

	Antenna	Antenna	RF output power		SAR Test Exclusion	SAR Test
Band/Mode	f (GHz)	Distance (mm)	dBm	mW	Threshold	Exclusion
GFSK	2.450	5	5.0	3.1623	0.9899< 3.0	Yes
π/4DQPSK	2.450	5	2.0	1.5849	0.4962< 3.0	Yes
8DPSK	2.450	5	2.0	1.5849	0.4962< 3.0	Yes
BT LE	2.450	5	4.0	2.5119	0.7863< 3.0	Yes
IEEE 802.11b	2.412	5	9.0	7.9433	2.4673< 3.0	Yes
IEEE 802.11g	2.412	5	8.0	6.3096	1.9598< 3.0	Yes
IEEE 802.11n HT20	2.412	5	7.0	5.0119	1.5567< 3.0	Yes
IEEE 802.11n HT40	2.412	5	7.0	5.0119	1.5567< 3.0	Yes

ANT 1

		Antenna	RF output power		SAR Test Exclusion	SAR Test
Band/Mode	f (GHz)	Distance (mm)	dBm	mW	Threshold	Exclusion
IEEE 802.11b	2.412	5	9.0	7.9433	2.4673< 3.0	Yes
IEEE 802.11g	2.412	5	9.0	7.9433	2.4673< 3.0	Yes
IEEE 802.11n HT20	2.412	5	7.0	5.0119	1.5567< 3.0	Yes
IEEE 802.11n HT40	2.412	5	7.0	5.0119	1.5567< 3.0	Yes

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Remark:

1. Output power including tune up tolerance;

2. When the minimum test separation distance is < 25 mm, a distance of 25 mm according to f) in section 4.1 is applied to determine SAR test exclusion.

3. WLAN and BT share same modular and same antenna, no need consider simultaneous transmit.

# Simultaneous Transmission for SAR Exclusion

The sample support one modular and supports two antennas, need consider simultaneous transmission;  $\Sigma$  of (the highest measured or estimated SARANT0+SARANT1)/1.6 = (0.2076+0.2076)/1.6 = 0.3 < 1.0;

# 7. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

.....THE END OF REPORT.....