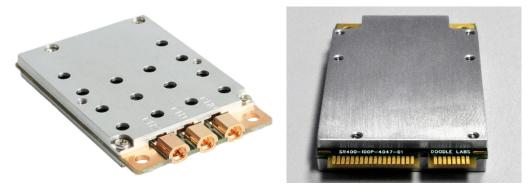


Doodle Labs NM-DB-2M Industrial Wi-Fi® Radio Transceiver

Product Family Overview

Doodle Labs' portfolio of Industrial Wi-Fi transceivers offer the industry's best-in-class performance. These transceivers have high transmit power for long-range communication and has been designed to withstand operation in extremely challenging environments. In addition, these transceivers feature high interference immunity that allows successful operation in today's congested Wi-Fi environments. The transceivers are FCC, CE, and IC certified and have been deployed in numerous demanding applications.

Figure 1. Top and bottom views of the NM-DB-2M transceiver with MMCX connectors.



Target Applications

The Doodle Labs Industrial Wi-Fi transceivers meet the demanding needs of customers across a broad range of industries. Examples include:

- Unmanned Vehicles Drones
- Unmanned Robots
- Industrial IoT applications
- Rugged/Military requirements with extended temperature and vibration resiliency
- Mesh Networking deployments
- Passenger Wi-Fi access aboard airplanes and trains
- Streaming HD Video Surveillance Cameras
- Wireless Infrastructure in harsh operating conditions of the Oil/Gas fields and Mines



Features

Best-in-class features include:

- Modular FCC, CE and IC certifications to expedite system integration
- Integrated LNA for best-in-class Rx sensitivity to pick up low energy signals from mobile phones
- Up to 30 dBm of RF power to get the largest possible area coverage
- Extended temperature range from -40C to +85C.
- Electrical Stress protection on Antenna ports for outdoor operation
- Long product life cycle to meet the needs of Industrial IoT applications
- High interference immunity for Wi-Fi congested environment
- Hardware "RF Kill" feature to meet the FAA requirement for airborne applications
- High band isolation to support concurrent dual band operation for multi-band routers

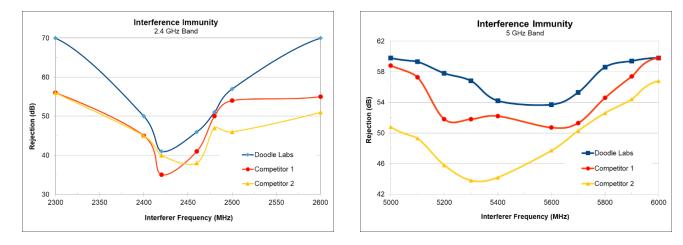


Figure 2. Interference immunity performance compared to leading competitors.



NM-DB-2M Specifications

Table 1. Technical Specifications.

Model No.	NM-DB-2M (Rugged/Military Applications)
Ordering Code	NM-DB-3M with MMCX connectors NM-DB-3U with U.FL connectors
Radio Configuration	2x2 MIMO, Dual Band
Special Features	 Extended lifespan with planned availability for long time Extreme Reliability, IPC Class 2 standard with Class 3 options Compliant to MIL-STD-202G, Qualified for high shock/vibration environments
Design-In Documentation	https://www.doodlelabs.com/technologies/technical-library/
MAC Chipset	Qualcomm Atheros: QCA9590-BR4B with Extended Temperature range
Software Support	Open Source Linux Drivers ath10k for 11n models <u>OpenWRT</u> (Wireless Router/Linux OS)
Center Frequency Range	5.180 GHz ~ 5.825 GHz 2.412 GHz ~ 2.462 GHz This varies by the regulatory domain
Channel Bandwidth*	20, 40 MHz channels
Radio Modulation/Data Rates (Dynamic Link Adaptation)	<u>802.11a</u> : 6, 9, 12, 18, 24, 36, 48 and 54 Mbps (5.x GHz) <u>802.11n</u> : MCS0-23 (5.x and 2.4 GHz) <u>802.11b/g</u> : 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48 and 54 Mbps (2.4 GHz)
802.11n version 2.0 Capabilities	 802.11 dynamic frequency selection (DFS) as an AP and Client Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx), Maximal ratio combining (MRC), Cyclic shift diversity (CSD), Frame aggregation, block ACK, 802.11e compatible bursting, Spatial multiplexing, cyclic-delay diversity (CDD), low-density parity check (LDPC), Space Time Block Code (STBC) Phy data rates up to 450 Mbps (40 MHz channel)



Operating Modes	AP, Client, and Adhoc modes for Access Point, PtP, PtmP, and Mesh networks
MAC Protocol	TDD with Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)
Wireless Error Correction	FEC, ARQ
Wireless Data Security	128 bit AES, WEP, TKIP and WAPI hardware encryption. Support for IEEE 802.11d, e, h, i, k, r, v, w and time stamp standards
FIPS Certification	 Small packet size (96 bytes) in AES encryption at full packet rate. FIPS 140-2, Level 2 (Temper Evidence Shield), Loop back mode to facilitate FIPS AES certification.



 Table 2. Tx and Rx performance at 5 GHz.

Tx/Rx Specification	Radio Modulation	Coding Rate	Tx Power (±2dBm) ²	Rx Sensitivity (Typ)			
5 GHz (20 MHz Channel) – 11n models							
802.11a, STBC	BPSK	1/2	27	-96			
802.11a	64 QAM	3/4	22	-80			
802.11n	BPSK	1/2	27	-96			
802.11n	16 QAM	3/4	25	-84			
802.11n	64 QAM	5/6	22	-75			
5 GHz (40 MHz Channel) – 11n models							
802.11n	BPSK	1/2	27	-93			
802.11n	16 QAM	3/4	25	-81			
802.11n	64 QAM	5/6	22	-75			



Table 3. Tx and Rx performance at 2.4 GHz.

Tx/Rx Specification	Radio Modulation	Coding Rate	Tx Power (±2dBm) ²	Rx Sensitivity (Typ)			
2.4 GHz (20 MHz Channel) – 11n models							
802.11b Single Stream, STBC	1 Mbps	ССК	29	-102			
802.11g	64 QAM	3/4	24	-80			
802.11n	BPSK	1/2	29	-95			
802.11n	16 QAM	3/4	27	-83			
802.11n	64 QAM	5/6	24	-76			
2.4 GHz (40 MHz Channel) – 11n models							
802.11n	BPSK	1/2	29	-91			
802.11n	16 QAM	3/4	27	-80			
802.11n	64 QAM	5/6	24	-73			

Note 1: It is advantageous to use the smallest channel bandwidth that can support the throughput requirements. Smaller bandwidths provide more channels to choose and help avoid interference issues.

Note 2: Total Tx power for all streams. Max allowed Tx power depends on the regulatory domain. De-rating of -1 dBm for U.FL connector.



 Table 4. Additional RF performance information.

Antenna Signal Strength	-35 to -85 dBm (Recommended), Absolute Maximum=+12 dBm
Interference Immunity	SAW filters on RF ports for immunity against high power cellular transmissions in the neighboring 2.4 GHz bands.
Antenna port isolation for concurrent operation	Up to +10 dBm signal strength for 5 GHz signal without degrading 2.4 GHz operation Up to +5 dBm signal strength for 2.4 GHz signal without degrading 5.x GHz operation
Integrated Antenna Port Protection	10 kV
Receiver LNA Gain	>10 dB
Receiver Adjacent Channel Rejection (ACR)	>18 dB @ 11a, 6 Mbps (Typ)
Receiver Alternate Channel Rejection (ALCR)	>35 dB @ 11a, 6 Mbps (Typ)
Receive chain Noise Figure	+6 dB
Transmitter Adjacent Channel Leakage Power Ratio (ACLR)	45 dB (Fc ± ChBW)
Transmitter Spurious Emission Suppression	-40 dBc
RF Power control	In 0.5 dBm steps. Accuracy of power calibration loop ± 2 dBm. Each transceiver individually calibrated and tested.
RF Hardware Disable (RF Kill)	Pin 20 of miniPCI-E interface. (Required for FAA compliance)
Spectral Analysis	8 bit resolution spectral FFTs available for software analysis



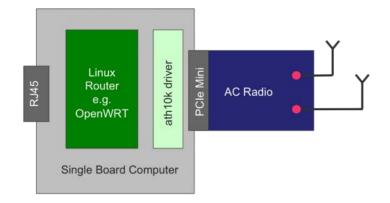
 Table 5. Physical, Environment, and Other Specifications.

Host Interface	miniPCI-Express 1.2 Standard
nost interface	
Host CPU Board	Any CPU board with miniPCIe interface with minimum 6 mm connector height
Operating Voltage	3.3 Volts from miniPCI-Express connector
Power Consumption	 5.3W @ Max power, in continuous data transfer mode on all chains 2.5W @ 20 dBm power (ETSI max), in continuous data transfer mode on all chains 0.9W in continuous data receive mode 250 mW in Sleep mode
Temperature range	-40°C to +85°C (shield case)
Humidity (Operating)	0% – 95% (Non-condensing)
Dimensions	30 x 50 x 4.75 mm, 12 grams. High Res Photos – Mechanical drawings and 3D-CAD files available upon request
MTBF	29 years
Regulatory Requirements	Designed and verified to meet various regulatory requirements. Formal testing and approval is required based on the Integrator's particular host platform and antenna type. The Integrator is also responsible for obtaining all required regulatory approvals in target markets for the finished product.
FCC ID	2AG87NM-DB-2M. DFS compliance in both Master and Client modes.
CE/ETSI	Conforms with all the requirements of the European Directive 1999/5/EC – EN 301 893 V1.8.1, EN 300 328 V.1.8.1, EN 301 489-1 V1.9.2, EN 301 489-17 V2.2.1, EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011+ A2:2013
Industry Canada (IC)	21411-NMDB2M
RoHS/WEEE Compliance	Yes. 100% Recyclable/Biodegradable packaging



System Integration

Figure 3. System Integration Block Diagram.



As shown in the block diagram, the modular nature of the MIMO radio transceivers allow for accelerated development of the wireless modem. Any embedded Single Board Computer with standard miniPCI-Express interface is required. The Linux distribution <u>OpenWRT</u> has evolved over time and provides advanced features in a wireless router. It is a stable distribution and many OEMs are using OpenWRT as a starting point and customize further for their application. The distribution includes the <u>ath10k</u> driver to interface with the MIMO transceivers. Both OpenWRT and open source drivers (ath9k and ath10k) have extensive online documentation available. User group forums also provide responsive technical support.

Portfolio Index

Doodle Labs' Industrial Wi-Fi transceiver portfolio provides configurations optimized for a vast variety of project needs. All models are form-factor compatible. For information on other models, please visit - http://www.doodlelabs.com/products/wi-fi-band-radio-transceivers/

Doodle Labs provides extensive design-in documents at:

https://www.doodlelabs.com/technologies/technical-library/

FCC Statement

FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247 and FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2016 paper presents antenna with gain ANT0: 2.4G Wifi: ANT0: 2.1dBi, ANT1: 2.1dBi 5.G Wifi: Band1: 3.2 dBi, Band3: 4.2dBi

FCC Regulatory Compliance:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be

determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If power exceeds the limit and the distance(Over 20cm distance in actual use between the device and user) is compliance with the requirement

RF Exposure Compliance:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.

Notice to OEM integrator

If the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. The end product shall haves the words "Contains Transmitter Module FCC ID: 2AG87NM-DB-2M". The device must be professionally installed.

The intended use is generally not for the general public. It is generally for industry/commercial use.

The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required. The user has no access to the connector.

Installation must be controlled. Installation requires special training.

Any company of the host device which installs this modular with unlimited modular approval should perform the test of radiated & conducted emission and spurious emission, etc. according to FCC part 15C: 15.247 and 15.207, 15B Class B and Part 15 Subpart E Section 15.407 requirement, only if the tests result comply with FCC part 15C: 15.247 and 15.207, 15B Class B and Part 15 Subpart E Section 15.407 requirement, then the host can be sole legally.

When the module is installed inside another device, the user manual of the hose contain below

1) This device may not cause harmful interference.

2) This device must accept any interference received, including interference that may cause undesired operation

IC statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic DevelopmentCanada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

The term "IC: " before the certification/registration number only signifies that the Industry Canada technical specifications were met.

This product meets the applicable Industry Canada technical specifications.

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences etDéveloppement économique Canada. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pasproduire de brouillage,et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme auxCNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

1)L'appareil ne doit pas produire de brouillage;

2)L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre lefonctionnement.

Please notice that if the ISED certification number is not visible when the module is installed inside another device, then theoutside of the device into which the module is installed o display a label referring to the enclosed module. This exteriorlabel can use wording such as the following: "Contains IC:21411-NMDB2M" any similar wording that expresses the same meaningmay be used.

l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots «Contient un module d'émission », du mot « IC:21411-NMDB2M » ou d'une formulation similaireexprimant le même sens, comme suit

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 etla conformité

à l'expositionde RSS-102 rf, utilisateurs peut obtenir l'information canadienne surl'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna ortransmitter. This equipment should be installed and operated with a minimum distance of 20centimeters between the radiator and your body.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ouémetteur. Cet équipementdevrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

B1 for indoor use only

B1 pour usage intérieur uniquement

Compliance	list INTEGRATION INSTRUCTIO	ONS for 996369 D03 OEM the a	and 996369 D03 OEM by

RegimentYesN/AComment22 List of applicable for CrulesYESRefer to instructionBefer to instructionFCC standards: FCC CFR Title 47 Part 15 Subpart C. Section 15.247 and FCC CFR Title 47 Part 15 Subpart E. Section 15.407: 2016Initial module manufacturer review detailed timinates method could include the the liminates method could include the process, particular to review detailed to prove spring include process the specific host. The addition process the specific host The module process the specific host The module process that is estimated to a host manufacturer set also Section 15.407: 2016Initial module manufacturer approval. Title 47 Part 15 Subpart E. Section tis host manufacturer set also Section 2.0 below concerning the need to notify host manufactures The pool antennas Yes to a host manufacturer set also Section 15.407: 2016Initial module manufacturer module process the specific host. The module manufacturer module process the specific host. The module manufacturer module act and which the training during the module on ontify host manufactures The pool antennas Yes to a host manufacturer for the pool antennas Yes to a host manufacturer for the pool antennas Yes to a host manufacture for the pool antennas Yes to a module a class 11 permissive change is required on the module, a Class 11 permissive change is required on the module action in power or compensation for could loss, then this information manufacturer for the pool antennas Yes to a module the instruction manufacturer for the produce in a specific host or the antenna degins, see the guidance in the instruction manufacturer for the produce and the first method in a first method in the module action in the instruction manufacture for the produce and the instruction manufacture for the produce and the first method is a differen	2.2 List of applicable FCC rules List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended		N/A	comment			1	
is the FCC failes that are applicable to the modular transmitter reviews detailed used that are supplicable to the power, sorrivores without a dimension of the prover sources without a dimension of the prover sources without a manufacturer reviews detailed used that requires without a dimension of the prover sources without a dimension of the provide transmitter with the manufacturer reviews detailed with a finited module grant that is othered on a host manufacturer set as to set of the product in always essures. For a distinual hosts of the product is always essures and that a finited module grant that is excessing the provide the salways essures. For a distinual hosts of the register the addition is a specific host and the sale grant to register the addition and the sale grant to register the addition in the sale grant to register the sale the sale that register the sale to remain the sale grant to register the addition in the sale grant to register the sale	ist the FCC rules that are applicable to the nodular transmitter. These are the rules that pecifically establish the bands of operating undamental frequencies. DO NOT list ompliance to unintentional-radiator rules Part 15 Subpart B) since that is not a ondition of a module grant that is extended	TES		Before to instruction	alternative method could include that the		1	
pockule transmitter. These are the rules that FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.2407. Exoton 15.2408. Exoton 15.2407. Exoton 12.2408.	nodular transmitter. These are the rules that pecifically establish the bands of operation, he power, spurious emissions, and operating undamental frequencies. DO NOT list ompliance to unintentional-radiator rules Part 15 Subpart B) since that is not a ondition of a module grant that is extended			Refer to instruction	limited module manufacturer reviews detailed			
perfective stabilish the bands of operation, be power, survivous emissions, and perating undamental frequencies. DO NOT list omplance to uninterional-radiator rules are 15 Subpart B since that is orta onofition of a module grant that is extended as host namufacturer. See also Section 2.10 else concerning the need to notify thost namufacturers that further testing is equired. 3 Sumpart B the sectific degrant that is extended as host namufacturers that further testing is equired. 3 Sumpart C Section 12.00 else concerning the need to notify thost namufacturers that further testing is equired. 3 Sumpart B the specific operational use onditions an automatic the specific operational use onditions manufacturers that further testing is excific use conditions that are applicable to the modular transmitter with testing the endular transmitter including for sample. If point-to point antemas are used to register the additional hosts a specific host. The module manufacturer must smaph. If point-to point antemas are used to register the additional hosts a specific host of the following aspect: layout of trace design. Part to modular transmitter with trace antenna designs. Section content to the module for Marcos, and isolation requirements. 4 Artema Type: paper presents antema Antemna Gain: 2.46: xNTD: 2.148i, MATI: 2.148i 56: Band1: 3.248i, Band3: 4.248i 56: Band1: 3.248i, Band3: 4.248i 57: Band1: 3.248i, Band3: 4	pecifically establish the bands of operation, he power, spurious emissions, and operating undamental frequencies. DO NOT list ompliance to unintentional-radiator rules 'art 15 Subpart B) since that is not a ondition of a module grant that is extended				test data or host designs prior to giving the host			
 be power, sourious emissions, and operating indicates a subjunct 2 section in the product is a subjunct 2 section 2 is a subjunct 2 sec	ne power, spurious emissions, and operating undamental frequencies. DO NOT list ompliance to unintentional-radiator rules art 15 Subpart B) since that is not a ondition of a module grant that is extended							
ndamental requencies. DO NOT list omplance to universitival-radiator unless Part 15 Subpart 8 since that is not a nonfiction of a module grant that is extended to a host manufacturer. See also Section 2.10 else concerning the need to notify host andfue to react the need to notify host andfuencess that further testing is guired. 3 3 Summarize the specific operational use nonfiliants a summarize the specific operation in structions a summarize the specific operation in structions mut a test that this information must also he est offic offic operation in structions offic the different nytic is approved as a finited module proceedies a so contain information must also he est obstruction is instead and in the specific operation is suffic to the so contain information must also he est obstruction is a landice that the information must also he est offic the salemative est over this integration information in that includes permitted variances (e.g., trace obstruct) decign particle specific provide in a namere paper this opprovale the so construct in sale alternative set over this in	undamental frequencies. DO NOT list compliance to unintentional-radiator rules Part 15 Subpart B) since that is not a condition of a module grant that is extended			Subpart C Section 15.247 and FCC CFR				
angle and the construction of a module grant that is extended 15.40/: 2015 a host manufacturers: Sea also School 2.10 Refer to instruction a host manufacturer: Sea also School 2.10 Refer to instruction a host manufacturer: Sea also School 2.10 Refer to instruction a host manufacturer: Sea also School 2.10 Refer to instruction a host manufacturer: Sea also School 2.10 Refer to instruction Antenna Type: paper presents antenna Antenna Gain: Antenna Type: paper presents antenna Antenna Gain: Refer to instruction a require reduction in power or ompeasation for cable loss, then this formation must be in the instructions must are require reductions must certain the integration instructions for the integration instructions for the integration instructions of the module instructions of the integration instructions of the module instructions of the integration instructions of the module instructions of the integration instructions of the induct instruction is the induction instructions must in the inimid in	ompliance to unintentional-radiator rules Part 15 Subpart B) since that is not a ondition of a module grant that is extended			Title 47 Part 15 Subpart E Section				
Part 15 Subpart 8] since that is not a modular transmitter is steaded modular transmitter will be installed will be modular transmitter will be i	Part 15 Subpart B) since that is not a ondition of a module grant that is extended			15.407: 2016				
ondition of a module grant that is extended Image: section 2.10	ondition of a module grant that is extended							
 a host manufacture. See also Section 2.10 a manufacture. See also Section 2.20 a manufacture shaf further testing is equired. Summarize the specific operational use of the module is assessment of register the additional hosts as a specific host originally granted with a limited module, a Cass Park Set (Corporational Use of the module transmitter, including for sample any limits in the interpretation in power or ompensation for cable loss, then this formation may also be eaded, such as pask gain per frequency band minimum gain, specifically provide transmitter is approved as a limited module arransmitter is of Set DPS bands. Yes Refer to instruction Antenna Type: paper presents antenna Antenna Gain: 2.46: ANTO: 2.1dBi, ANTI: 2.1dBi SG: Band1: 3.2dBi, Band3: 4.2dBi SG: Band1: 3.2dBi, Band3: 4.2dBi Ker of the additional hosts as a specific host originally granted with a limited module accuss of the module case of the module set of the mod								
elew concerning the need to notify host anufacturers that further testing is equired	o a host manufacturer. See also Section 2.10							
anufacturers that further testing is equired								
equired.3 with a limited module, a Class II permissive 3.5 unmarize the specific operational use conditions that are applicable to he modular transmitter, including for xample, if point-to-point antennas, etc. For xample any limits on antennas, etc. For xample any limits on antennas, etc. For secondu to now ero NO NO 2.4 G : ANTO: 2.1dBi, ANTI: 2.1dBi to formation must be in the instructions fitte se condition limitations extend to rofessional users, then instructions must tate that this information also extends to the oth manufacturer's instructor manual. In ddition, certain information may also be edd, such as peak gain per frequency band manufacture is responsible for approved as a limited module, "then the module set existing the module is set within the minited module as a limited module, sits the module set evision instructions, the alternative set evision instructions, the alternative set evisiting theory manufacturer sets to verify that the bin mediature reset is officiation for mation that lincludes permitted variances (e.g., trace boundary limits, thickness, length, with haspe(s), dielectric constant, and impedance as applicable for each type of antennal scale. No Yes Refer to instruction Presciption instructions for the following aspect: layout of trace design, parts int (BOM), antenna, connectors, and isolation requirements.4 No A Limited module procedures is modular transmitter is approved as a limited module, "then the module is ensith the limited module manufacturer is the institution of the fining and in the installation instructions, the alternative set evisities the design shall be considered a difference, the weekength, and antenna fain: No No 2.4.6 : ANTO: 2.1.4								
3 Summarize the specific operational use onditions YES Refer to instruction Change is required on the module grant to regulate the additional hous as a specific host also approved with the module. Image any limit the daditional hous as a specific host also approved with the module. Image any limit the daditional hous as a specific host also approved with the module. Image any limit the daditional hous as a specific host also approved with the module. Image any limit the daditional hous as a specific host also approved with the module. Image any limit the addition power hous as a specific host also approved with the module. Image any limit the also approved with the module. Image any limit the also approved with the module approved houses are condition information and so the second the integration information and so the second the integration information and as a specific host also approved with the module approved with the module approved as a limited module procedures a modular transmitter is approved as a limited module is set overity that the house manufacturer of a limited bodie manufacturer is the module antenna facture approved as a limited module manufacturer of a limited bodie manufacturer is phase) can affect a antenna facture is set overity that the house manufacturer is design the printed circuit (PC) board layout; d) Appropriate parts by manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturers is design the printed circuit (PC) board layout; d) Appropriate parts by manufacturers is design the printed circuit (PC) board layout; d) Approprinte parts by manufacturers is design the printed c	nanufacturers that further testing is							
 Provide the spectrum operation in the left of indication Preser of indication	equired.3							
Antenna Type: paper presents antenna Antenna Gain: 2.46 : ANTO: 2.1dBi, ANTI: 2.1dBi 5G: Band1: 3.2dBi, Band3: 4.2dBi 5G: Band1: 3.2	.3 Summarize the specific operational use	YES		Refer to instruction				
 Antenna Type: paper presents antenna sample, if point that are application to any limits on antennas, etc. For ample, if point to-point antennas are used formation moust be in the instructions. If the se condition limitations extend to ordesignal sectors, then instructions must tate that this information also extends to the ost manufacturer is instruction manual. In difficient type: paper presents antenna tate this information may also be eaded, such as peak gain per frequency band diminum gain, specifically for master audiature is seproved as a limited module procedures fra modular transmitter is approved as a limited module responsible for approving the est overify han the host meets the necessary equirements to satisfy the module limiting onditions. Yes Refer to instruction for a modular transmitter is approved as a limited module is est overify han the host meets the necessary equirements to satisfy the module limiting onditions. Initiced module finities the necessary equirements to satisfy the module limiting onditions. Initiced module finities the necessary equirements to satisfy the module limiting onditions. Initiced module manufacturer fas the excitions that the limitie module limiting onditions. Initiced module finities the necessary equirements to satisfy the module limiting onditions. Initiced module manufacturer fas the necessary equirements to satisfy the module limiting onditions. Initiced module manufacturer fas the necessary equirements to satisfy the module limiting onditions. Initiced module manufacturer fas the necessary equirements to satisfy the module limiting onditions. Initiced module manufacturer fas the excibility to define its alternative method to dotes the initial the initial Initiced module manufacturer fas the necessary equirements to satisfy the module limiting onditions. Initiced module manufacturer fas the exci	onditions							
Antenna Samiter, including for Antenna Samiter, including for Internal Samiter, including for Asymple any limits on antennas, set. For 2.4G : ANTO: 2.1dBi, ANTI: 2.1dBi For a modular transmitter with frace antenna designs, see the guidance in Question 11 of Antenna Samiter, including for SG: Band1: 3.2dBi, Band3: 4.2dBi For a modular transmitter with frace antenna designs, see the guidance in Question 11 of So condition limitations extends to the cost attend to forforsation also extends to the cost manufacturer's instructions must tate that this information also be eaded, such as peak gain per frequency band and minimum gain, specifically for master evices in SGHZ DFS bands. Yes Refer to instruction Altineter Module transmitter is approved as a function dualit transmitter is approved as a the full module is set with. The manufacturer of a limited module is set with. The manufacturer of a limited module is set with. The manufacturer or a limited module is set to with the the stimeters. Antenna Type: paper presents antenna Antenna Gain: a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna gain and must be considered; c) The parameters shall be provided in a manner permitting host manufacturers to design the initiad include for dual is set to with the the the necessary equirements to satisfy the module limiting onditions. () The parameters shall be provided in a man	escribe use conditions that are applicable to			Antenna Type: paper presents antenna				
Armple, any limits on antennas, yetc. rol sample, if point-to-point antennas are used hat require reduction in power or ompensation for cable loss, then this formation must be in the instructions must be in the instructions must be in the instruction also extends to the ost manufacturer's instruction manual. In ddition, certain information many also be eeded, such as peak gain per frequency band and minimum gain, specifically for masterYesRefer to instruction instructionsdefer to instruction and the module provided in a antenna Specifically for masterYesYes ease dwith. The manufacturer of a lainted oddue must describe, both in the filing and in ees to verify that the host meters to ease to satisfy the module limiting onditions.YesRefer to instruction sate that the limited module is set on set overify that the host meters to a manufacturer has the existion structions that limit the initialYesRefer to instruction sate sate set overify that the host meters to design and a sate set overify that the host meters to design be addition intructions that limited module is set overify that the host meters to design be addition that init the initialYesRefer to instruction sate set overify that the host meters to design be addition addition that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), delectric constant, and impedance as applicable for each type of antenna; this manufacturer of a limited odule manufacturer of a limited set owerify that the host meters to design the host meters to design the instructions that limit the initialSet is Band1: 3.2dBi, Band3: 4.2dBib) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavel	he modular transmitter, including for			Antenna Gain:		NO		The module has its own fixed antenna pa
xample, if point-to-point antennas are used har require reduction in gover or ompensation for cable loss, then this iformation must be in the instructions. If the se condition limitation sextends to the costs manufacturer's instructions must tate that this information also extends to the costs manufacturer's instruction manual. In ddition, certain information also extends to the costs manufacturer's instructions must tate that this information also extends to the costs manufacturer's instruction manual. In ddition, certain information also extends to the costs manufacturer's instructions must tate that this information also extends to the costs manufacturer's instruction manual. In ddition, certain information also extends to the costs manufacturer's instructionYesRefer to instruction Antenna Type: paper presents antenna Antenna Gain: 2.4.G : ANTO: 2.1dBi, ANTI: 2.1dBi SG: Band1: 3.2dBi, Band3: 4.2dBiClease also also extends to full 100 to extend the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.4a limited module procedures far modular transmitter is approved as a set exity instruction. Hat the bin interd module is set with. The manufacturer of a limited module manufacturer sets to verify that the host meets the necessary equirements to satisfy the module limiting onditions. Limited module instructions that limit the initialSG: Band1: 3.2dBi, Band3: 4.2dBi SG: Band1: 3.2dBi, Band3: 4.2dBiClease also be exity of antenna set with the host meets the necessary equirements to satisfy the module limiting onditions.SG: Band1: 3.2dBi, Band3: 4.2dBiClease also be exity of antenna set with the host meets the necessary equirements to satisfy the module limiting onditions.SG: Band1: 3.2dBi, B	xample any limits on antennas, etc. For			2.4G - ANTO- 2.1dBi ANT1- 2.1dBi				
Sol: BandQ.1: 3.2dbi, BandQ.2: 4.2dbi, Sol: BanQ.1: 3.2dbi, BandQ.2: 4.2dbi, KDB Publication 996369 D02 FAQ - Modules for Micro-Strip Antennas and traces. The for Micro-Strip Antennas and traces. The integration instructions must be in the instructions must tate that this information may also be for Micro-Strip Antennas and traces. The eeded, such as peak gain per frequency band nd minimum gain, specifically for master view in Sol: Strip Antenna, connectors, and isolation requirements. Yes Refer to instruction A Limited module procedures Yes fa modula: 1.2.2dbi, Band3: 4.2dbi Antenna Type: paper presents antenna Antenna Type: paper presents antenna Antenna Gain: 2.4 Limited module groups that the fulling and in SG: Band1: 3.2dbi, Band3: 4.2dbi sed with. The manufacturer of a limited SG: Band1: 3.2dbi, Band3: 4.2dbi SG: Band1: 3.2dbi, Band3: 4.2dbi Micro-Sing Antennas and traces. updule must describe, both in the filing and in SG: Band1: 3.2dbi, Band3: 4.2dbi set oviring that the bot meets the necessary SG: Band1: 3.2dbi, Band3: 4.2dbi Gifferent type (caper that the biniting onditions that limiting module manufacturer has the exist the necessary SG: Band1: 3.2dbi, Band3: 4.2dbi Gifferent type (caper that the bot meets the necessary SG: Band1: 3.2dbi, Band3: 4.2dbi<	xample, if point-to-point antennas are used							
ompensation for cable loss, then this for Micro-Strip Antennas and traces. The integration must be in the instructions. If the se condition limitations extend to rofessional users, then instructions must the integration information also extends to the ost manufacturer's instruction manual. In ddition, certain information may also be eeded, such as peak gain per frequency band minimum gain, specifically for master evices in 5 GH2 DFS bands. Yes A Limited module procedures randular transmitter is approved as a innitidution, scription, the module Antenna Type: paper presents antenna Antenna Type: paper presents antenna Antenna Type: paper presents antenna Antenna Type: spaper presents antenna b) Each design shall be considered a difficiences:rice, bord in the filling and in 2.4G : ANTO: 2.1dBi, Band3: 4.2dBi Sets or rify that the host meets the necessary guirements to satisfy the module limiting ondidium structurer has the filling term type (ranse) transmitter to be design, parts is the interd module manufacturer band to doted manufacturer band traces applicable for each type of antenna); b) Each design shall be considered a difference Sci Band1: 3.2dBi, Band3: 4.2dBi c) The parameters shall be provided in a annene permitting bost manufacturers to design the printed circuit (PC) bo				5G: Band1: 3.2dBi, Band3: 4.2dBi				
formation must be in the instructions. If the se condition limitations extend to ordersoinal users, then instructions must tate that this information also extends to the ost manufacturer's instruction manual. In didition, certain information may also be eaded, such as peak gain per frequency band nd minimum gain, specifically for master Integration information information shall include for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.4 4 Limited module procedures far module runsmitter is approved as a limited module is set environ that finding and in set set overify that the host meets the necessary equirements to satisfy the module limiting onditions. Yes Refer to instruction 2.4 G: ANTO: 2.1dBi, ANTI: 2.1dBi SG: Band1: 3.2dBi, Band3: 4.2dBi b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shall must be considered.3 a manace structurer is a latemative meets the necessary equirements to satisfy the module limiting onditions. SG: Band1: 3.2dBi, Band3: 4.2dBi b) Test procedures for design wavelength and antenna shape (traces in place) can affect antenna gain and must be considered.3 a manace true for the filting and in the initial SG: Band1: 3.2dBi, Band3: 4.2dBi c) The parameters shall be provided in a manane formation system of the syst	ompensation for cable loss, then this							
se condition limitations extend to rofessional users, then instructions must tate that this information also extends to the ost manufacturer's instruction manual. In ddition, certain information may also be eaded, such as peak gain per frequency band nd minimum gain, specifically for master evices in 5 GHz DF5 bands. Yes Refer to instruction f a modular transmitter is approved as a limited module," then the module naurafacturer is responsible for approving the ost environment that limited module is set overify that the limited module is set overify that the host meets the necessary equirements to satisfy the module limiting onditions. Limited module manufacturer has the lexibility to define its alternative method to ddiress the conditions that limit the limitid					0			
rofessional users, then instructions must tate that this information also extends to the ost manufacturer's instruction manual. In iddition, certain information may also be leeded, such as peak gain per frequency band and minimum gain, specifically for master levices in 5 GHz DFS bands. 24 Limited module, "then the module manufacturer is reproved as a limited module, "then the module nanufacturer is a supported to for approving the ost environment that the limited module is sed with. The manufacturer of a limited module must describe, both in the filing and in he installation instructions, the alternative eases to verify that the host meets the necessary equirements to satisfy the module limiting onditions. Vimited module manufacturer has the lexibility to define its alternative method to differse its to exolutions that limitid in the initial	se condition limitations extend to							
tate that this information also extends to the ost manufacturer's instruction manual. In didition, certain information may also be eeded, such as peak gain per frequency band and minimum gain, specifically for master levices in 5 GHz DFS bands. Isis (BOM), anterna, connectors, and isolation requirements.4 4 Limited module procedures Yes Refer to instruction 6 a modular transmitter is approved as a limited module; is set within the limited module is set to verify that the host meets the necessary equirements to satisfy the module manufacturer sets to verify that the host meets the necessary equirements to satisfy the module limiting onditions. 2.4G : ANT0: 2.1dBi, Band3: 4.2dBi b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape) can affect antenna gain and must be considered); b. Each design the limited module is set to verify that the host meets the necessary equirements to satisfy the module limiting onditions. SG: Band1: 3.2dBi, Band3: 4.2dBi c) The parameters shall be provided in a manner permitting host manufacturer and specifications; b. Limited module manufacturer has the lexibility to define its alternative method to differe its alternative method to differ					0, , , , , , , , , , , , , , , , , , ,			
ost manufacturer's instruction manual. In ddition, certain information may also be a requirements.4 ddition, certain information may also be eeded. such as peak gain per frequency band a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each 4 Limited module, "then the module Antenna Type: paper presents antenna b) Each design shall be considered a annufacturer is responsible for approving the ost environment that limited module is 2.4G : ANTD: 2.1dBi, ANT1: 2.1dBi sed with. The manufacturer a limited 2.4G : ANTD: 2.1dBi, Band3: 4.2dBi c) The parameters shall be provided in a manufacturer is an and facturer is an and facturer is the necessary equirements to satisfy the module immiting onditions. c) The parameters bhall be provided in a manufacturer is and must be considered); bilited module manufacturer has the lexibility to define its alternative method to didress the conditions that limit the initial c) The parameters bhall be provided in a manufacturer and specifications; c) The parameters shall be provided in a manufacturer is and mutic be readified circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; c) Test procedures for design c) Test proce					list (BOM), antenna, connectors, and isolation			
ddition, certain information may also be eeded, such as peak gain per frequency band a) a) Information that includes permitted and minimum gain, specificatily for master evices in 5 GHz DFS bands. Yes Refer to instruction a) a) Information that includes permitted A Limited module, "Then the module nanufacturer is responsible for approving the carcinoment that the limited module is sed with. The manufacture of a limited module is set overify that the host meets the necessary equirements to satisfy the module limiting onditions. A.4.6 : ANT0: 2.1dBi, ANT1: 2.1dBi b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect a netnena and must be considered); c) The parameters shall be provided in a manten permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; e) Test procedures for design N limited module manufacturer has the lexibility to define is alternative method to different type (clarency, the savelength, and antenna gain and must be considered); c) The parameters shall be provided in a manten permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications;					requirements.4			
eeded, such as peak gain per frequency band an information that includes permitted information that includes permitted an information that includes permitted vervies in 5 GAVE DFS bands. Yes A Limited module procedures Yes Fa modular transmitter is approved as a limited module is ost environment that the limited module is ost environment that the limited module is advector of a limited sed with. The manufacturer of a limited module manufacturer of a limited module manufacturer of a limited module manufacturer sets to verify that the host meets the necessary equirements to satify the module limiting onditions. Antenna Type: paper presents antenna partenna partenna partenna partenna gain: Vimited module manufacturer has the lexibility to define its alternative method to didress the conditions that limit the initial Antenna Type: paper presents antenna partenna pa								
and minimum gain, specifically for master variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); A Limited module, "then the module manufacturer is approved as a limited module," then the minute module is sed with. The manufacturer of a limited ondule is set overify that the limited module is to statisfy the module manufacturer is antenna inserving quirements to satisfy the module manufacturer has the lexibility to define its alternative method to ddress the conditions that limit the initial Refer to instruction A interna Type: paper presents antenna Antenna Gain: 2.4G : ANTO: 2.1dBi, ANT1: 2.1dBi b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manufacturer set to existly the module limiting onditions. c) The parameters shall be provided in a manufacturer and specifications; c) Test procedures for design c) Test procedures for design		4						
levices in 5 GHz DFS bands. Yes Refer to instruction .4 Limited module procedures Yes Refer to instruction fa modular transmitter is approved as a limited module," then the module is sed with. The manufacturer of a limited module is sed with. The manufacturer of a limited module is sed with. The manufacturer of a limited module is set overlife the installation instructions, the alternative means that the limited module limiting ond in he installation instructions, the alternative sets to verlife the installation instructions, the alternative meanufacturer is sets overlife the installation instructions the alternative meanufacturer has the lexibility to define its alternative method to ddress the conditions that limit the initial SG: Band1: 3.2dBi, Band3: 4.2dBi (inckness, tength, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); b) Each design shall be considered a different type (e.g., antenna and must be considered); (inckness, tength, width, shape(s), dielectric constant, and antenna gain and must be considered; c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; (d) Appropriate parts by manufacturer and specifications; verification conditions. Verification conductions the different type of design the printed circuit (PC) board layout;								
L4 Limited module procedures Yes Refer to instruction Constant, and impedance as applicable for each type of antenna); fa modular transmitter is approved as a limited module, "then the module hannufacturer is responsible for approving the lost environment that the limited module is sed with. The manufacturer of a limited sed with the filing and in he installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary equirements to satisfy the module limiting onditions. A limited module manufacturer has the lexibility to define its alternative method to differe its alten								
f a modular transmitter is approved as a limited module," then the module module, "then the module module," then the module manufacturer responsible for approving the set environment that the limited module is a constrained of the filing and in the instructions, the alternative means that the limited module manufacturer as the events the necessary equirements to satisfy the module manufacturer has the exibility to define its alternative method to differe its alternative method to dithere its adiffere its alternative method to differe its alternati		Vec	-	Pefer to instruction				
limited module," then the module manufacturer is responsible for approving the set environment that the limited module is set with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative reans that the limited module manufacturers sets overify that the host meets the necessary equirements to satisfy the module limiting modifices. Antenna Type: paper presents antenna Antenna Type: paper presents antenna antenna Gain: 2.4G : ANTO: 2.1dBi, ANT1: 2.1dBi b) Each design shall be considered a different type (e.g., antenna length in antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; old in use distribution to the scholly to define its alternative method to deress the conditions that limit the initial		res		Refer to instruction	type of antenna);			
manufacturer is responsible for approving the ost environment that the limited module is sed with. The manufacturer of a limited nodule must describe, both in the filing and in he installation instructions, the alternative nears that the limited module manufacturer sets to verify that the host meets the necessary equirements to satisfy the module limiting onditions. 2.4G : ANTO: 2.1dBi, ANT1: 2.1dBi 5G: Band1: 3.2dBi, Band3: 4.2dBi different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna hape) can affect antenna again and must be considered); c) The parameters shall be provided in a manner permitting host manufacturer sets to verify that the host meets the necessary equirements to satisfy the module limiting onditions. c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; e) Test procedures for design veriferation; and				Antonna Turaci panar procentr antonna	 b) Each design shall be considered a 			
ost environment that the limited module is sed with. The manufacturer of a limited module must describe, both in the filing and in he installation instructions, the alternative neans that the limited module manufacturer sets to verify that the host meets the necessary equirements to satisfy the module limiting modificing. A.G : ANTD: 2.1dBi, ANT1: 2.1dBi 5G: Band1: 3.2dBi, Band3: 4.2dBi multiple(s) of frequency, the wavelength, and antenna and must be considered); c) The parameters shall be provided in a manuer permitting host manufacturers to design the printed circuit (PC) board layout; c) The parameters by manufacturer and specifications; Limited module manufacturer has the lexibility to define its alternative method to ddress the conditions that limit the initial o) Test procedures for design writeriform and								
sed with. The manufacturer of a limited 2.46 : ANT0: 2.1dBi, ANT1: 2.1dBi antenna shape (traces in phase) can affect antenna gain and must be considered); ordule must describe, both in the filing and in teinstallation instructions, the alternative eases that the limited module manufacturers to sets overify that the host meets the necessary equirements to satisfy the module limiting onditions. 56: Band1: 3.2dBi, Band3: 4.2dBi antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; c) The parameters by manufacturers to design the printed circuit (PC) board layout; utilities module manufacturer has the exibility to define its alternative method to deress the conditions that limit the initial c) Test procedures for design verifection; and								
nodule must describe, both in the filing and in te installation instructions, the alternative sens that the limited module manufacturer sets to verify that the host meets the necessary equirements to satisfy the module limiting onditions. 5G: Band1: 3.2dBi, Band3: 4.2dBi antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; c) The tprocedures for design exibility to define its alternative method to deress the conditions that limit the initial c) The tprocedures for design				2.4G : ANTO: 2.1dBi, ANT1: 2.1dBi				
ne installation instructions, the alternative hears that the limited module manufacturers is sto verify that the host meets the necessary equirements to satisfy the module limiting onditions. c) The parameters shall be provided in a manuner permitting host manufacturers to design the printed circuit (PC) board layout; officine. d) Appropriate parts by manufacturer ends the existing is alternative method to diress the conditions that limit the initial o) Test procedures for design de				5G: Band1: 3.2dBi, Band3: 4.2dBi				
teams that the limited module manufacturer a manner permitting host manufacturers to design the printed circuit (PC) board layout; ses to verify that the host meets the necessary quirements to satisfy the module limiting onditions. d) Appropriate parts by manufacturer and specifications; limited module manufacturer has the exibility to define its alternative method to ddress the conditions that limit the initial e) Test procedures for design								
ses to verify that the host meets the necessary quirements to satisfy the module limiting onditions. Limited module manufacturer has the exibility to define its alternative method to deress the conditions that limit the initial	eans that the limited module manufacturer							
equirements to satisfy the module limiting onditions. limited module manufacturer has the exibility to define its alternative method to ddress the conditions that limit the initial		,						
onditions. d) Appropriate parts by manufacturer limited module manufacturer has the exibility to define its alternative method to ddress the conditions that limit the initial e) Test procedures for design					design the printed circuit (PC) board layout;			
Limited module manufacturer has the lexibility to define its alternative method to deress the conditions that limit the initial and specifications; o) Test procedures for design					d) Appropriate parts by manufacturer			
ddress the conditions that limit the initial	Imited module manufacturer has the							
adress the conditions that limit the initial verification: and	exibility to define its alternative method to							
pproval, such as: shielding, minimum Verification; and								
	pproval, such as: shielding, minimum				vernication; and			
				·]				

f) Production test procedures for ensuring compliance. The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a			instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors. 2.8 Label and compliance information Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC IO" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.	YES		Refer to instruction If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:
Class II permissive change application. 2.6 RF exposure considerations	YES	Refer to instruction				"Contains Transmitter Module FCC ID: 2AG87NM-DB-2M Or Contains FCC ID: 2AG87NM-DB-2M "
It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).		The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device. This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.	2.9 Information on test modes and additional testing requirementss Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously teremenittee modules or other transmitters in a	YES		Refer to instruction Any company of the host device which installs this modular with unlimited modular approval should perform the test of radiated & conducted emission and spurious emission, etc. according to FCC part 15C: 15.247 and 15.407and 15.209 & 15.207, 15C class B requirement, only if the tests result comply with FCC part 15C: 15.247 and 15.407 and 15.209 & 15.207, 15B Class B requirement, then the host can be sole legally
2.7 Antennas A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole,	YES	RRefer to instruction Antenna Type: paper presents antenna Antenna Gain: 2.4G : ANTO: 2.1dBi, ANT1: 2.1dBi 5G: Band1: 3.2dBi, Band3: 4.2dBi	transmitting modules or other transmitters in a host. Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.			
PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type")). For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration			2.10 Additional testing, Part 15 Subpart B disclaimer The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC		No	Refer to instruction Any company of the host device which installs this modular with unlimited modular approval should perform the test

 -	_	-
		equipment and receiver.
		Connect the equipment into an outlet on
		a circuit different from that to
		which the receiver is connected.
		-Consult the dealer or an experienced
		radio/TV technician for help.