

Test report No:
80434REM.002

Test report

**FCC Rules and Regulations CFR 47, Part 15, Subpart B
(10-1-23 Edition) & ICES-003 Issue 7 (October 2020)**

(*) Identification of item tested	Telematic control unit with wireless technologies, used in automotive industry
(*) Trademark	VW AG
(*) Model and /or type reference	TKCMOD12N00
Other identification of the product	TKCMOD12E00, TKCMOD11000, TKCMOD12C00, TKCMOD12J00, TKCMOD12R00, TKCMOD12T00 and TKCMOD13C00, TKCMOD11001
(*) Features	FCC ID: T8GCONMOD IC: 6434ACONMOD
(*) Manufacturer	Features: GSM, UMTS, LTE, 5G, GNSS, Wi-Fi, BTLE, BT_EDR HW version: H26 SW version: J036
Test method requested, standard	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH Becker-Goering-Str. 16 76307, Karlsbad, GERMANY
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez EMC Consumer & RF Lab. Manager 
Date of issue	2026-04-22
Report template No	FDT08_27 (*) "Data provided by the client"

Firmado digitalmente por
53680346W JOSE
MANUEL GOMEZ
(CA29507456)
Fecha: 2026.04.22
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Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
MP	Measurement Point
OM	Operation Mode
S/	Sample
V	Verdict

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ dB for peak measurements ($k=2$).

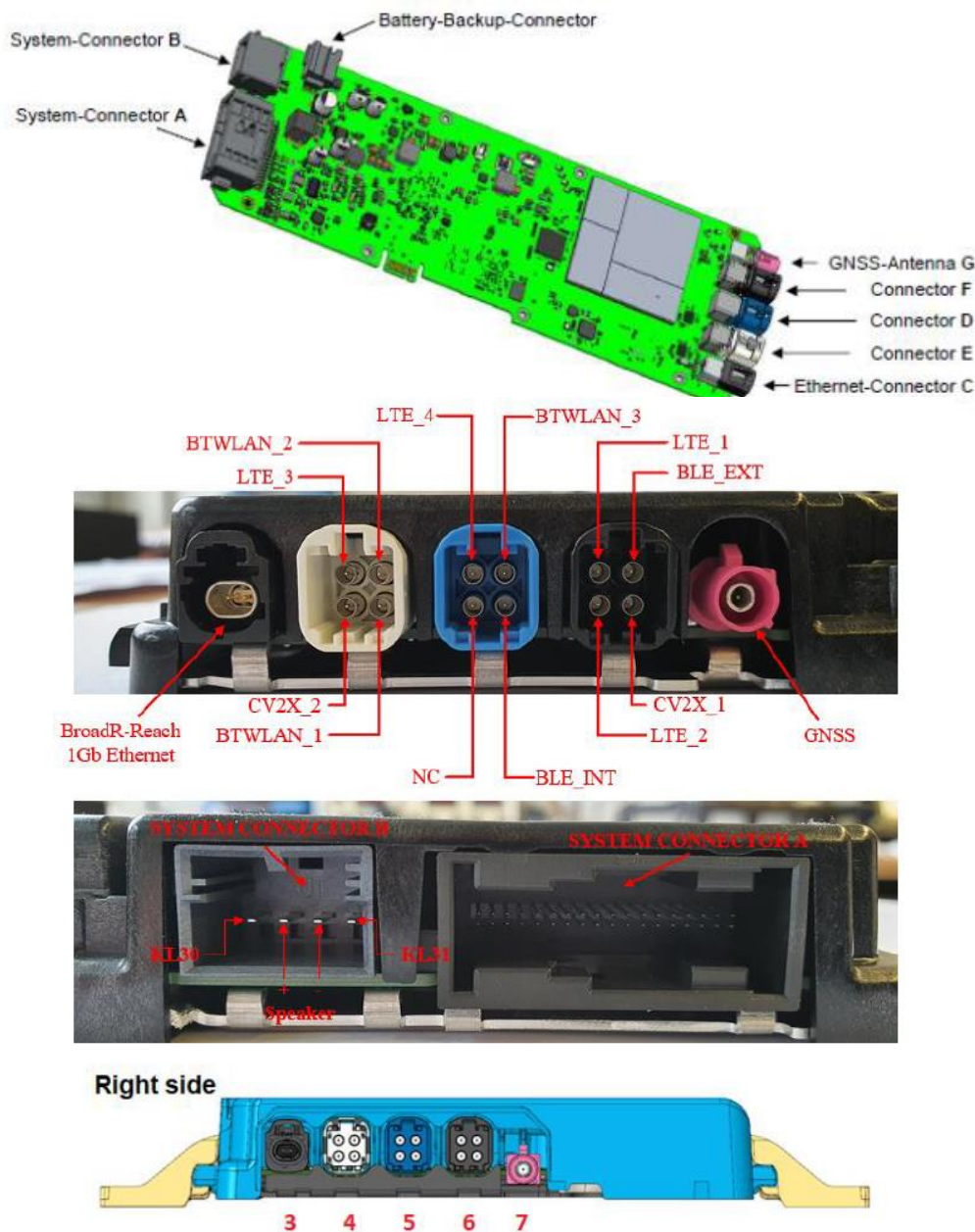
The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 12.75 GHz is $I = \pm 2,6$ dB for peak and average measurements ($k=2$).

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", "Manufacturer").
2. The sample consists of a Telematic control unit with wireless technologies, used in automotive industry. The device is a Telematics control unit with wireless technologies, used in automotive, equipped with one modem, OEM. This unit was designed for automotive usage and contains the following features: GSM, UMTS, LTE, 5G, GNSS, WLAN (a, b, g, n, ac), Bluetooth Low Energy (BTLE) and Bluetooth EDR.

NOTE: Device is equipped with one NAD modules; see Technical description.



Plug-in position (overview)	Coding	Connector Type	Description
1	B	QKK	Power/Audio
2	A	NanoMQS 36-pol	Audio/Button/Debug/CAN/Airbag
3	C	H-MTD	Ethernet
4	D (white)	Mini Fakra 4x	Mixed – LTE, BLE, BT/WiFi
5	E (blue)	Mini Fakra 4x	Mixed – LTE, V2X, BT/WiFi
6	F (black)	Mini Fakra 4x	Mixed – LTE, V2X, BLE
7	G (violet)	Single Fakra	GNSS

3. Derived model not tested. These models have been declared by the supplier of the sample as being the same as the model under test.

HARMAN AUTOMOTIVE DIVISION
HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GÖRING-STRASSE 16
76307 KARLSBAD, GERMANY



Declaration of similarity

To whom it may concern,

We, **Harman Becker Automotive Systems GmbH,** located in
Becker-Goering-Str. 16; 76307 Karlsbad, Germany

Hereby declare that the following units: TKCMOD12E00, TKCMOD12N00,
TKCMOD11000, TKCMOD12C00, TKCMOD12J00, TKCMOD12R00,
TKCMOD12T00 and TKCMOD13C00

have integrated the same BT/Wifi chipset.

The different naming comes from country specific, features enabled or network
access device type.

Targeted countries	Product Name	Type	NAD-HW	GNSS	Bluetooth h WLAN	NAD Services	CV2X
Rest of the world (offline variant)	TKCMOD11000	V046	EU	x	x		
EU + some other countries	TKCMOD12E00	V037, V042, V043, V044, V049	EU	x	x	x	
Canada/Mexico/USA	TKCMOD12N00	V038, V039, V047	NA	x	x	x	
China (without CV2X)	TKCMOD12C00	V105	CN	x	x	x	
Japan	TKCMOD12J00	V045	RW	x	x	x	
Armenia/Belarus/Kazakhstan/Russia/Uzbekistan	TKCMOD12R00	V048	EU	x	x	x	
Turkey	TKCMOD12T00	V040	EU	x	x	x	
China (with CV2X)	TKCMOD13C00	V106	CN	x	x	x	x

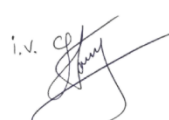
This declaration is intended to be included in the test reports where applies

Regards

HARMAN AUTOMOTIVE DIVISION
Harman Becker Automotive Systems GmbH
Becker-Göring-Straße 16
76307 Karlsbad, Germany



By: Andrei-Daniel CALIN
Title: Regulatory Product Compliance Expert
Company: Harman Becker
Telephone: +40 799 305 814
e-mail: andreidaniel.calin@harman.com



By: Iulian-George Stoica
Title: Regulatory Product Compliance Expert
Company: Harman Becker
Telephone: +40799 306 699
e-mail: iulian.stoica@harman.com

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	80434B_67.1	Telematic control unit	TKCMOD 12N00	358845895448385	2026-03-05	Element Under Test
S/01	80434B_88.1	Harness CONMOD			2026-03-05	Auxiliary Element

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	RF connector - code			[]	[X]	[]	
	RF connector - code			[X]	[X]	[]	
	RF connector - code			[X]	[]	[]	
--							
Supplementary information to the ports..... :	--						
Rated power supply	Voltage and Frequency			Reference poles			
				L1	L2	L3	N
	[]	AC:	[]	[]	[]	[]	[]
[X]		DC: 12V car battery (4.8 VDC inside of TCU)					
Rated Power	12V DC						
Clock frequencies.....	See Block Diagram						
Other parameters	See Technical description						
Software version	J036						
Hardware version	H26						
Dimensions in cm (W x H x D)							
Mounting position	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[]	Hand-held equipment					
	[X]	Other: Automotive telematics control unit					
Modules/parts.....	Module/parts of test item			Type		Manufacturer	
	--						
Accessories (not part of the test item)	Description			Type		Manufacturer	
	Cable Harness			--			
	2G/3G4G/5G Antenna			--		Hirschmann/ Molex	
	eCall button/LED			--			
	SOS Loudspeaker			--			
	Wake-up unit Box			--			
	--						
Documents as provided by the applicant.....	Description			File name		Issue date	
	Technical Description						
	--						

⁽³⁾ Only for Medical Equipment

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
Becker-Goering-Str. 16
76307, Karlsbad, GERMANY

Testing period and place

Test Location	DEKRA TESTING AND CERTIFICATION S.A.U. C/ Severo Ochoa, 6 - Parque Tecnológico de Andalucía; 29590 Campanillas (Málaga) (Location B)
Date (start)	2026-03-26
Date (finish)	2026-03-27

Document history

Report number	Date	Description
80434REM.002	2026-04-22	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Iván Guerrero González.

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P
Partial Passed	P*

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
08866	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-06-12
06132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2026-04-28
06126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2026-04-22
04612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2027-10-15
05641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-10-23
05705	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2026-07-23
06064	SEMIANECHOIC ABSORBER LINED CHAMBER	SAC-3	Frankonia	--
06329	SHIELDED ROOM	--	FRANKONIA	--
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--

Summary

Test Specification	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-23 Edition) & ICES-003 Issue 7 (October 2020)	RE Radiated emission. Electromagnetic field measure	P	(1)
	CE Continuous conducted emission	N/A	(2)
<u>Supplementary information and remarks:</u> (1) Test required only to the 5th harmonics of the maximum internal work frequency in the EUT. (2) Equipment powered by battery			

Appendix A: Test results

Appendix A content

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Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.
The operation modes used by the samples to which the present report refers, are shown in the following table:

Id	Description
OM/01	EUT ON. Bluetooth without communication established. WiFi 2.4GHz and 5GHz without communication established. Power supply: 12Vdc.

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-23 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.
	ANSI C63.4 (2014)	CE Continuous conducted emission

SAMPLE CALCULATION

For radiated measurements:

Values measures by the test receiver / analyzer are converted to field strength, in dBuV/m, at the regulatory distance using the following calculation:

$$\text{Unwanted Lvl (dBuV/m)} = \text{Raw Rec (dBuV)} + \text{Preamp (dB)} + \text{Trd Corre. (dB/m)} + \text{SigPath (dB)}$$

Where,

Raw Rec (dBuV): Measured voltage in the receiver / spectrum analyzer in dBuV

Preamp (dB): Path loses due to preamplifier

Trd Corr. (dB/m): Antenna factor in dB/m

SigPath (dB) = Cable loss (dB) – External Gain amplifier (dB) – Distance factor (dB)

Cable loss (dB): Cable loss

External Gain amplifier (dB): Gain from external amplifier (when used)

Distance factor (dB): Distance factor in dB. When measurement distance is different to limit distance

The field strength, calculated by this way is compared with the regulatory limit.

Test Cases Details

FCC 47 CFR Part 15B

RE Radiated emission. Electromagnetic field measure

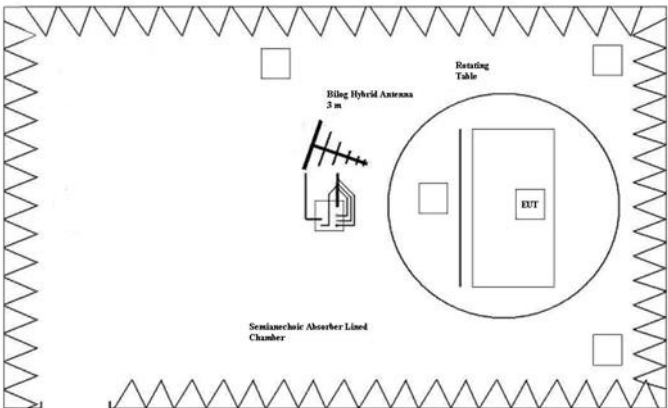
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-23 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

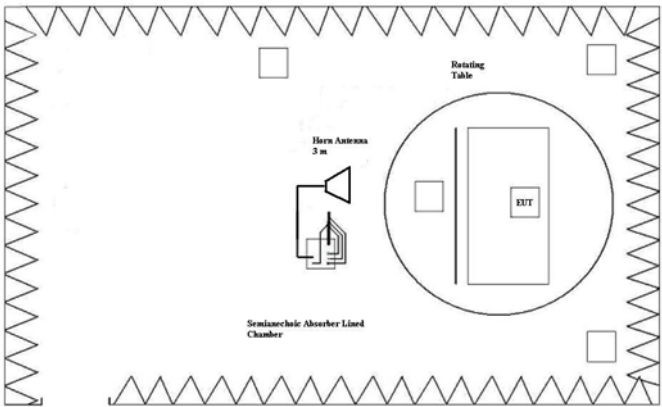
Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(μ V/m)	(dB μ V/m)	(μ V/m)	(dB μ V/m)	(dB μ V/m)	(dB μ V/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

Limits according to FCC Part 15B, are equal or more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

Sl	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR1	[1000, 17000]	P
01	OM/01	RE0101HR2	[17000, 26000]	P

Verdict

Pass

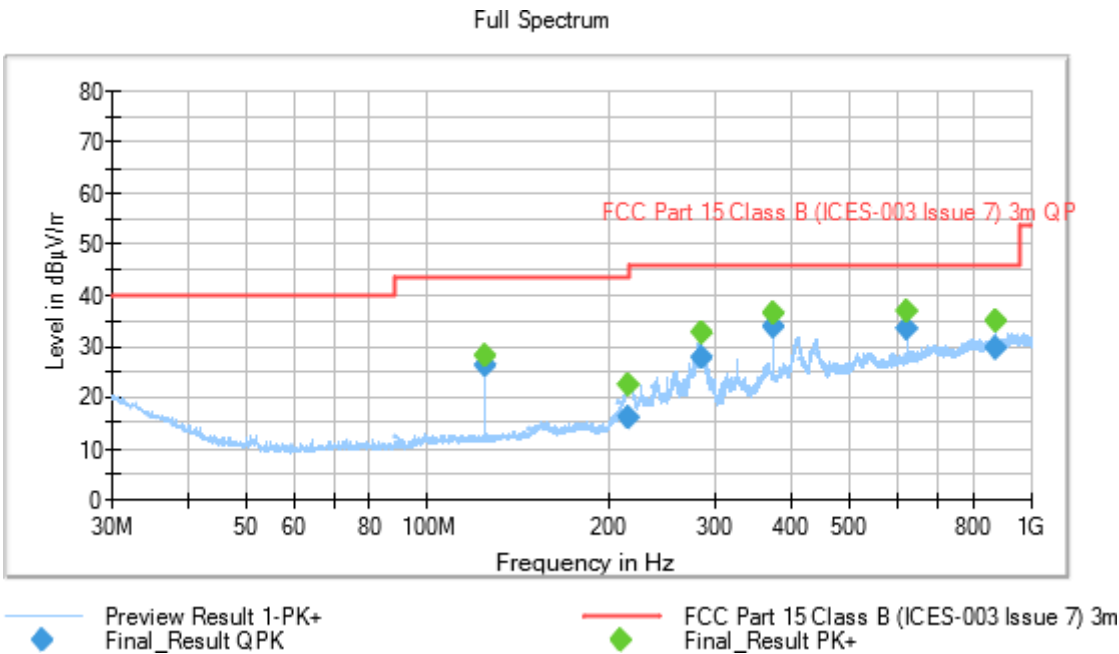
Attachments

EMC Test Code = RE0101LR Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

Radiated Emission

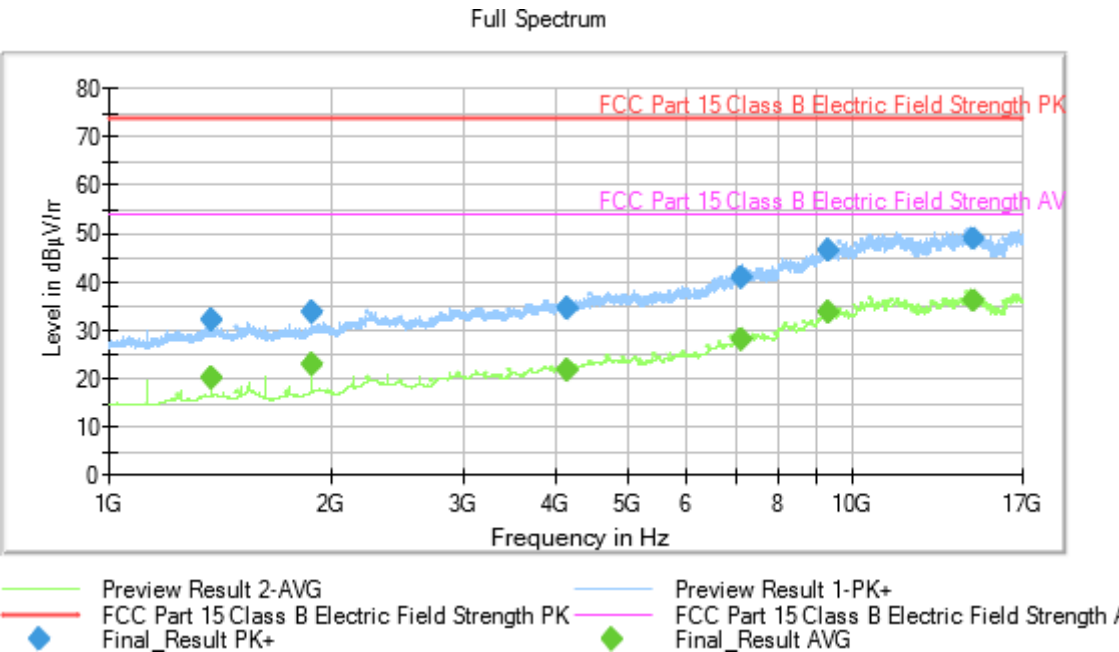
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
124.980000	---	28.06	---	---	120.0	V	-136.0	1.2	3.0	7.6	16.3
124.980000	26.29	---	43.52	17.23	120.0	V	-136.0	1.2	3.0	7.6	14.5
215.880000	---	22.54	---	---	132.0	H	117.0	1.5	3.0	10.9	7.2
215.880000	16.04	---	43.52	27.48	132.0	H	117.0	1.5	3.0	10.9	0.7
285.240000	---	32.60	---	---	126.0	H	179.0	1.9	3.0	12.4	15.3
285.240000	27.60	---	46.00	18.40	126.0	H	179.0	1.9	3.0	12.4	10.3
375.000000	33.70	---	46.00	12.30	114.0	V	-47.0	2.0	3.0	18.1	10.6
375.000000	---	36.31	---	---	114.0	V	-47.0	2.0	3.0	18.1	13.2
624.990000	---	36.86	---	---	144.0	H	159.0	2.6	3.0	21.8	9.5
624.990000	33.50	---	46.00	12.50	144.0	H	159.0	2.6	3.0	21.8	6.1
874.980000	29.71	---	46.00	16.29	161.0	V	-54.0	3.0	3.0	22.7	1.1
874.980000	---	34.83	---	---	161.0	V	-54.0	3.0	3.0	22.7	6.2

EMC Test Code = RE0101HR1 Frequency Range MHz = [1000, 17000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

Radiated Emission

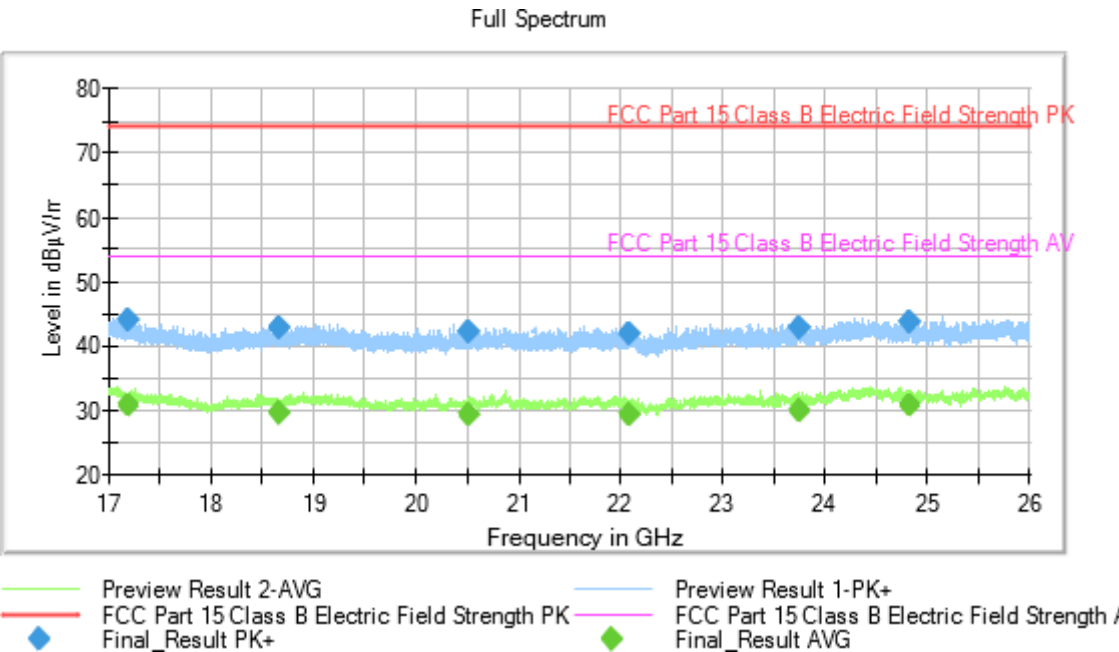
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
1375.000000	31.94	---	73.97	42.03	-38.6	0.0	26.0	44.5
1375.000000	---	20.13	53.97	33.84	-38.6	0.0	26.0	32.7
1875.000000	33.48	---	73.97	40.49	-37.9	0.0	25.6	45.8
1875.000000	---	22.86	53.97	31.11	-37.9	0.0	25.6	35.2
4141.750000	---	21.48	53.97	32.49	-36.5	0.0	29.9	28.1
4141.750000	34.47	---	73.97	39.50	-36.5	0.0	29.9	41.1
7131.750000	40.94	---	73.97	33.03	-34.7	0.0	36.3	39.3
7131.750000	---	28.05	53.97	25.92	-34.7	0.0	36.3	26.4
9348.750000	---	33.68	53.97	20.29	-32.0	0.0	39.1	26.6
9348.750000	46.42	---	73.97	27.55	-32.0	0.0	39.1	39.3
14599.250000	48.99	---	73.97	24.98	-28.0	0.0	42.0	35.0
14599.250000	---	35.98	53.97	17.99	-28.0	0.0	42.0	22.0

EMC Test Code = RE0101HR2 Frequency Range MHz = [17000, 26000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

Radiated Emission

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
17181.500000	43.88	---	73.97	30.09	1000.0	100.0	V	36.0	-58.4	0.0	37.7	64.6
17181.500000	---	30.66	53.97	23.31	1000.0	100.0	V	36.0	-58.4	0.0	37.7	51.3
18668.600000	42.76	---	73.97	31.21	1000.0	100.0	V	-103.0	-57.8	0.0	38.2	62.4
18668.600000	---	29.58	53.97	24.39	1000.0	100.0	V	-103.0	-57.8	0.0	38.2	49.2
20523.200000	---	29.18	53.97	24.79	1000.0	100.0	V	82.0	-54.8	0.0	37.7	46.3
20523.200000	42.10	---	73.97	31.87	1000.0	100.0	V	82.0	-54.8	0.0	37.7	59.2
22079.900000	---	29.22	53.97	24.75	1000.0	100.0	V	-150.0	-53.3	0.0	38.0	44.5
22079.900000	42.00	---	73.97	31.97	1000.0	100.0	V	-150.0	-53.3	0.0	38.0	57.3
23747.000000	---	29.76	53.97	24.21	1000.0	100.0	V	-10.0	-51.4	0.0	38.5	42.6
23747.000000	42.86	---	73.97	31.11	1000.0	100.0	V	-10.0	-51.4	0.0	38.5	55.7
24824.300000	---	30.88	53.97	23.09	1000.0	100.0	H	157.0	-51.2	0.0	39.2	42.9
24824.300000	43.59	---	73.97	30.38	1000.0	100.0	H	157.0	-51.2	0.0	39.2	55.6