DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29507456

Test report No:
NIE: 62486RRF.012

Partial Test Report

Reference Standard:
USA FCC Part 24
CANADA RSS-133

(*) Identification of item tested	Telematic control unit with wireless technologies, used in automotive industry
(*) Trademark	BMW
(*) Model and /or type reference	WAVE-11-HIGH-R1
Other identification of the product	HW version: D3 SW version: 20512H.001_047_009 FCC ID: T8GWAVE11HIGHR1 IC: 6434A-WAVE11HIGHR1
(*) Features	GSM, UMTS, LTE, 5G, GNSS
Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
Test method requested, standard	USA FCC Part 24 (10-1-19 Edition). CANADA RSS-133 Issue 6, Jan. 2018. - Radiated emissions. ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Approved by (name / position & signature)	José Carlos Luque RF Lab. Supervisor Firmado digitalmente por 74841983Y JOSE CARLOS LUQUE (C:A29507456) Fecha: 2021.03.22 11:45:38 +01'00'
Date of issue	2021-03-22
Report template No	FDT08_23 (*) "Data provided by the client"

Index

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.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

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. **IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification S.A.U.

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.

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").
2. The sample of the model WAVE-11-HIGH-R1 is a Telematics control unit with wireless technologies, used in automotive, equipped with 2 modems, OEM and customer. The project name WAVE has the meaning “Wireless Access in Vehicular Environment” and thus describes the key features of this device as Communication and Data Interface. This unit was designed for automotive usage and contains the following features: GSM, UMTS, LTE, 5G, and GNSS.

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.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
62486E/719	Telematic Control Unit	WAVE-11-HIGH-R1	B395A.0M4907000	2021/02/04
62486E/012	Antenna (DA WAVE HIGH 5G US)	DA05DI20	--	2020/09/22
62486E/036	Antenna Box	AB01-I20-01	--	2020/09/22
62486E/037	Antenna Box	AB01-I20-01	--	2020/09/22
62486E/038	Antenna Box	AB01-I20-01	--	2020/09/22
62486E/039	Antenna Box	AB01-I20-01	--	2020/09/22
62486E/117	Harness	--	--	2020/09/28

Auxiliary elements used with the Sample S/01:

Control Nº	Description	Model	Serial Nº	Date of reception
62486E/109	Battery Li-ion	11FR1580-2	--	2020/09/28
62486E/042	Antenna ground plane for roof	--	--	2020/09/22
62486E/131	RF Cable for 4-Fakra	--	--	2020/09/28
62486E/055	OABR Cable	--	--	2020/09/22
62486E/162	OABR 1000 BaseT Converter	--	--	2020/09/28
62486E/070	I-Box OABR Adapter	--	--	2020/09/28
62486E/072	Ethernet Cable	--	--	2020/09/22
62486E/090	Speaker	FR7	--	2020/09/28
62486E/101	SOS Pulser (E-Call)	9385	11221	2020/09/28

Sample S/01 has undergone the following test(s): The Radiated tests indicated in the Appendix A.

Test sample description

Ports..... :	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)
	RF connector –code D violet trunk/roof)	Port not used for SOP2021 (it has V2X interfaces and gateway for SDARS signal towards another ECU)	☐	☒	☐
	RF connector – code C blue (trunk/roof)	>5m	☒	☒	☐
	NanoMQS 20pol	>5m	☒	☐	☐
	NanoMQS 10pol	>8m	☒	☐	☐
	HDBT MATEnet 2-Pol (Roof/Trunk)	>5m	☒	☐	☐
	Antenna Connector grey (Roof)	<0.5m	☒	☒	☐

Supplementary information to the ports..... :							
Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 12V car battery / attenuator (4,5 V ≤ UB ≤ 18 V; UB typical: 12 V)					
	☐	DC:					
Rated Power .....:	12V DC						
Clock frequencies.....:	25MHz;26MHz;32,768kHz;49,58MHz;						
Other parameters.....:	See Technical description						
Software version .....:	20512H.001_047_009						
Hardware version .....:	D3						

Dimensions in cm (W x H x D) ....:	160x18x112 mm			
Mounting position .....:	☐	Table top equipment		
	☐	Wall/Ceiling mounted equipment		
	☐	Floor standing equipment		
	☐	Hand-held equipment		
	☒	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
	E-CALL 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.
Date (start)	2021-02-19
Date (finish)	2021-02-25

Document history

Report number	Date	Description
62486RRF.012	2021-03-22	First release.

Environmental conditions

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Miguel Manuel López, Javier Miguel Nadales and José Manuel Jiménez.

Used instrumentation:

Radiated Measurements

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
3.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
4.	Biconical/Log Antenna 30MHz - 6GHz ETS LINDGREN 3142E	2020/10	2023/10
5.	Attenuator 3 dB 2W, DC-6GHz, JFW 50HN-03	2020/10	2021/10
6.	Multi-Device Controller INNCO CO3000	N.A.	N.A.
7.	Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2019/10	2021/10
8.	Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2020/08	2023/08
9.	RF Preamplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2020/10	2021/10
10.	Low Noise Amplifier G>30dB, 18 - 40 GHz BONN ELEKTRONIK BLMA 1840-1M	2019/02	2021/02
11.	Horn Antenna 18-40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2020/05	2023/05
12.	Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	N.A.	N.A.
13.	Wideband Radio Communication Tester ROHDE AND SCHWARZ CMX500	N.A.	N.A.

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

FCC PART 24 / RSS-133 PARAGRAPH		
Requirement – Test case	**Verdict**	**Remark**
FCC 24.232 / RSS-133 6.4: RF output power	N/M	(1)
FCC 2.1047 / RSS-133 6.2: Modulation characteristics	N/M	(1)
FCC 24.235 / RSS-133 6.3: Frequency stability	N/M	(1)
FCC 2.1049: Occupied Bandwidth	N/M	(1)
FCC 24.238 / RSS-133 6.5: Spurious emissions at antenna terminals	N/M	(1)
FCC 24.238 / RSS-133 6.5: Radiated emissions	P	(2)

Supplementary information and remarks:

(1) Test not requested. Radiated emissions test only requested.

(2) The 62486RRF.001 contains the results of the pre-testing to determine the worst case of the setting of the antennas:

· Conf #1: MIMO1 Port -> Int BuA Antenna / MIMO2 Port -> MIMO2 Antenna / Antennenbox for NAD#2.

· Conf #2: MIMO1 Port -> Int BuA Antenna / MIMO2 Port -> MIMO2 Antenna / FSA antenna for NAD#2.

· Conf #3: MIMO1 Port -> MIMO1 Antenna / MIMO2 Port -> MIMO2 Antenna / Antennenbox for NAD#2.

· Conf #4: MIMO1 Port -> MIMO2 Antenna / MIMO2 Port -> MIMO2 Antenna / FSA antenna for NAD#2.

Appendix A: Test results for FCC Part 24 / RSS-133

INDEX

TEST CONDITIONS

POWER SUPPLY (V):

Vnominal: 12 Vdc
Type of Power Supply: External DC (vehicle battery).

The module with the highest antenna gain has been tested using the worst case obtained for conducted output power for New Radio 5G. And the other module has been tested using an adjacent channel to the 5G with LTE band with a setting that would allow communication in the same band to both modules simultaneously.

TEST FREQUENCIES:

- 5G SA & LTE (MIMO 2x2):

n2A + LTE Band 2. (Antenna configuration 3)

Table 4.3.1.1.1.2-1: Test frequencies for NR operating band n2 and SCS 15 kHz

CBW [MHz]	*carrier Bandwidth* [PRBs]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	point A [MHz]	*absolute FrequencyPoint A* [ARFCN]	*offsetToCarrier* [Carrier PRBs]	SS block SCS [kHz]	GSCN	*absolute FrequencySSB* [ARFCN]	k_{SSB}	Offset Carrier CORESET#0 [RBs] Note 2	CORESET#0 Index (Offset [RBs]) Note 1	offsetToPointA (SIB1) [PRBs] Note 1
5	25	Downlink	Low	1932.5	386500	1930.25	386050	0	15	4829	386410	0	0	0 (0)	0
			Mid	1960	392000	1939.39	387878	102		4900	391970	8	1	0 (0)	103
			High	1987.5	397500	1894.53	378906	504		4968	397470	8	1	0 (0)	505
		Uplink	Low	1852.5	370500	1850.25	370050	0	-	-	-	-	-	-	-
			Mid	1880	376000	1787.03	357406	504		-	-	-	-	-	-
			High	1907.5	381500	1904.17	380834	6		-	-	-	-	-	-
10	52	Downlink	Low	1935	387000	1930.32	386064	0	15	4830	386430	2	0	0 (0)	0
			Mid	1960	392000	1936.96	387392	102		4894	391490	10	1	0 (0)	103
			High	1985	397000	1889.6	377920	504		4955	396490	10	1	0 (0)	505
		Uplink	Low	1855	371000	1850.32	370064	0	-	-	-	-	-	-	-
			Mid	1880	376000	1784.6	356920	504		-	-	-	-	-	-
			High	1905	381000	1899.24	379848	6		-	-	-	-	-	-
15	79	Downlink	Low	1937.5	387500	1930.39	386078	0	15	4831	386450	4	0	0 (0)	0
			Mid	1960	392000	1934.53	386906	102		4888	391010	0	0	1 (2)	104
			High	1982.5	396500	1884.67	376934	504		4945	395570	8	1	1 (2)	507
		Uplink	Low	1857.5	371500	1850.39	370078	0	-	-	-	-	-	-	-
			Mid	1880	376000	1782.17	356434	504		-	-	-	-	-	-
			High	1902.5	380500	1894.31	378862	6		-	-	-	-	-	-
20	106	Downlink	Low	1940	388000	1930.46	386092	0	15	4832	386650	6	1	2 (4)	5
			Mid	1960	392000	1932.1	386420	102		4882	390530	2	0	1 (2)	104
			High	1980	396000	1879.74	375948	504		4932	394590	10	1	1 (2)	507
		Uplink	Low	1860	372000	1850.46	370092	0	-	-	-	-	-	-	-
			Mid	1880	376000	1779.74	355948	504		-	-	-	-	-	-
			High	1900	380000	1889.38	377876	6		-	-	-	-	-	-

Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.
Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter $\Delta F_{OffsetCORESET\text{-}0\text{-}Carrier}$ in Annex C expressed in number of common RBs.

Module NAD2					Module NAD1			
Test frequencies for n2A.					LTE Band 5			
5G Carrier in Band n2.								
Channel	n2A							
	SCS (kHz)	BW (MHz)	Freq. (MHz)	NR-ARFCN	Channel	BW (MHz)	Freq. (MHz)	EARFCN
Low	15	20	1860	372000	Adjacent channel to Low	15	1877.5	18875
Middle	15	20	1880	376000	Adjacent channel to Middle	15	1897.5	19075
High	15	20	1900	380000	Adjacent channel to High	15	1882.5	18925

NOTE: 5G n2A band is completely included in 5G n25A band, so the channels of Band 25 were tested to give conformity to the assigned block.

n25A + LTE Band 25. (antenna configuration 3)

Table 4.3.1.1.1.25-1: Test frequencies for NR operating band n25 and SCS 15 kHz

CBW [MHz]	*carrier Bandwidth* [PRBs]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	point A [MHz]	*absolute FrequencyPoint A* [ARFCN]	*offsetToCarrier* [Carrier PRBs]	SS block SCS [kHz]	GSCN	*absolute FrequencySSB* [ARFCN]	k_{SSB}	Offset Carrier CORESET#0 [RBs] Note 2	CORESET#0 Index (Offset [RBs]) Note 1	offsetToPointA (SIB1) [PRBs] Note 1
5	25	Downlink	Low	1932.5	386500	1930.25	386050	0	15	4829	386410	0	0	0 (0)	0
			Mid	1962.5	392500	1941.89	388378	102		4904	392410	0	0	0 (0)	102
			High	1992.5	398500	1899.53	379906	504		4979	398410	0	0	0 (0)	504
		Uplink	Low	1852.5	370500	1850.25	370050	0	-	-	-	-	-	-	-
			Mid	1882.5	376500	1789.53	357906	504		-	-	-	-	-	-
			High	1912.5	382500	1909.17	381834	6		-	-	-	-	-	-
10	52	Downlink	Low	1935	387000	1930.32	386064	0	15	4830	386430	2	0	0 (0)	0
			Mid	1962.5	392500	1939.46	387892	102		4898	391930	2	0	0 (0)	102
			High	1990	398000	1894.6	378920	504		4969	397490	10	1	0 (0)	505
		Uplink	Low	1855	371000	1850.32	370064	0	-	-	-	-	-	-	-
			Mid	1882.5	376500	1787.1	357420	504		-	-	-	-	-	-
			High	1910	382000	1904.24	380848	6		-	-	-	-	-	-
15	79	Downlink	Low	1937.5	387500	1930.39	386078	0	15	4831	386450	4	0	0 (0)	0
			Mid	1962.5	392500	1937.03	387406	102		4892	391450	4	0	0 (0)	102
			High	1987.5	397500	1889.67	377934	504		4956	396510	0	0	1 (2)	506
		Uplink	Low	1857.5	371500	1850.39	370078	0	-	-	-	-	-	-	-
			Mid	1882.5	376500	1784.67	356934	504		-	-	-	-	-	-
			High	1907.5	381500	1899.31	379862	6		-	-	-	-	-	-
20	106	Downlink	Low	1940	388000	1930.46	386092	0	15	4832	386650	6	1	2 (4)	5
			Mid	1962.5	392500	1934.6	386920	102		4886	390970	6	0	0 (0)	102
			High	1985	397000	1884.74	376948	504		4943	395530	2	0	1 (2)	506
		Uplink	Low	1860	372000	1850.46	370092	0	-	-	-	-	-	-	-
			Mid	1882.5	376500	1782.24	356448	504		-	-	-	-	-	-
			High	1905	381000	1894.38	378876	6		-	-	-	-	-	-

Note 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.

Note 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter $\Delta F_{OffsetCORESET\text{-}0\text{-}Carrier}$ in Annex C expressed in number of common RBs.

Module NAD2					Module NAD1			
Test frequencies for n25A					LTE Band 25			
5G Carrier in Band n25								
Channel	n25A							
	SCS (kHz)	BW (MHz)	Freq. (MHz)	NR-ARFCN	Channel	BW (MHz)	Freq. (MHz)	EARFCN
Low	15	20	1860	372000	Adjacent channel to Low	20	1880	18900
Middle	15	20	1882.5	376500	Adjacent channel to Middle	20	1902.5	19125
High	15	20	1905	381000	Adjacent channel to High	20	1885	18950

Radiated emissions

SPECIFICATION:

FCC § 24.238. RSS-133 Clause 6.5.

The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

METHOD:

The measurement was performed with the EUT inside an anechoic chamber.

The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 18 GHz and at 1 m distance for measurements above 18 GHz.
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded.

The maximum field strength (dBµV/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

EIRP (dBm) = E (dBµV/m) + 20 log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
D = 3 m

Measurement Limit**:**

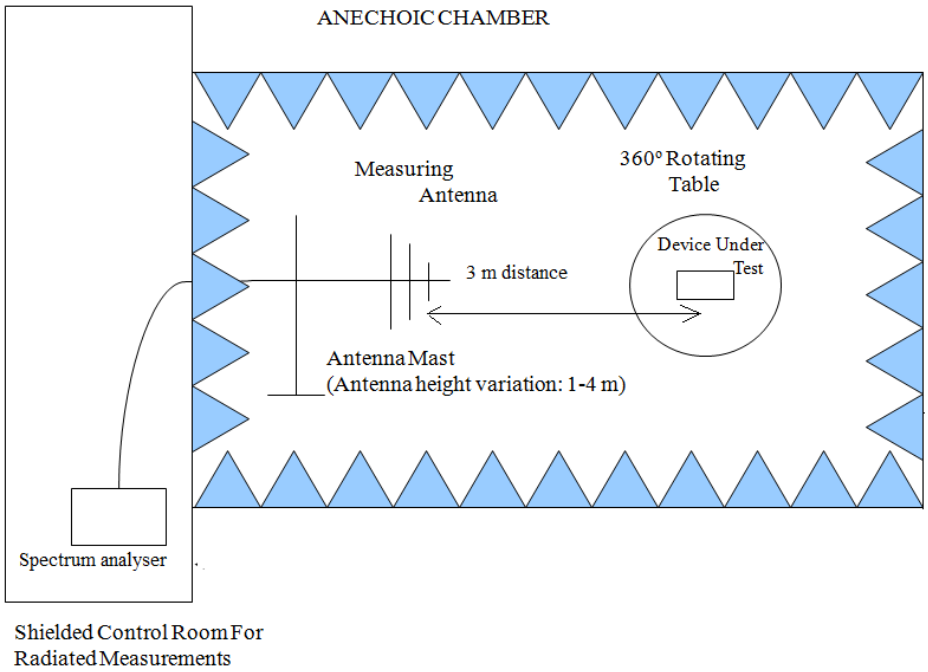
According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.
At Po transmitting power. the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative Po becomes:

Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = - 13 dBm

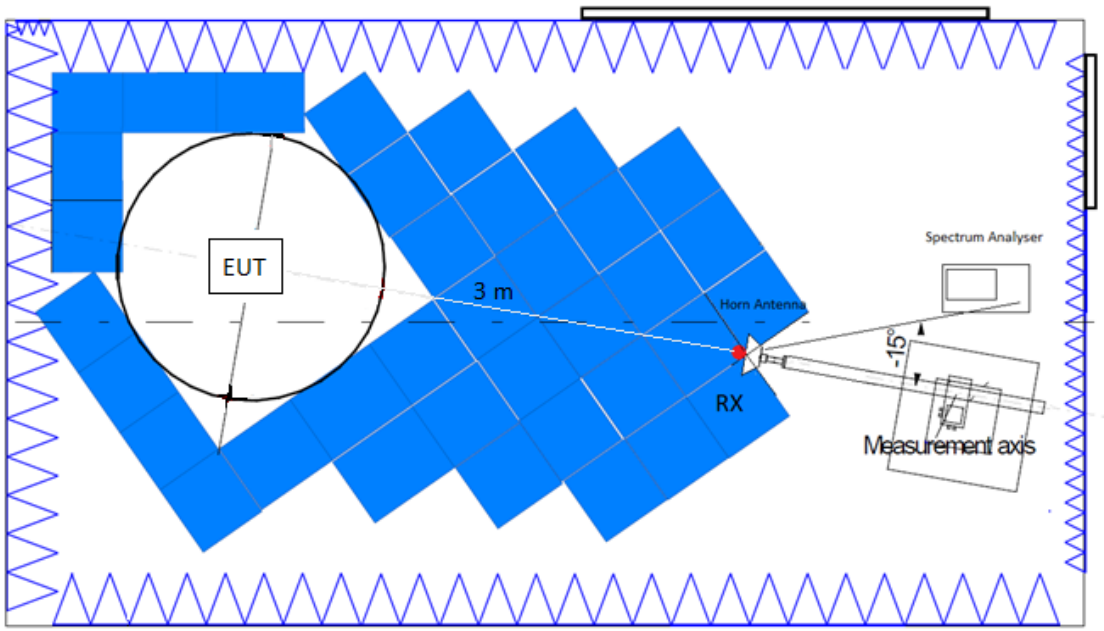
A resolution bandwidth / video bandwidth of 100 kHz / 300 kHz or higher were used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

TEST SETUP:

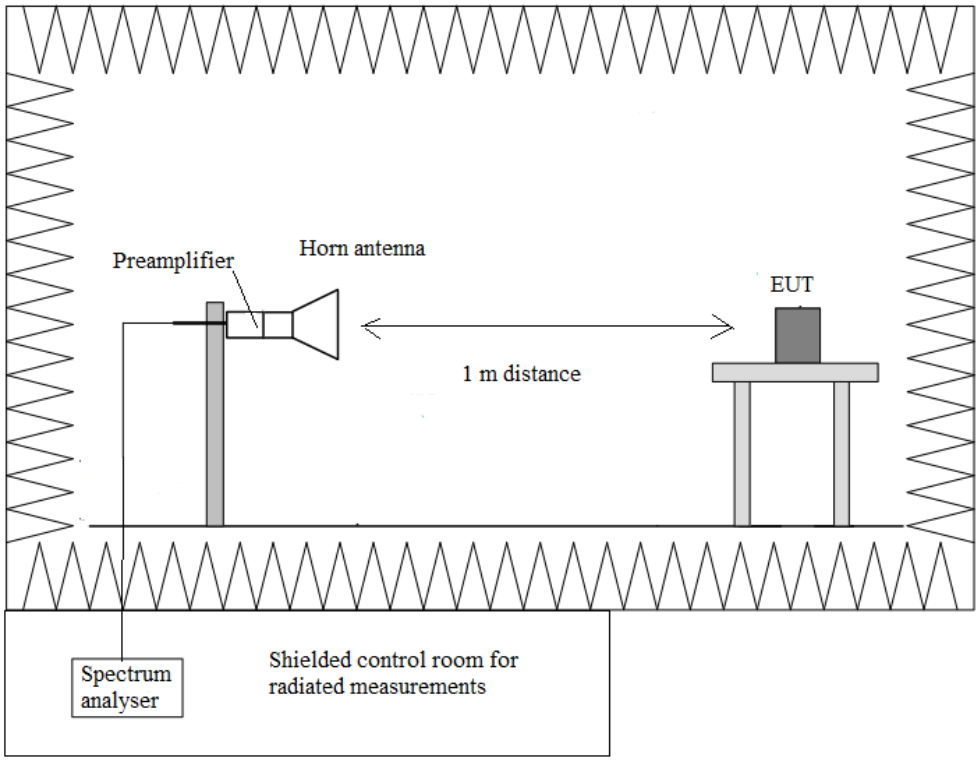
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 18 GHz:



Radiated measurements setup f > 18 GHz:



RESULTS:

- **n25A + LTE Band 25:**

A preliminary scan determined the worst case:

1) n25A (Module NAD2):

   n25A: Pi/2 BPSK, BW=20 MHz, SCS=15 kHz, RB=1, Offset=53.

2) LTE Band 25 (Module NAD1):

   25: QPSK, BW=20 MHz, RB=1, Offset=0.

The following results are the ones of the worst case.

- LOW CHANNEL:

Frequency range 30 MHz - 1 GHz:

No spurious frequencies at less than 20 dB below the limit.

Frequency range 1 - 18 GHz:

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
2.401500000	-26.42	H	Peak	<± 5.13
2.436500000	-29.18	V	Peak	<± 5.13

Frequency range 18 - 20 GHz:

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
18.801	-30.24	V	Peak	<± 4.82

- MIDDLE CHANNEL:

Frequency range 30 MHz - 1 GHz:

No spurious frequencies at less than 20 dB below the limit.

Frequency range 1 GHz-18 GHz:

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
2.401000000	-29.92	V	Peak	<± 5.13

Frequency range 18 - 20 GHz:

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
18.826	-26.78	V	Peak	<± 4.82

- HIGH CHANNEL:

Frequency range 30 MHz - 1 GHz:

No spurious frequencies at less than 20 dB below the limit.

Frequency range 1 GHz-18 GHz:

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
2.426000000	-29.44	V	Peak	<± 5.13
2.454500000	-32.20	H	Peak	<± 5.13
2.480000000	-30.74	V	Peak	<± 5.13

Frequency range 18 - 20 GHz:

Spurious frequencies at less than 20 dB below the limit:

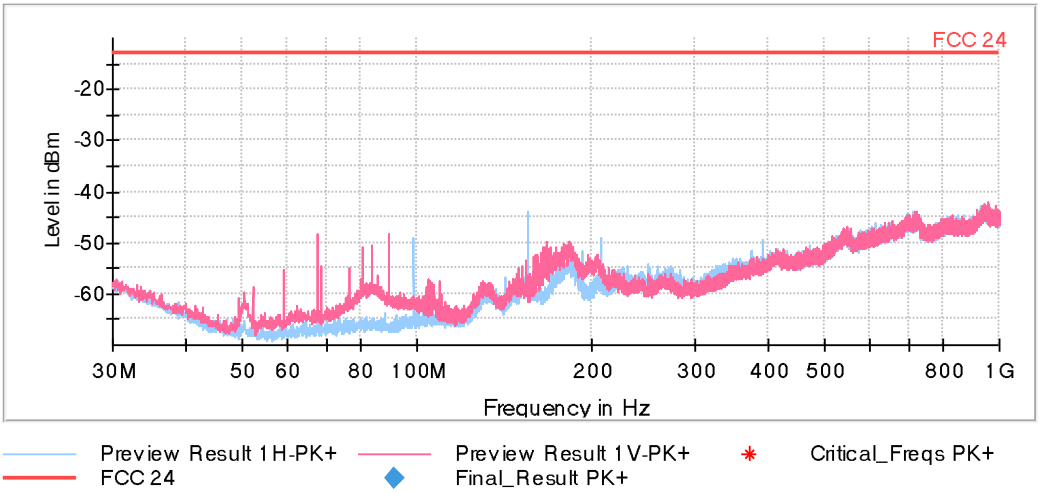
Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
18.761	-29.18	V	Peak	<± 4.82
19.0505	-30.80	V	Peak	<± 4.82

Measurement Uncertainty (dB)	<± 5.08 for f < 1 GHz <± 5.13 for f ≥ 1 GHz up to 17 GHz <± 4.82 for f ≥ 17 GHz up to 20 GHz

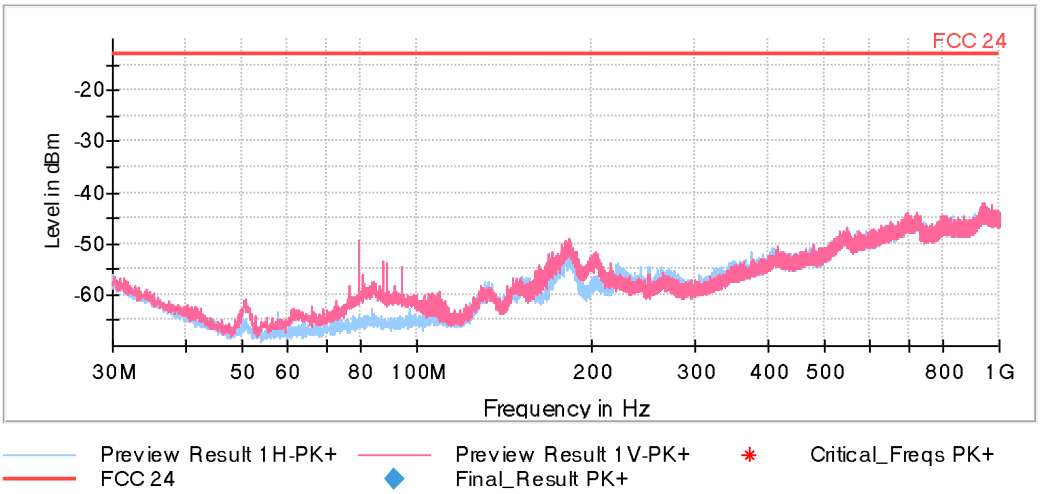
Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

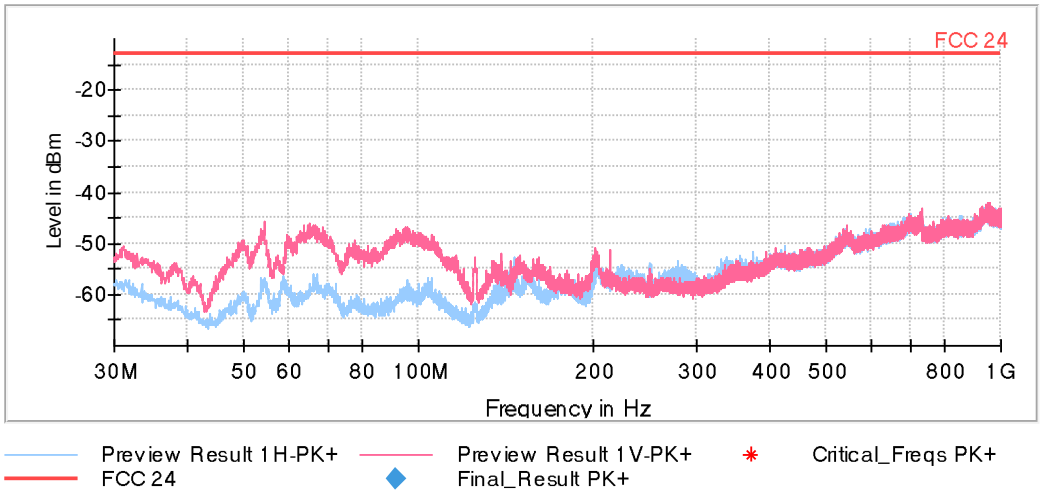
- Low Channel:



- Middle Channel:

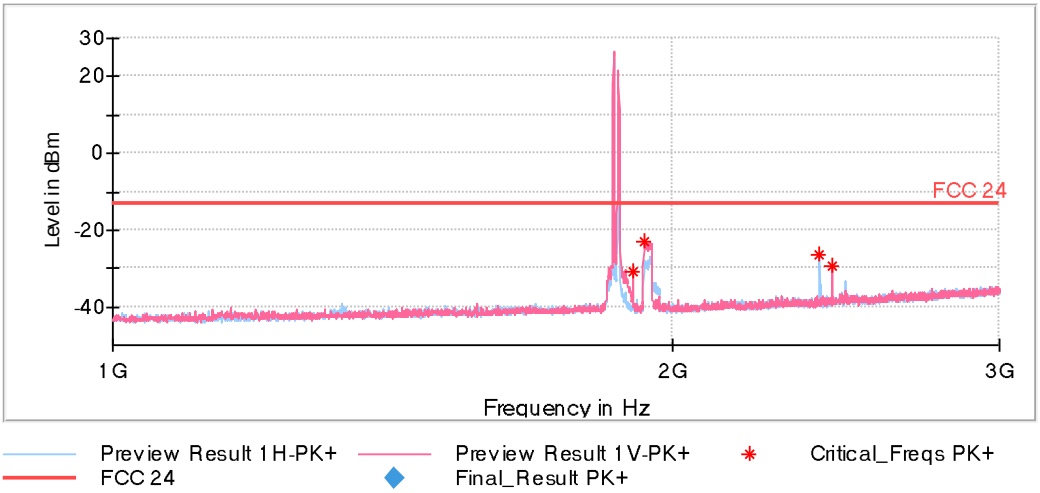


- High Channel:



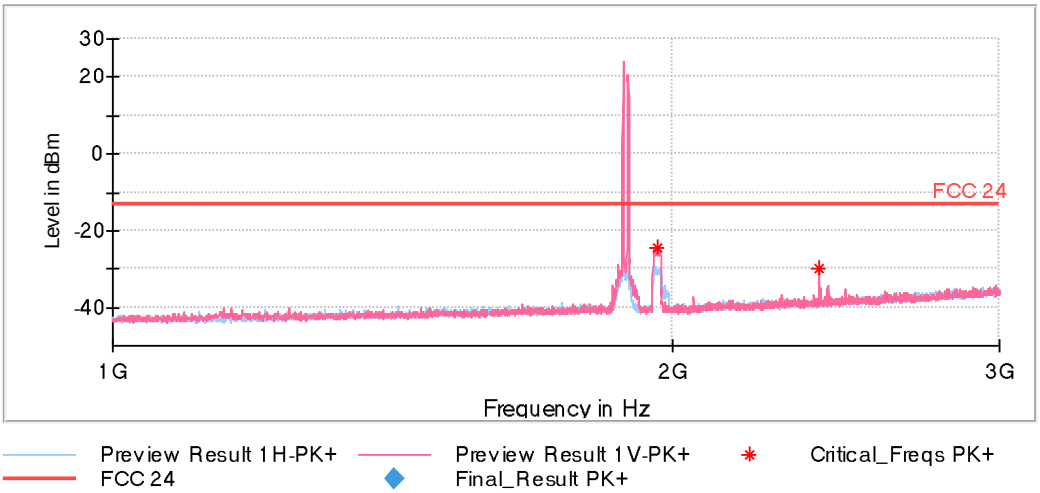
FREQUENCY RANGE 1 - 3 GHz (worst case):

- Low Channel:



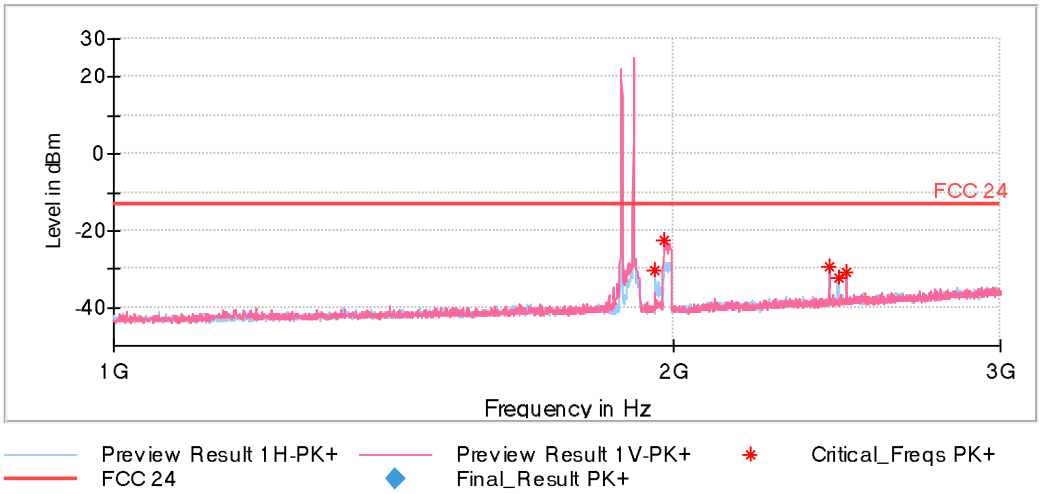
The peak above the limit is the carrier frequency. The peak at 1940 MHz corresponds to the downlink signal.

- Middle Channel:



The peak above the limit is the carrier frequency. The peak at 1962.5 MHz corresponds to the downlink signal.

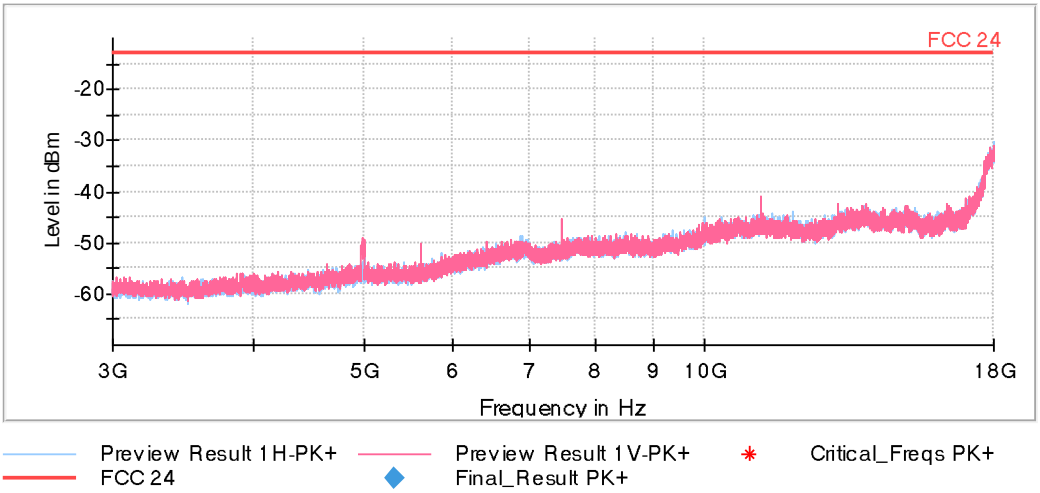
- High Channel:



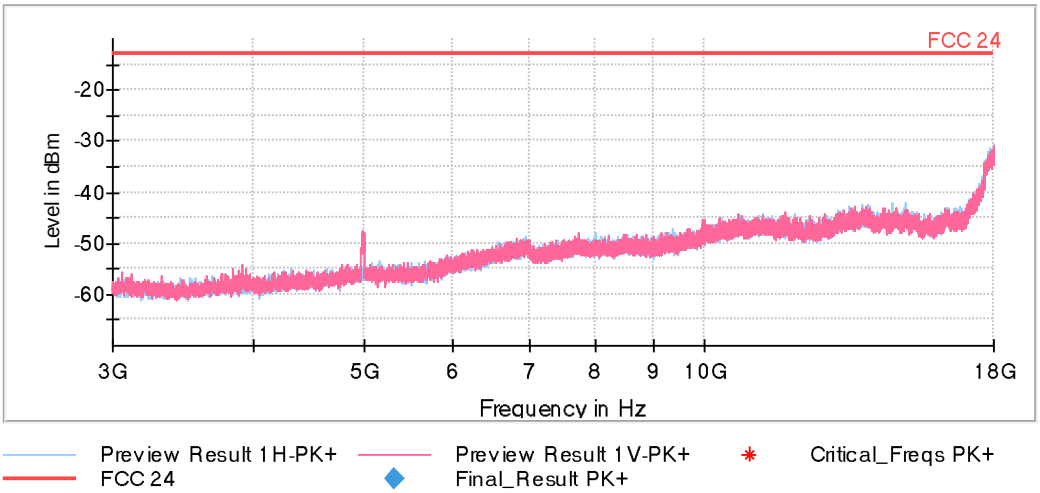
The peak above the limit is the carrier frequency. The peak at 1965 MHz and 1985MHz correspond to the downlink signals.

FREQUENCY RANGE 3 - 18 GHz (worst case):

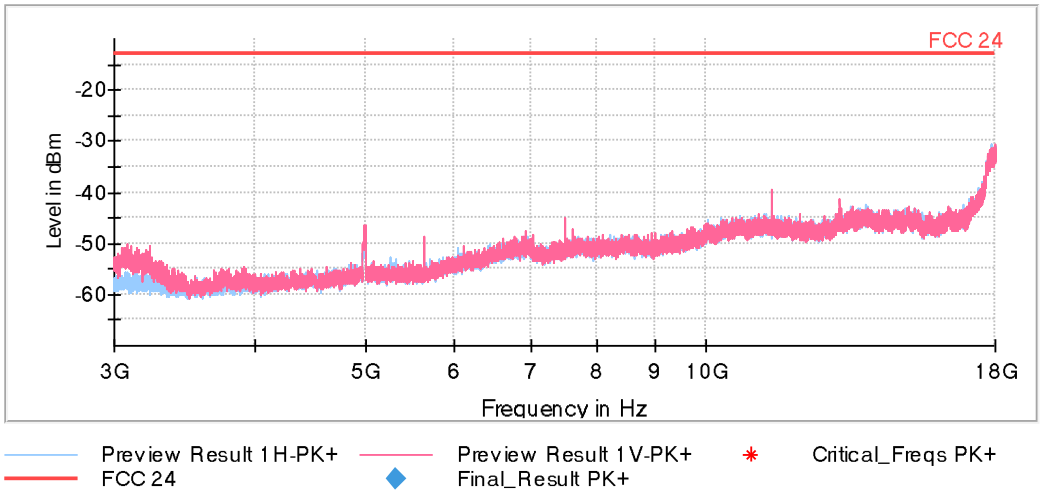
- Low Channel:



- Middle Channel:

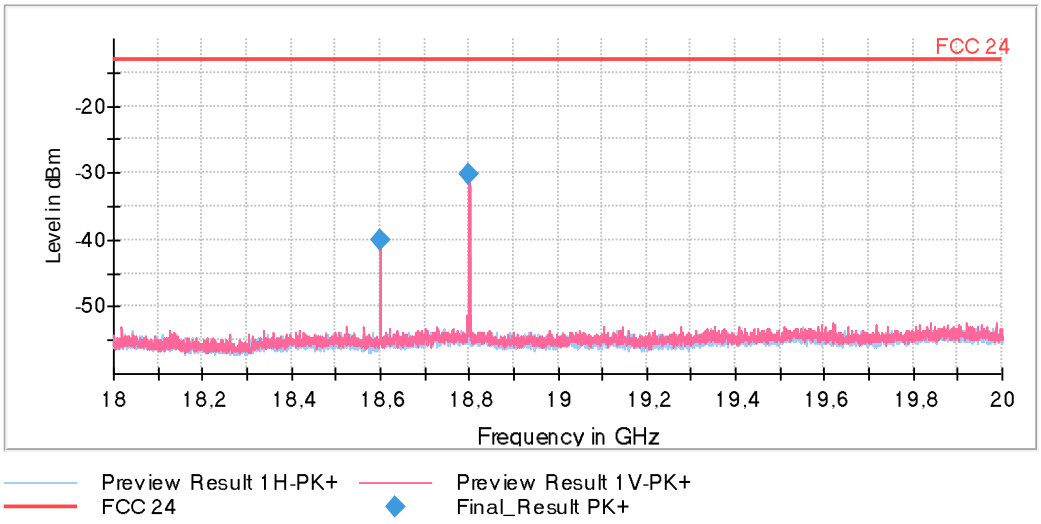


- High Channel:

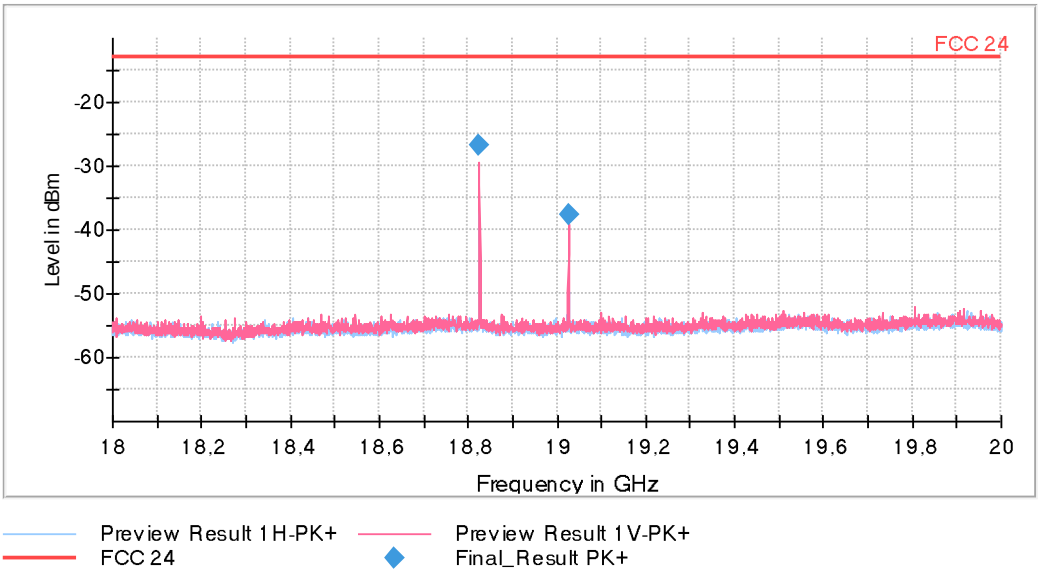


FREQUENCY RANGE 18 - 20 GHz (worst case):

- Low Channel:



- Middle Channel:



- High Channel: