

**TEST REPORT**

of the test laboratory

TÜV Nr.:INE-AT/FG-21/126

**Applicant:** YUNEX GmbH  
Otto-Hahn-Ring 6  
D-81739 München

**Tested Product:** ITS Radiocommunications equipment 'RSU2X'  
with two antenna connectors

**Type:** L24707-E200-A1

**Manufacturer:** YUNEX GmbH  
Otto-Hahn-Ring 6  
D-81739 München

**Output power:** 27 dBm eirp max.      **Power Supply:** Power over Ethernet

**Frequency range:** 5880 – 5920 MHz      **Channel separation:** 10 MHz

**Standard:** 47 CFR Part 90 (eCFR 10.05.2021)  
ASTM E2213-03 (incorporated by reference)

Testing Laboratory,  
Inspection Body,  
Certification Body,  
Calibration Laboratory,  
Verifizierungsstelle**Notified Body 0408**  
IC 2932K-1**Non-executive**  
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1230 Vienna/Austria**Branch Offices:**  
www.tuv.at/standorte**Company Register**  
**Court / - Number:**  
Vienna / FN 288476 f**Bank Details:**  
IBAN  
AT131200052949001066  
BIC BKAUATWWVAT ATU63240488  
DVR 3002476TÜV AUSTRIA SERVICES GMBH  
Test laboratory for EMC

Ing. Andreas Malek

**examined by / Testing**  
**Laboratory**  
**TÜV AUSTRIA SERVICES**  
**GMBH**

18.08.2021

Ing. Michael Emminger

**approved by / Testing**  
**Laboratory**  
**TÜV AUSTRIA SERVICES**  
**GMBH**

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The results of this test report only refer to the provided equipment.

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## 1. Applicant

**Company:** YUNEX GmbH

**Department:** ---

**Address:** Otto-Hahn-Ring 6; D- 81739 München

**Contact person:** Mr. Thomas Jatschka

**EUT received on:** 10.05.2021

**Tests were performed on:** 10.05. – 12.08.2021

## 2. Description of EUT

<b>EUT:</b>	ITS Radiocommunications equipment 'RSU2X' with two antenna connectors
<b>Type:</b>	L24707-E200-A1
<b>Serial Number:</b>	Prototype
<b>Manufacturer:</b>	YUNEX GmbH Otto-Hahn-Ring 6 D- 81739 München
<b>Description:</b>	YUNEX GmbH provided the following configuration for the measurements:  Prototype – PoE powered, case earthed
<b>Operating mode:</b>	The measurements were carried out at the following running states:  Communicating
<b>Technical data EUT:</b>	Rated voltage: 48 VDC Rated current: 1,5A Rated frequency: DC  Mains voltage during the tests: Power over Ethernet (PoE)
<b>Climatic conditions in the emc laboratory:</b>	Relative humidity: 37% Temperature: 21°C

All parameters were measured for all antenna ports.

General Radio Data:

Device Class C (max. 20 dBm conducted power)

Type 1 Receiver

According to the definitions of ASTM E2213-03

### 3. Standards / Final result

Name	Title	Deviation	Result
47 CFR Part 90 (eCFR 10.05.2021)	PRIVATE LAND MOBILE RADIO SERVICES	none	OK
<p>Result: Opinions and interpretation of testing laboratory OK: EUT passed NOK: EUT failed</p>			

#### 4.1 Transmitter frequency stability

#### SUBCLAUSE 8.10.4

Rated output power 27 dBm eirp (conducted measurement, 6dBi maximum antenna gain plus 3dB internal losses taken into account)

Measured Antenna: Sector 1, Channel 0

Test conditions		Transmitter frequency stability (kHz)						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			1,919	2,136	2,154	2,159	2,167
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			2,582	2,718	2,839	2,848	2,998
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			1,389	1,919	2,108	2,217	2,324
Measurement uncertainty		± 1 kHz						

Test conditions		Transmitter frequency stability (ppm)						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			0,326	0,363	0,365	0,365	0,366
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			0,439	0,461	0,481	0,482	0,506
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			0,236	0,326	0,357	0,375	0,393
Maximum deviation from nominal frequency (ppm)				0,439	0,461	0,481	0,482	0,506

#### LIMIT

#### SUBCLAUSE 8.10.4

The transmitted center frequency tolerance shall be ±10 ppm maximum for RSUs and ±10 ppm maximum for OBUs. The transmit center frequency and the symbol clock frequency shall be derived from the same reference oscillator.

Measuring equipment used: EMV-205; NT-216; EMV-213; M-1200

## Transmitter frequency stability

## SUBCLAUSE 8.10.4

Rated output power 27 dBm eirp (conducted measurement, 6dBi maximum antenna gain plus 3dB internal losses taken into account)

Measured Antenna: Sector 1, Channel 1

Test conditions		Transmitter frequency stability (kHz)						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			2,144	2,15	2,156	2,165	2,168
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			2,898	3,073	2,922	3,006	2,842
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			2,619	2,56	2,529	2,512	2,466
Measurement uncertainty		± 1 kHz						

Test conditions		Transmitter frequency stability (ppm)						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			0,365	0,365	0,365	0,366	0,366
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			0,493	0,522	0,495	0,509	0,480
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			0,445	0,435	0,429	0,425	0,417
Maximum deviation from nominal frequency (ppm)				0,493	0,522	0,495	0,509	0,480

## LIMIT

## SUBCLAUSE 8.10.4

The transmitted center frequency tolerance shall be ±10 ppm maximum for RSUs and ±10 ppm maximum for OBUs. The transmit center frequency and the symbol clock frequency shall be derived from the same reference oscillator.

Measuring equipment used: EMV-205; NT-216; EMV-213; M-1200

## Transmitter frequency stability

## SUBCLAUSE 8.10.4

Rated output power 27 dBm eirp (conducted measurement, 6dBi maximum antenna gain plus 3dB internal losses taken into account)

Measured Antenna: Sector 2, Channel 0

Test conditions		Transmitter frequency stability (kHz)						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			2,308	2,348	2,351	2,349	2,347
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			4,23	4,01	4,177	4,079	4,207
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			7,482	7,819	8,108	8,228	8,453
Measurement uncertainty		± 1 kHz						

Test conditions		Transmitter frequency stability (ppm)						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			0,393	0,399	0,398	0,397	0,396
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			0,719	0,681	0,708	0,690	0,711
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			1,272	1,328	1,374	1,392	1,428
Maximum deviation from nominal frequency (ppm)				1,272	1,328	1,374	1,392	1,428

## LIMIT

## SUBCLAUSE 8.10.4

The transmitted center frequency tolerance shall be ±10 ppm maximum for RSUs and ±10 ppm maximum for OBU's. The transmit center frequency and the symbol clock frequency shall be derived from the same reference oscillator.

Measuring equipment used: EMV-205; NT-216; EMV-213; M-1200



## 4.2 RF output power

## SUBCLAUSE 90.377

Rated output power 27 dBm eirp (conducted measurement, 6dBi maximum antenna gain plus 3dB internal losses taken into account)

Measured Antenna: Sector 1, Channel 0

Test conditions		RF output power (dBm) eirp						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			27,17	27,12	22,29	22,46	27,58
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			27,64	27,82	22,88	22,02	27,03
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			26,92	25,65	21,30	21,02	26,40
Measurement uncertainty		± 0,5 dB						

Remark: Standard Power was reduced by 5 dB on 5900 and 5910 MHz.

## LIMIT

## SUBCLAUSE 90.377

Channel No.	Frequency range (MHz)	Max. EIRP <sup>1</sup> (dBm)	Channel use
170	5850-5855		Reserved.
172	5855-5865	33	Service Channel. <sup>2</sup>
174	5865-5875	33	Service Channel.
175	5865-5885	23	Service Channel. <sup>3</sup>
176	5875-5885	33	Service Channel.
178	5885-5895	33/44.8	Control Channel.
180	5895-5905	23	Service Channel.
181	5895-5915	23	Service Channel. <sup>3</sup>
182	5905-5915	23	Service Channel.
184	5915-5925	33/40	Service Channel. <sup>4</sup>

Measuring equipment used: EMV-205; NT-216; EMV-213; M-1200

## RF output power

## SUBCLAUSE 90.377

Rated output power 27 dBm eirp (conducted measurement, 6dBi maximum antenna gain plus 3dB internal losses taken into account)

Measured Antenna: Sector 1, Channel 1

Test conditions		RF output power (dBm) eirp						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			26,71	26,97	22,18	22,28	27,50
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			27,80	27,96	22,95	22,98	27,31
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			26,92	27,62	22,28	21,73	26,38
Measurement uncertainty		± 0,5 dB						

Remark: Standard Power was reduced by 5 dB on 5900 and 5910 MHz.

## LIMIT

## SUBCLAUSE 90.377

Channel No.	Frequency range (MHz)	Max. EIRP <sup>1</sup> (dBm)	Channel use
170	5850-5855		Reserved.
172	5855-5865	33	Service Channel. <sup>2</sup>
174	5865-5875	33	Service Channel.
175	5865-5885	23	Service Channel. <sup>3</sup>
176	5875-5885	33	Service Channel.
178	5885-5895	33/44.8	Control Channel.
180	5895-5905	23	Service Channel.
181	5895-5915	23	Service Channel. <sup>3</sup>
182	5905-5915	23	Service Channel.
184	5915-5925	33/40	Service Channel. <sup>4</sup>

Measuring equipment used: EMV-205; NT-216; EMV-213; M-1200

## RF output power

## SUBCLAUSE 90.377

Rated output power 27 dBm eirp (conducted measurement, 6dBi maximum antenna gain plus 3dB internal losses taken into account)

Measured Antenna: Sector 2, Channel 0

Test conditions		RF output power (dBm) eirp						
		5860 MHz	5870 MHz	5880 MHz	5890 MHz	5900 MHz	5910 MHz	5920 MHz
T <sub>nom</sub> ( 21 )°C	V <sub>nom</sub> ( 24 )V			24,59	24,49	19,64	19,87	25,18
T <sub>min</sub> ( -40 )°C	V <sub>nom</sub> ( 24 )V			28,10	26,73	21,68	21,05	26,54
T <sub>max</sub> ( 74 )°C	V <sub>nom</sub> ( 24 )V			25,51	24,14	19,59	19,36	24,91
Measurement uncertainty		± 0,5 dB						

Remark: Standard Power was reduced by 5 dB on 5900 and 5910 MHz.

## LIMIT

## SUBCLAUSE 90.377

Channel No.	Frequency range (MHz)	Max. EIRP <sup>1</sup> (dBm)	Channel use
170	5850-5855		Reserved.
172	5855-5865	33	Service Channel. <sup>2</sup>
174	5865-5875	33	Service Channel.
175	5865-5885	23	Service Channel. <sup>3</sup>
176	5875-5885	33	Service Channel.
178	5885-5895	33/44.8	Control Channel.
180	5895-5905	23	Service Channel.
181	5895-5915	23	Service Channel. <sup>3</sup>
182	5905-5915	23	Service Channel.
184	5915-5925	33/40	Service Channel. <sup>4</sup>

Measuring equipment used: EMV-205; NT-216; EMV-213; M-1200

#### 4.3 Transmitter unwanted emissions outside the 5 GHz ITS frequency band

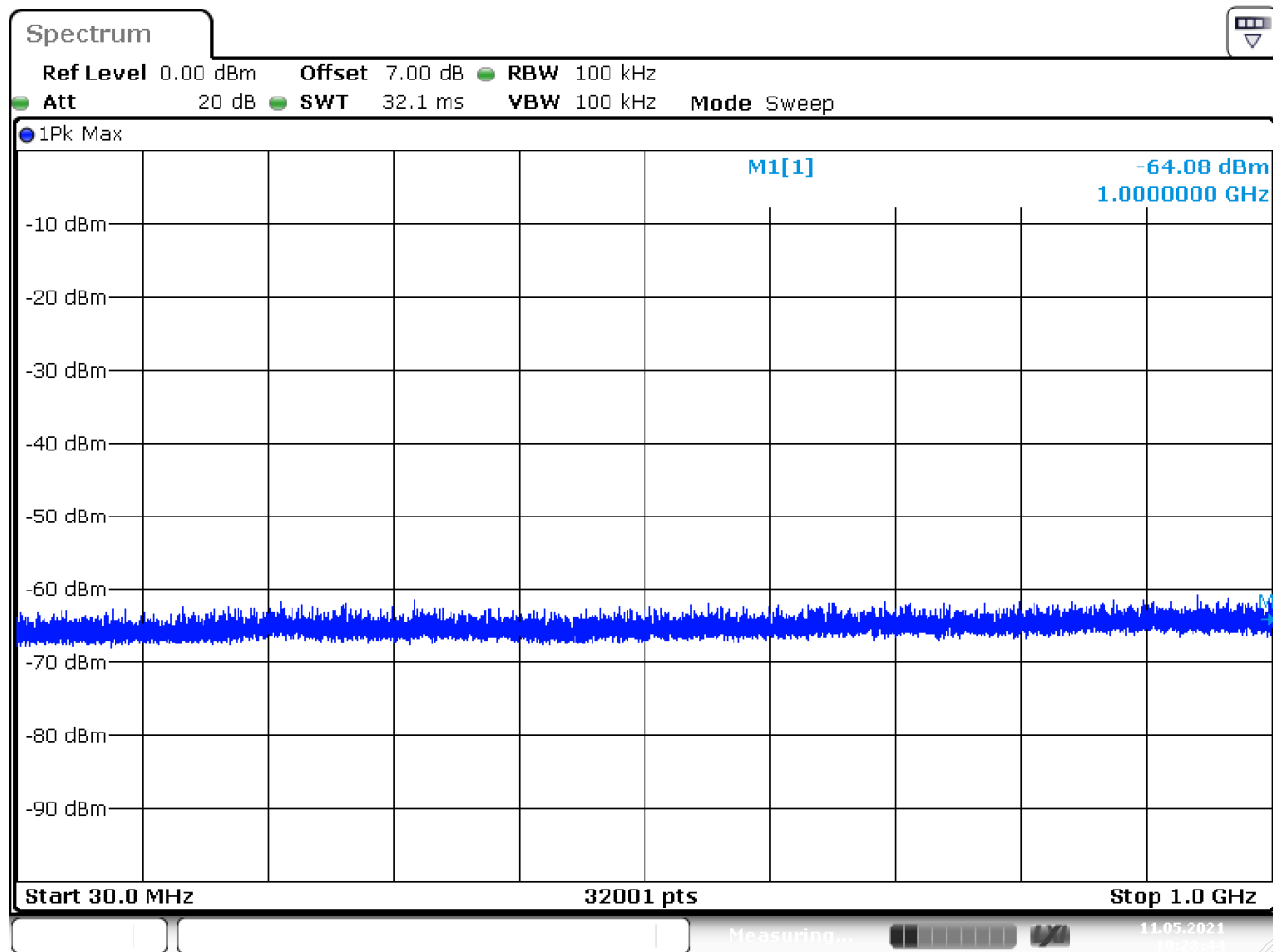
#### SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5880 MHz

Modulated



Date: 11.MAY.2021 10:28:44

#### LIMITS

#### SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

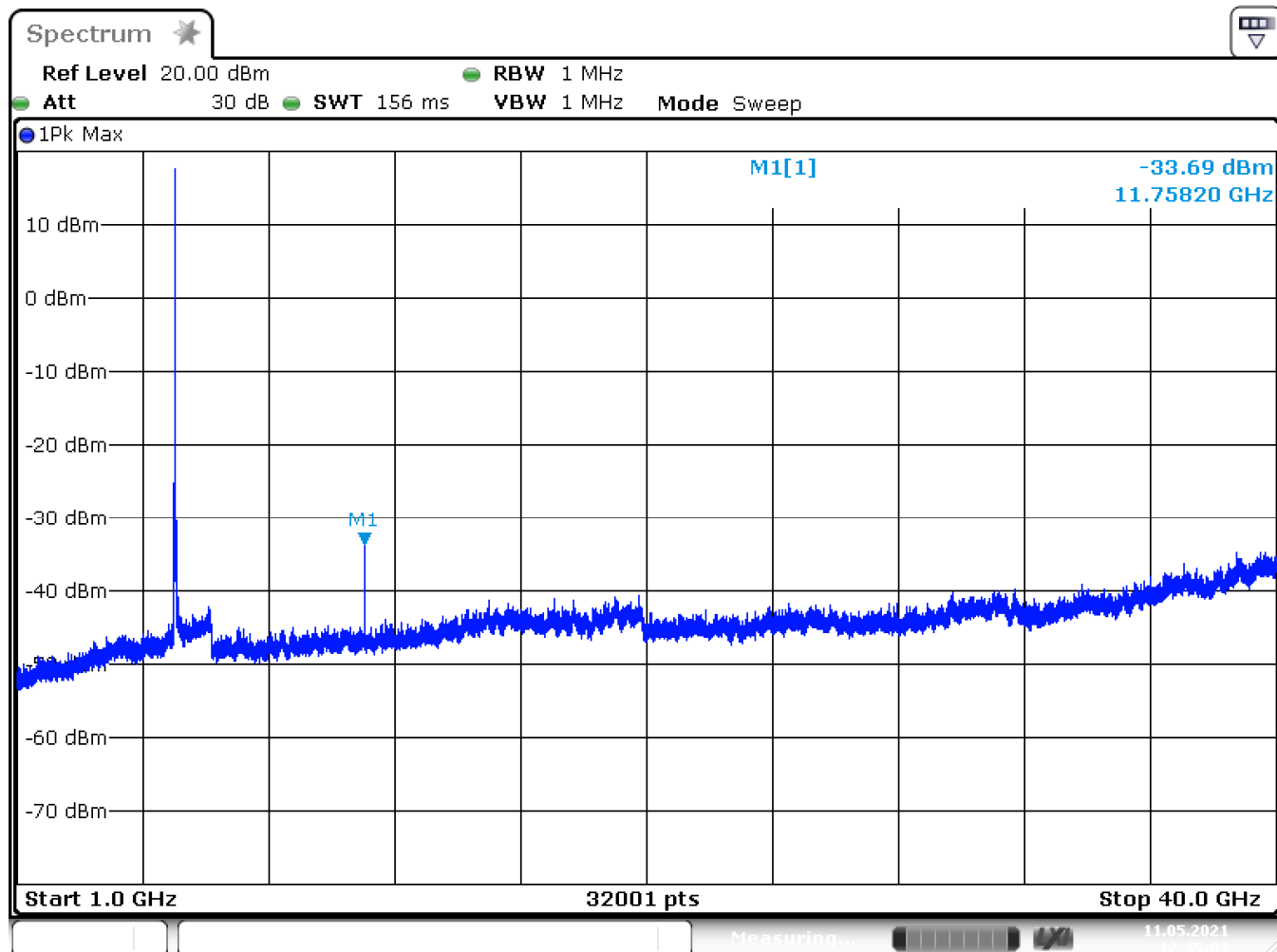
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5880 MHz

Modulated



Date: 11.MAY.2021 12:45:03

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

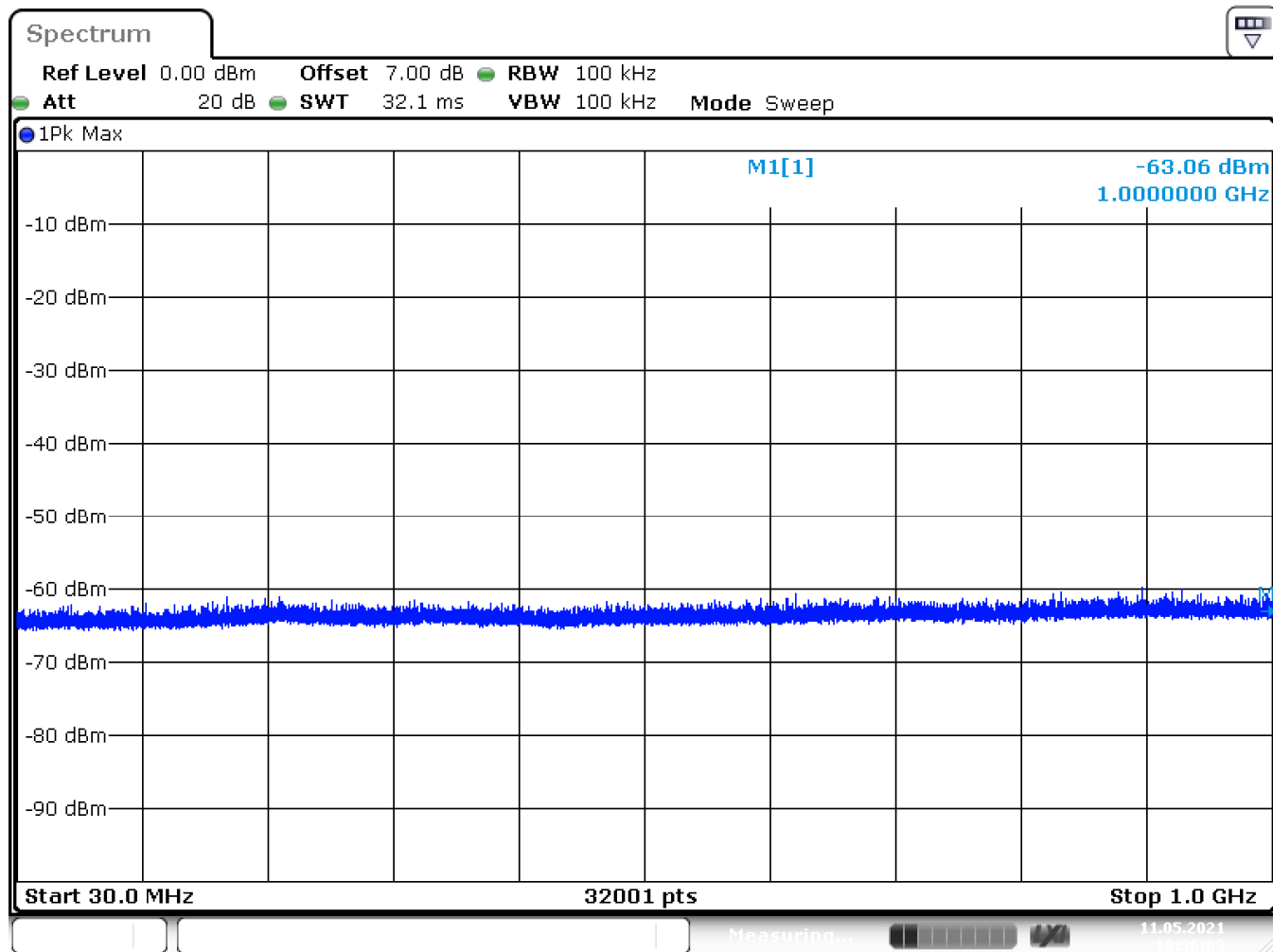
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5890 MHz

Modulated



Date: 11.MAY.2021 10:36:04

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

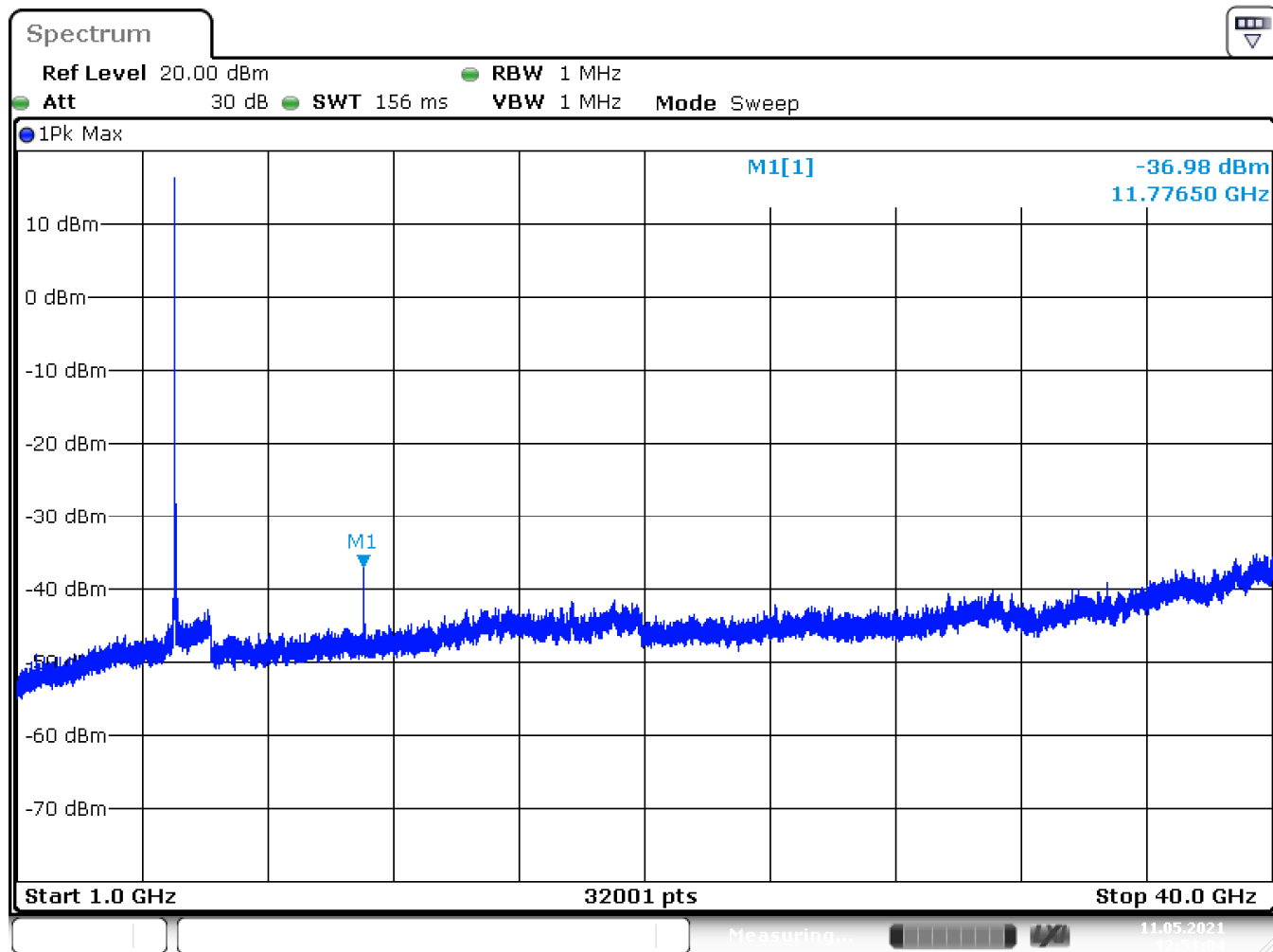
**Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2**

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5890 MHz

Modulated



Date: 11.MAY.2021 12:51:04

**LIMITS SUBCLAUSE 8.10.2.2.2**

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

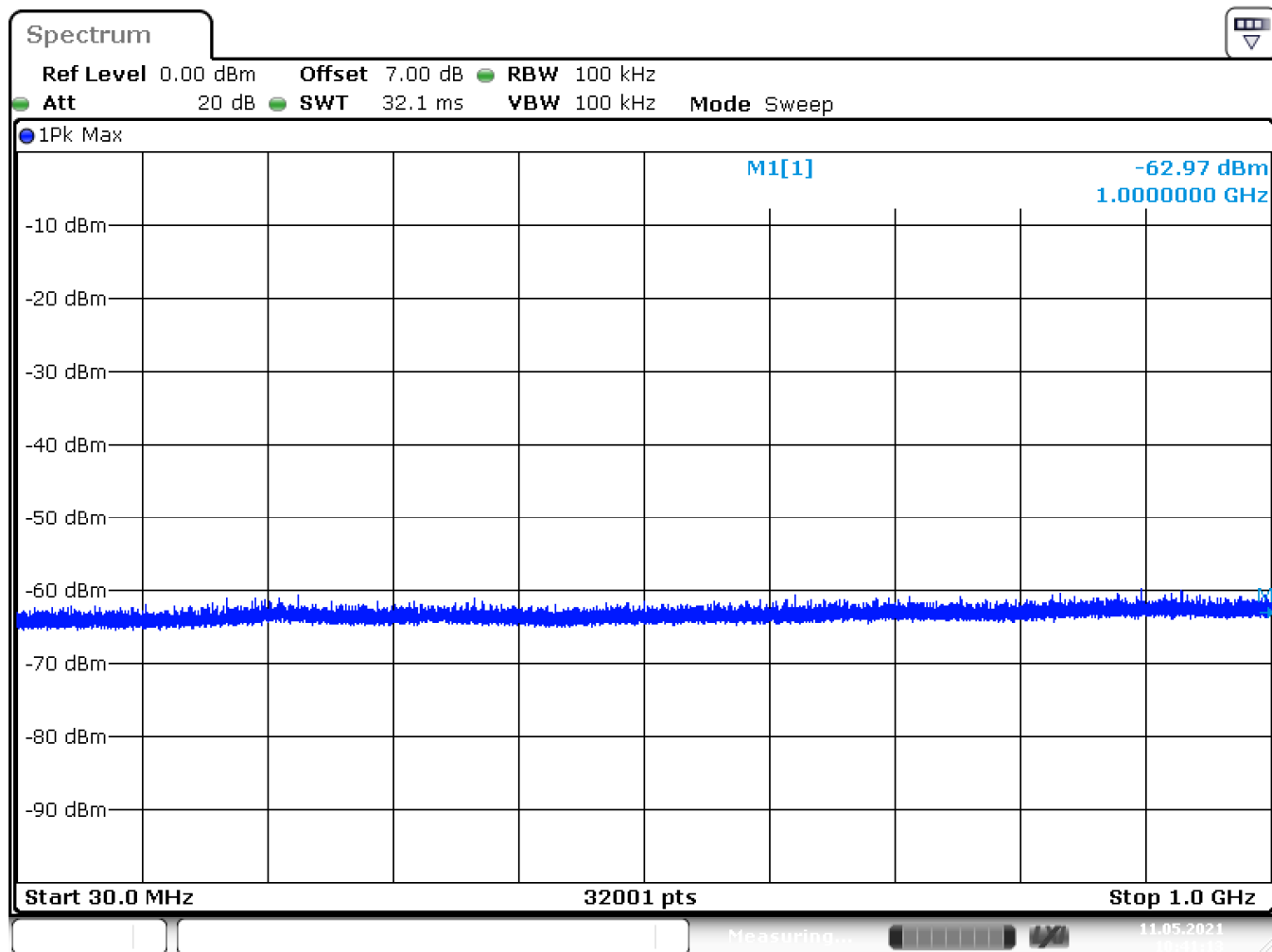
**Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2**

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5900 MHz

Modulated



Date: 11.MAY.2021 10:41:14

**LIMITS SUBCLAUSE 8.10.2.2.2**

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205



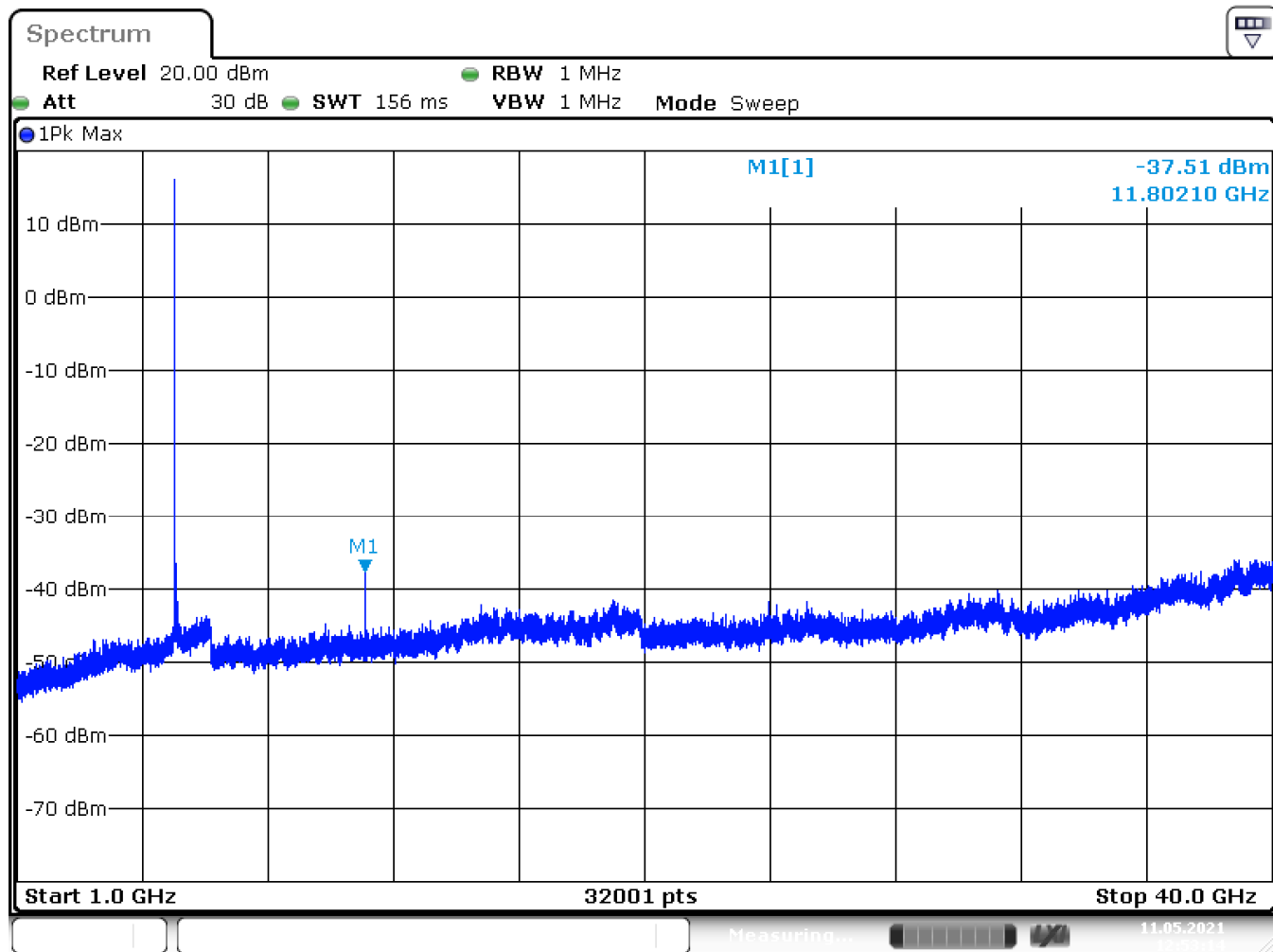
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5900 MHz

Modulated



Date: 11.MAY.2021 12:53:14

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

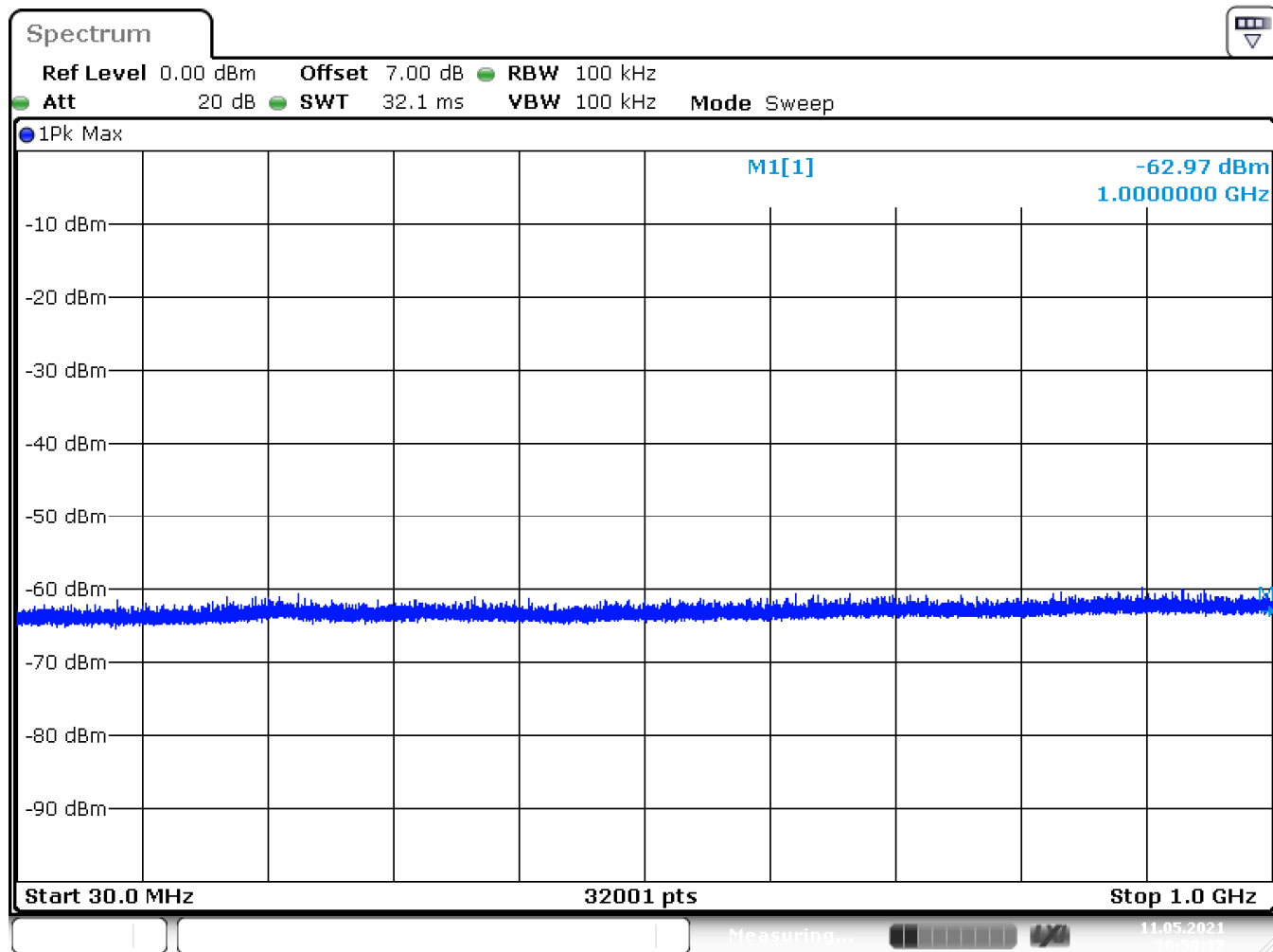
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5910 MHz

Modulated



Date: 11.MAY.2021 10:50:17

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

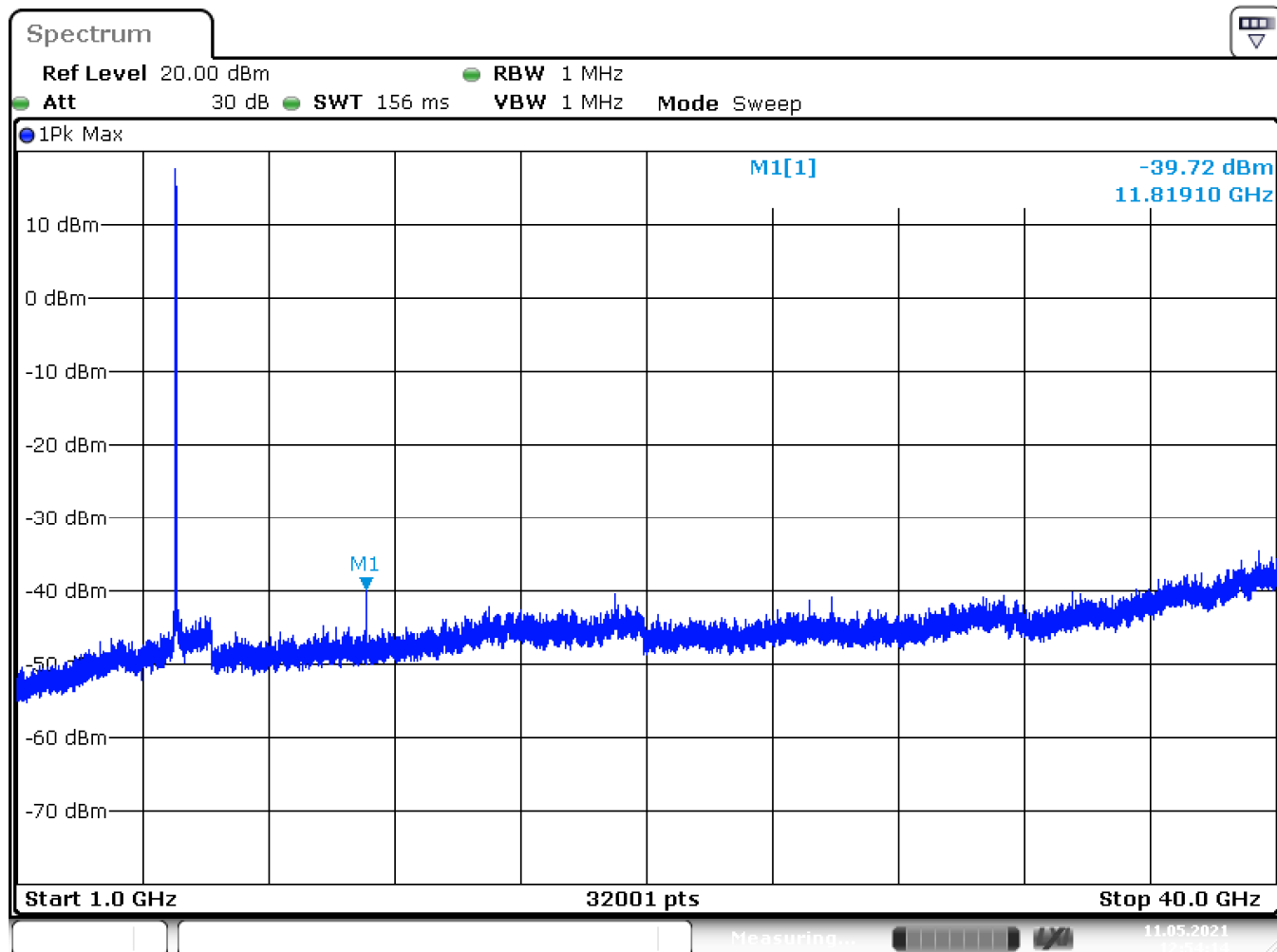
**Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2**

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5910 MHz

Modulated



Date: 11.MAY.2021 12:54:14

**LIMITS SUBCLAUSE 8.10.2.2.2**

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

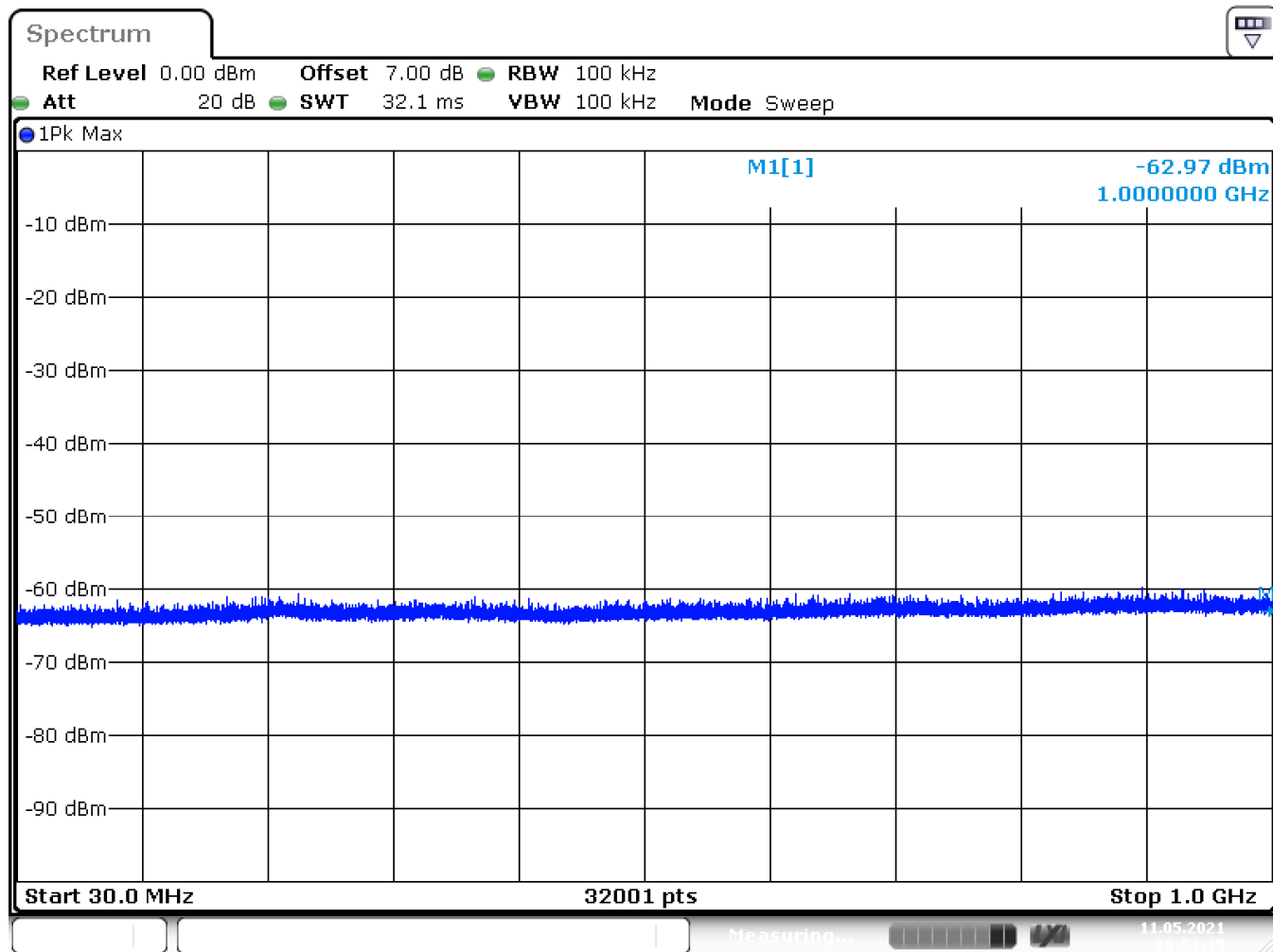
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5920 MHz

Modulated



Date: 11.MAY.2021 10:54:46

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

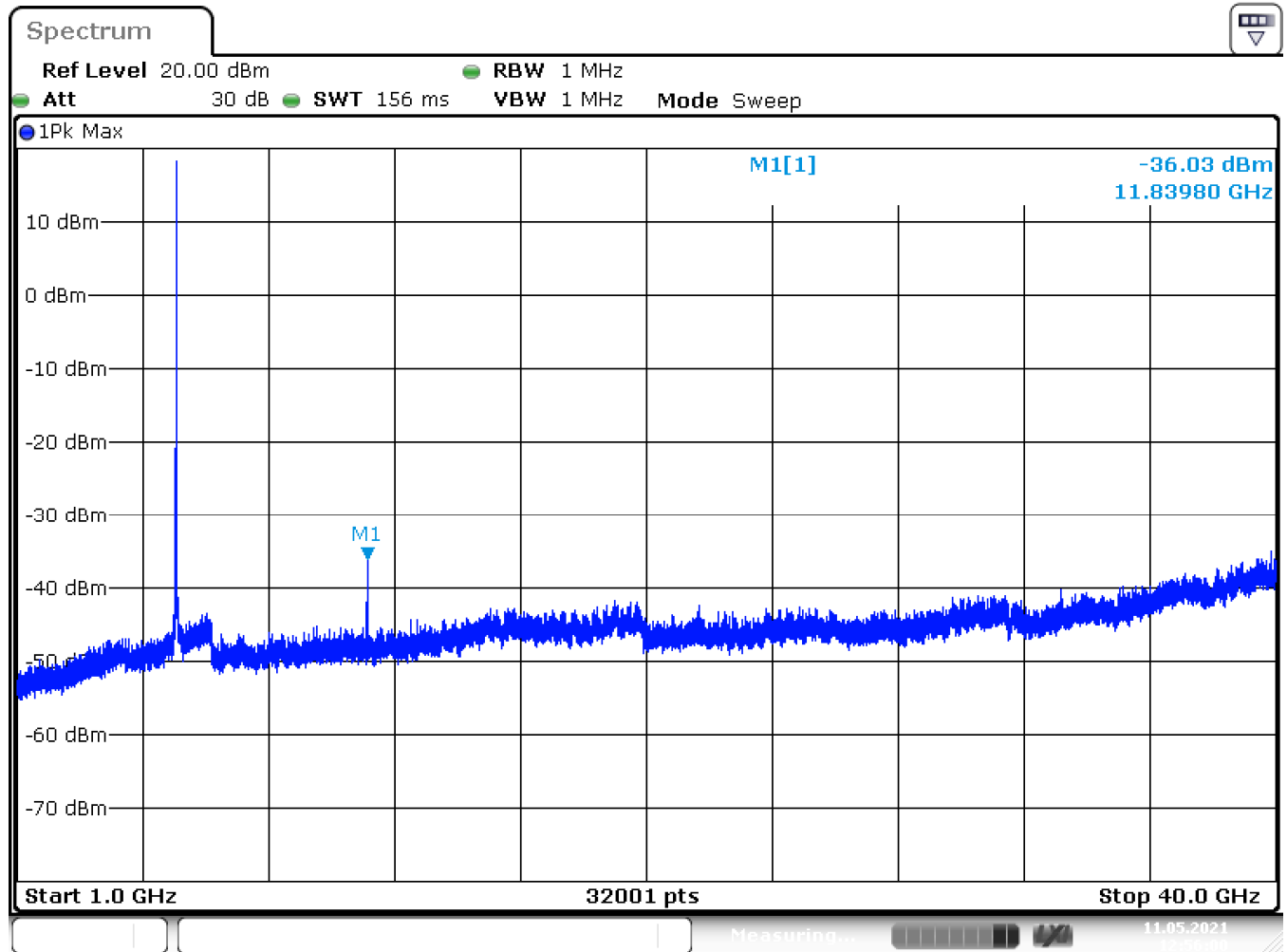
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 0

Transmitter operating – 5920 MHz

Modulated



Date: 11.MAY.2021 12:56:00

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

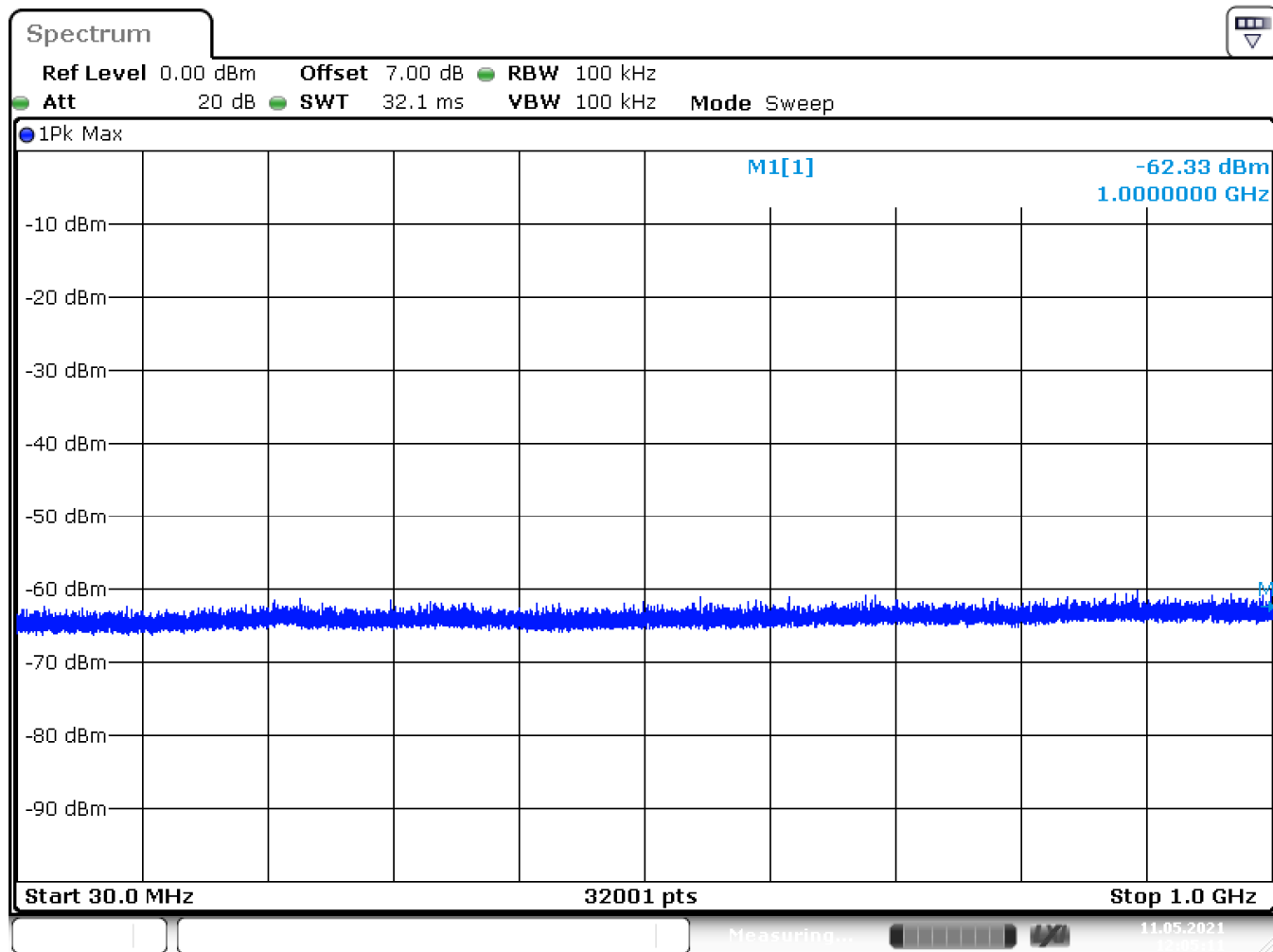
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5880 MHz

Modulated



Date: 11.MAY.2021 12:05:12

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

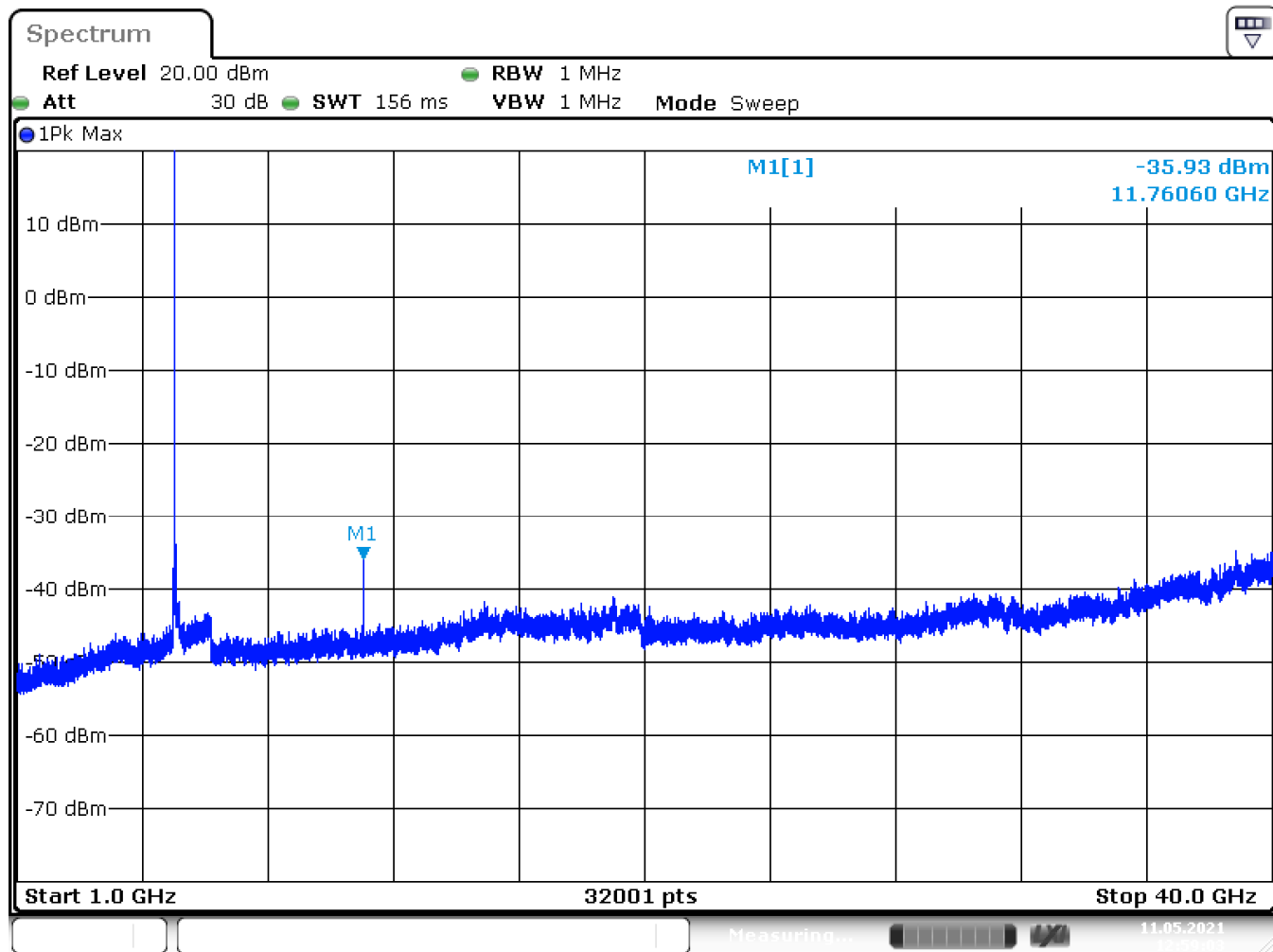
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5880 MHz

Modulated



Date: 11.MAY.2021 12:59:04

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

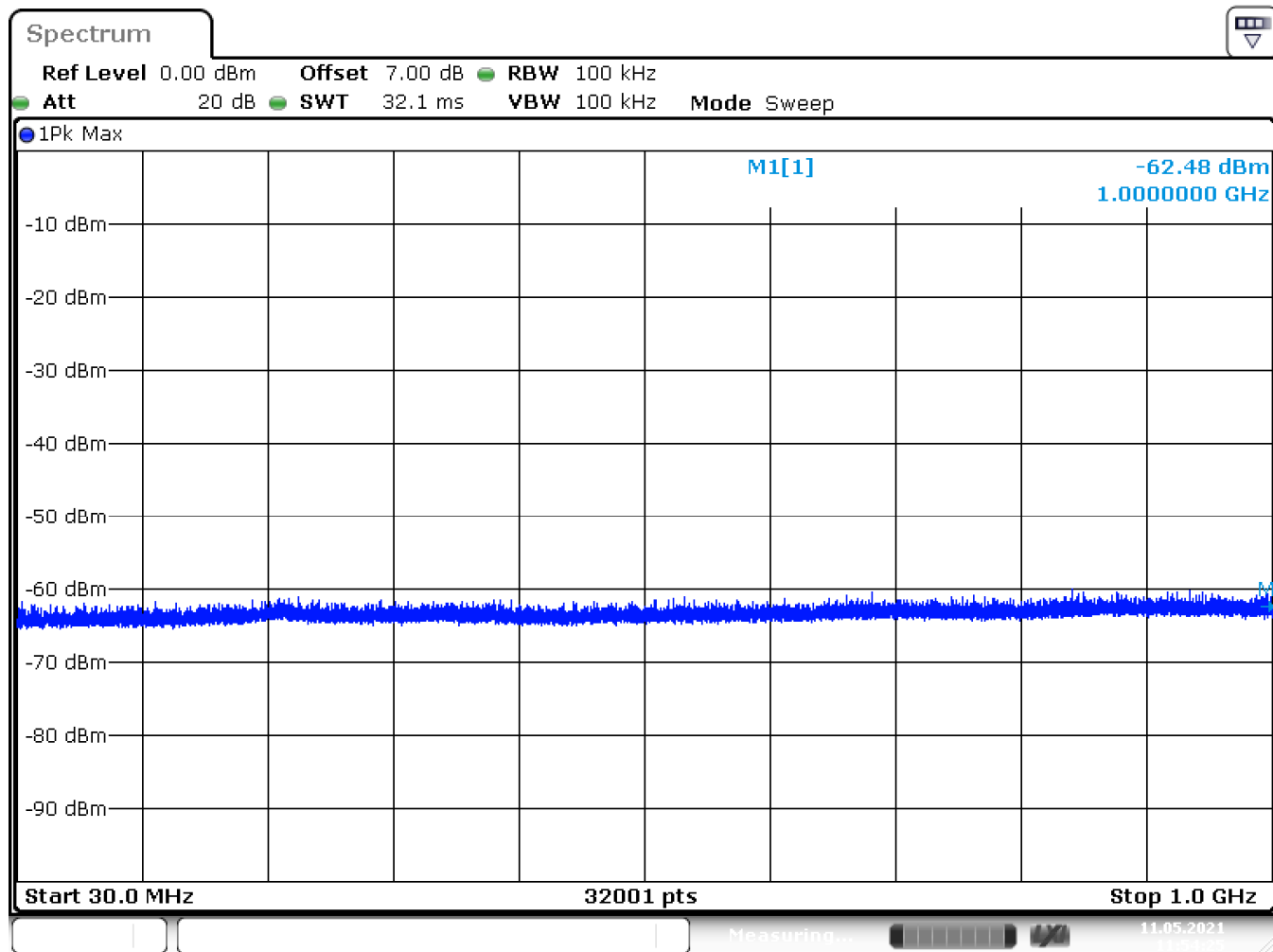
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5890 MHz

Modulated



Date: 11.MAY.2021 11:54:25

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205



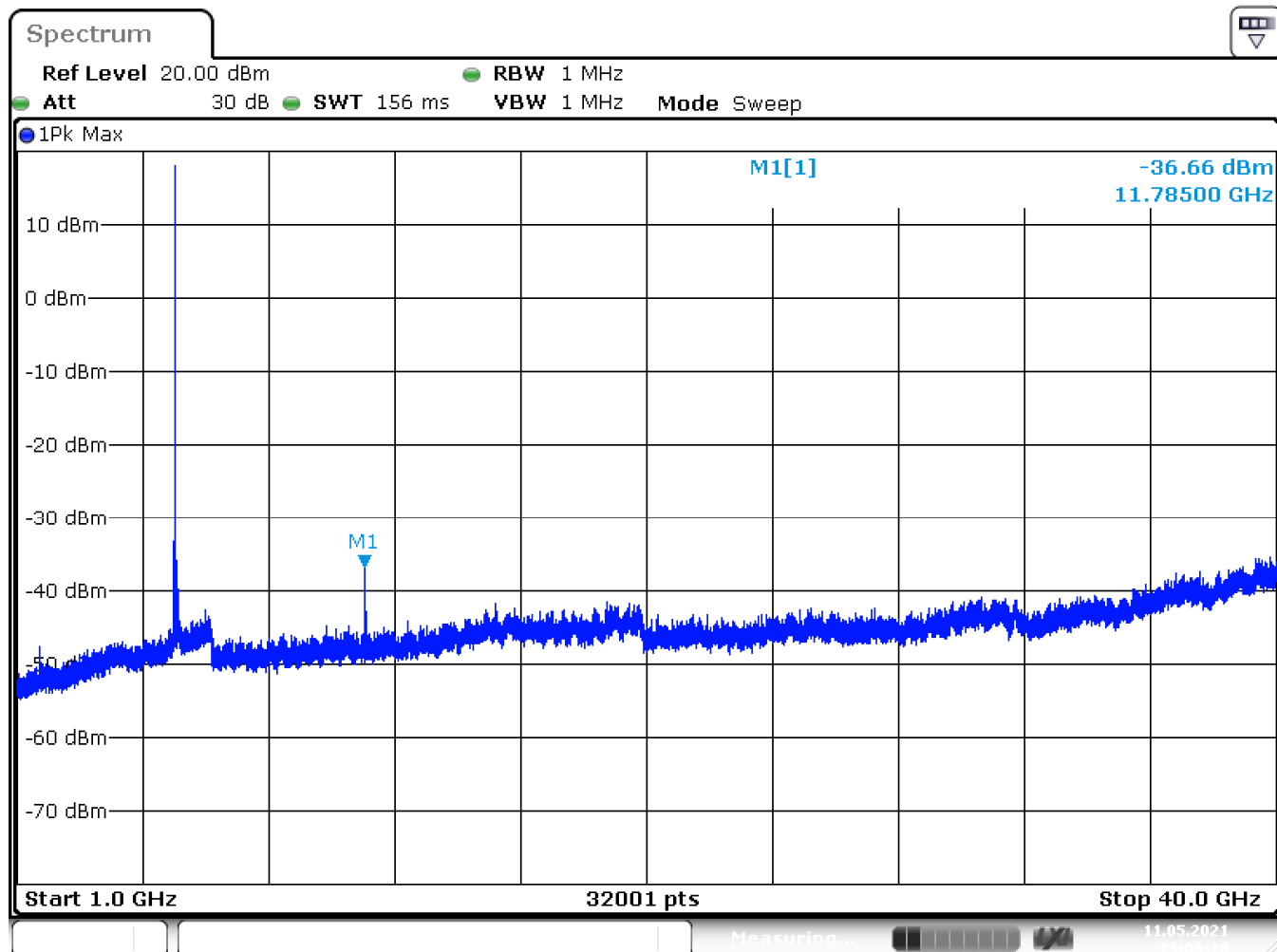
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5890 MHz

Modulated



Date: 11.MAY.2021 13:03:10

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

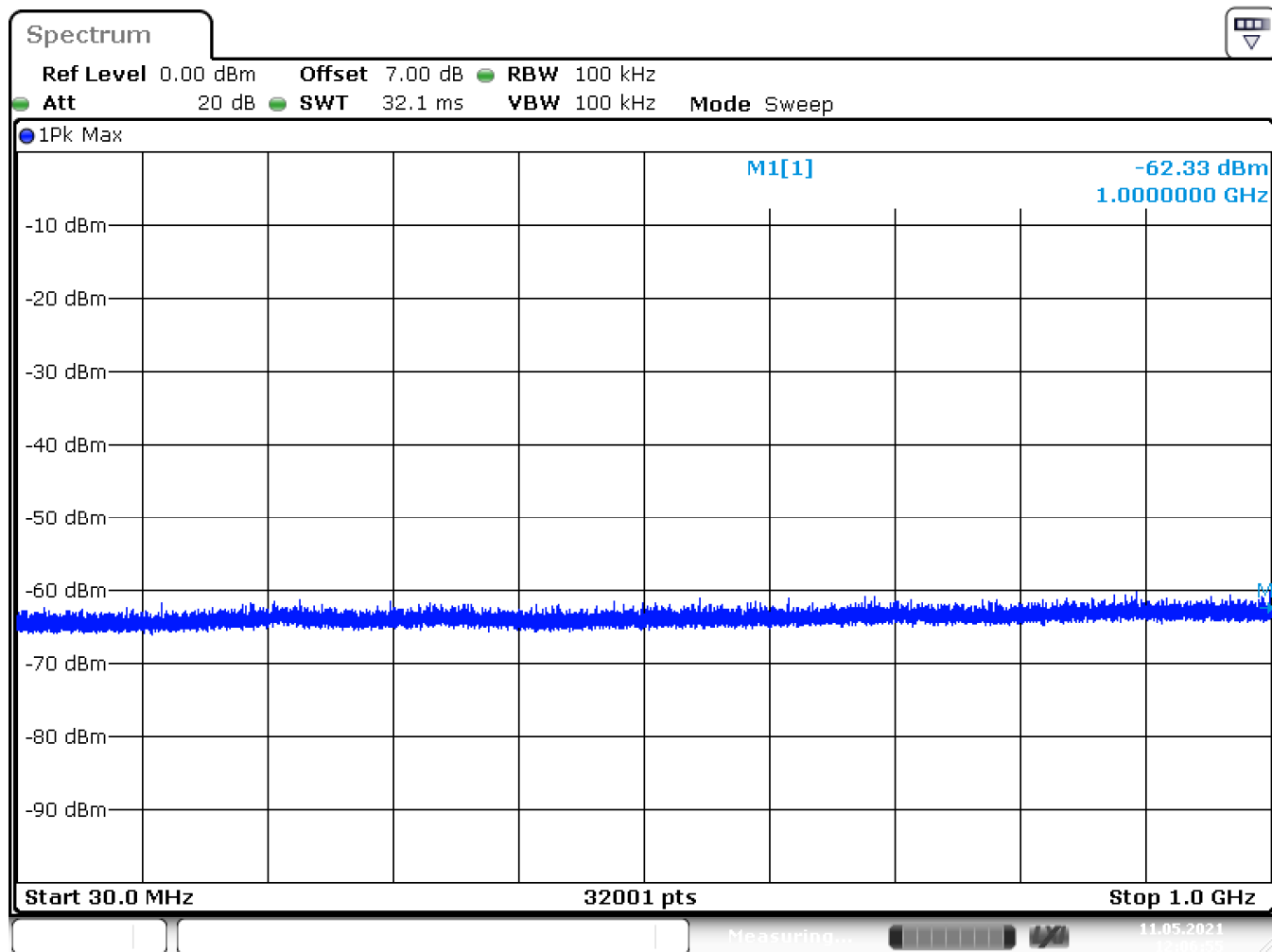
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5900 MHz

Modulated



Date: 11.MAY.2021 12:06:56

### LIMITS

### SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

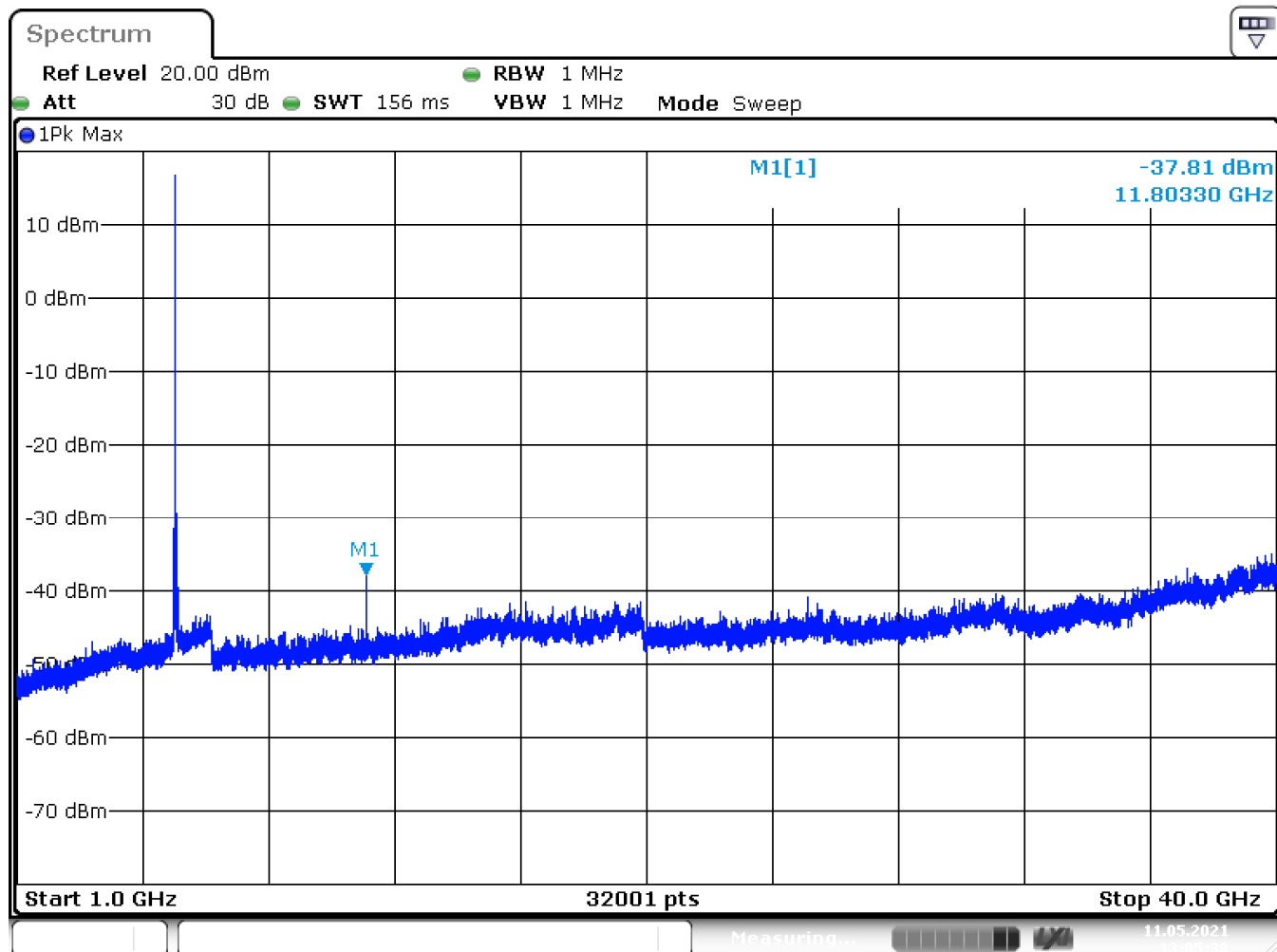
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5900 MHz

Modulated



Date: 11.MAY.2021 13:05:39

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

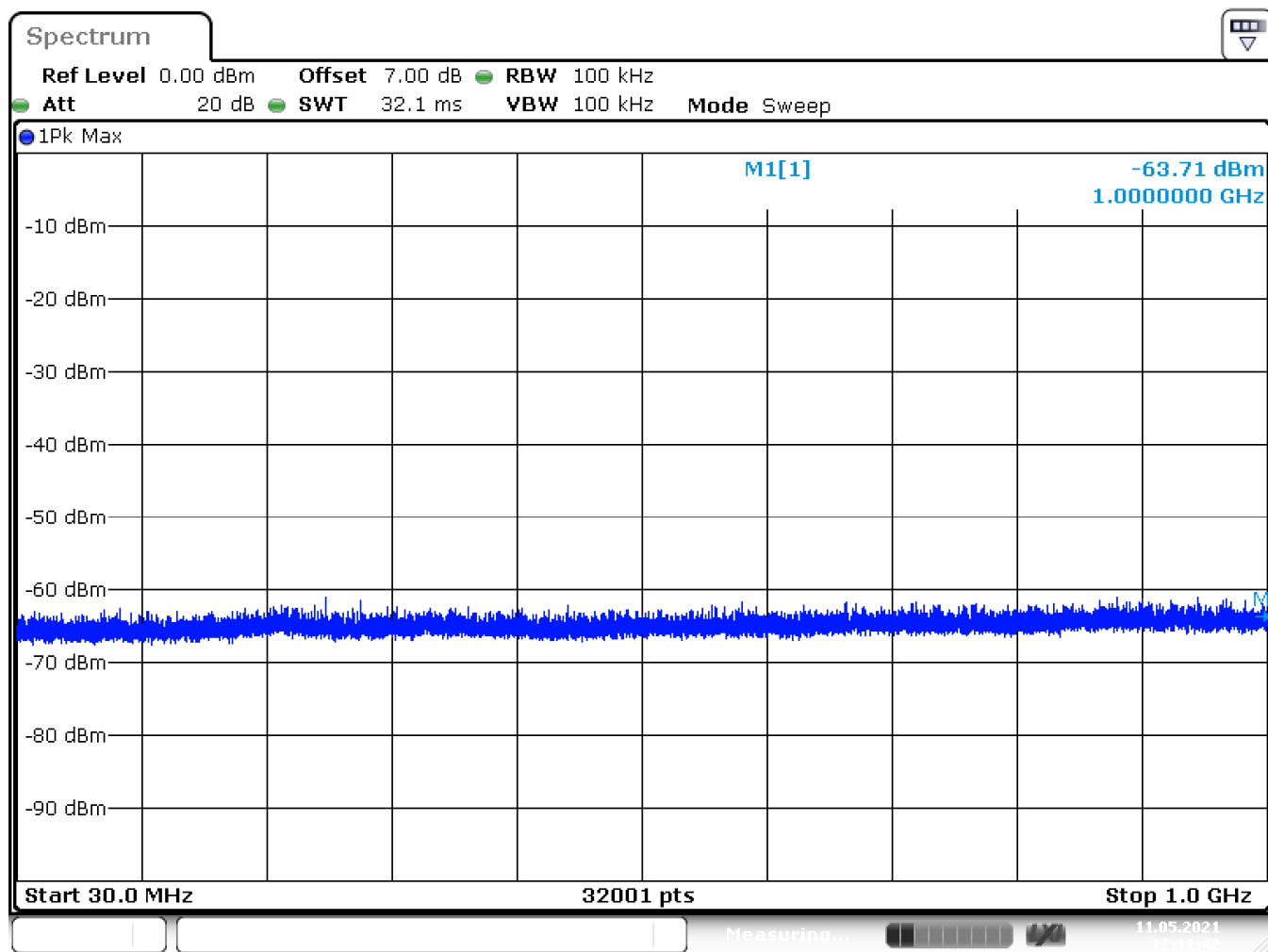
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5910 MHz

Modulated



Date: 11.MAY.2021 12:11:42

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

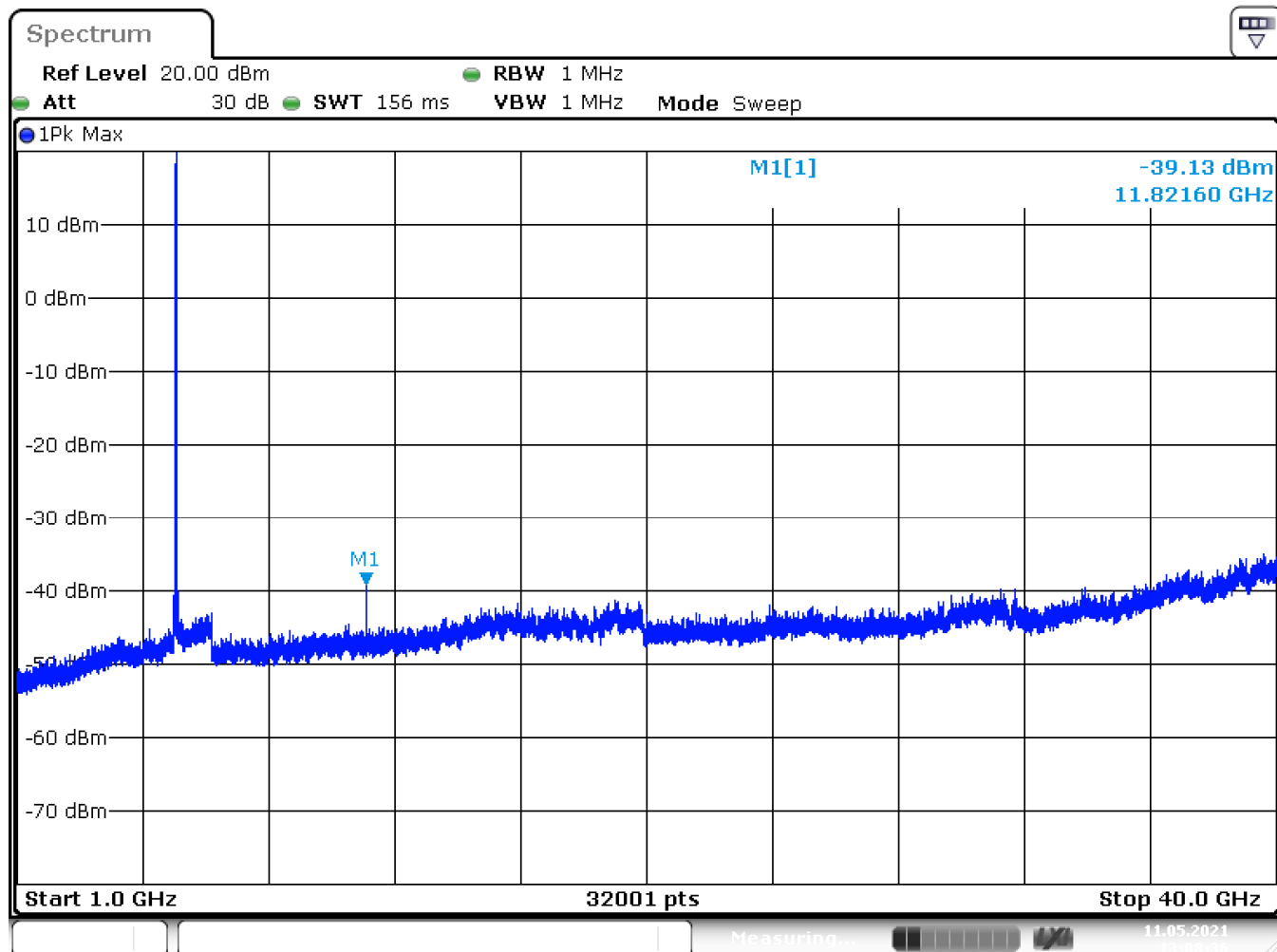
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5910 MHz

Modulated



Date: 11.MAY.2021 13:08:37

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

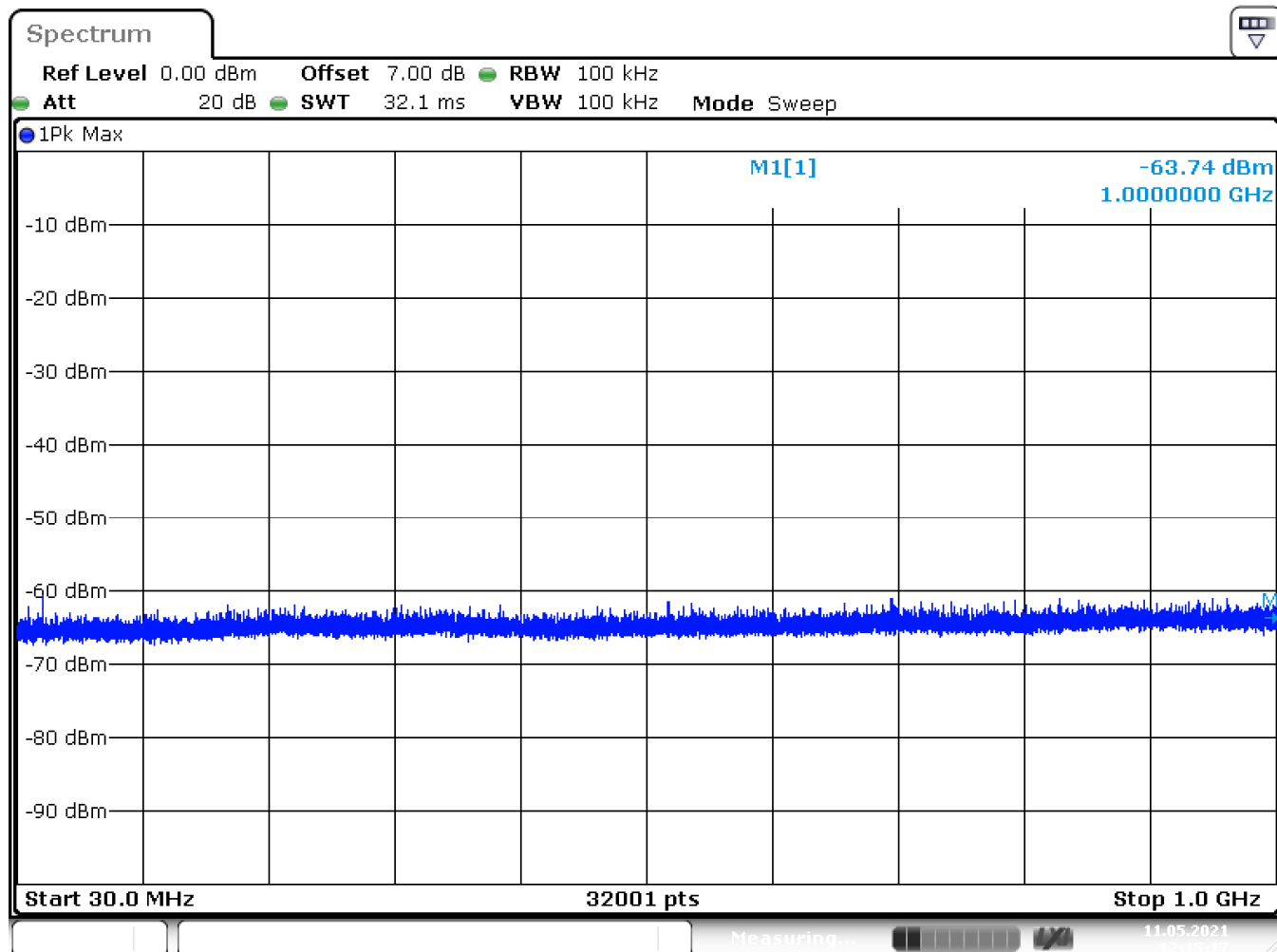
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5920 MHz

Modulated



Date: 11.MAY.2021 12:15:17

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

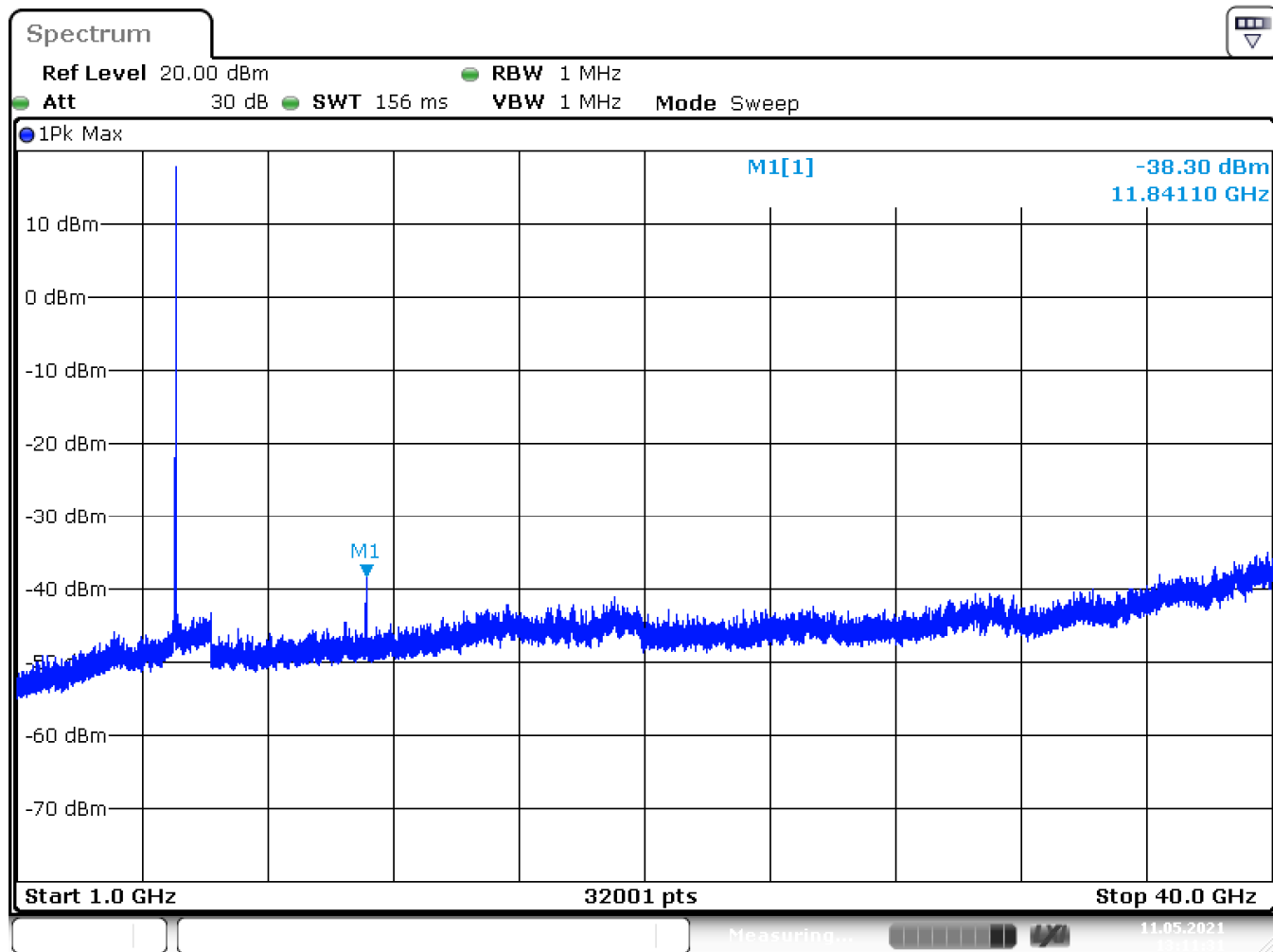
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 1, Channel 1

Transmitter operating – 5920 MHz

Modulated



Date: 11.MAY.2021 13:11:31

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

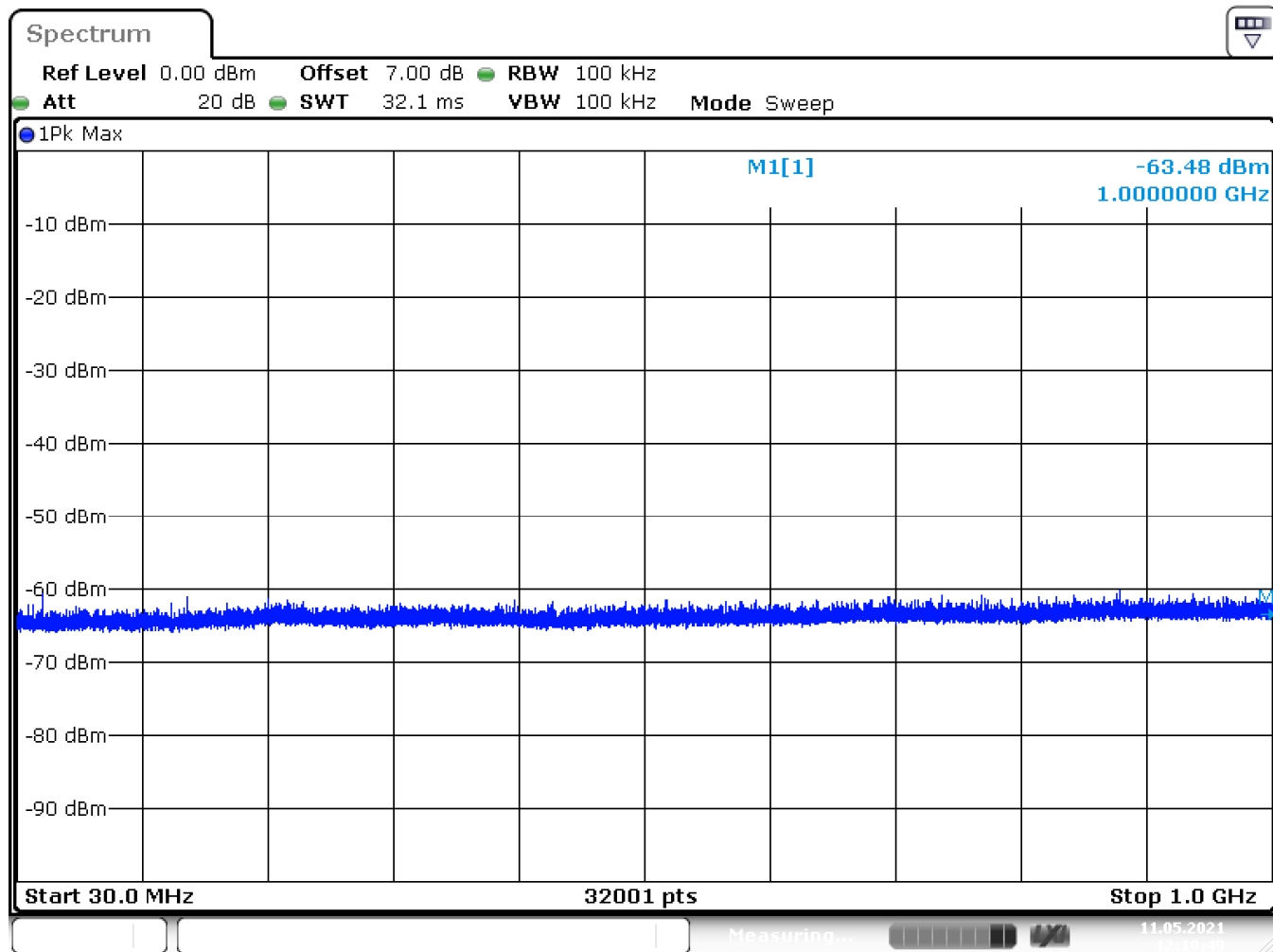
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5880 MHz

Modulated



Date: 11.MAY.2021 12:19:49

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205



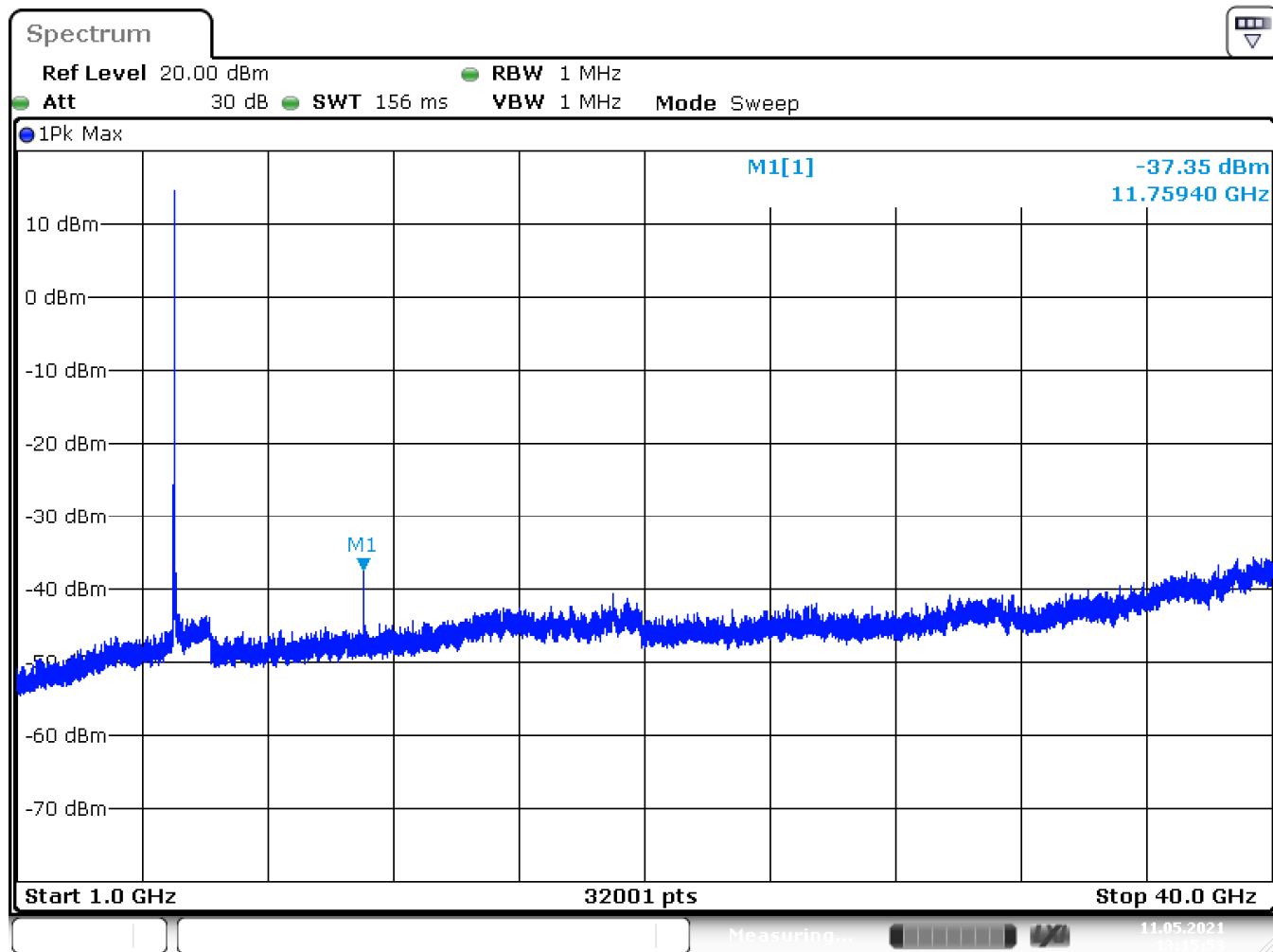
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5880 MHz

Modulated



Date: 11.MAY.2021 13:15:54

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

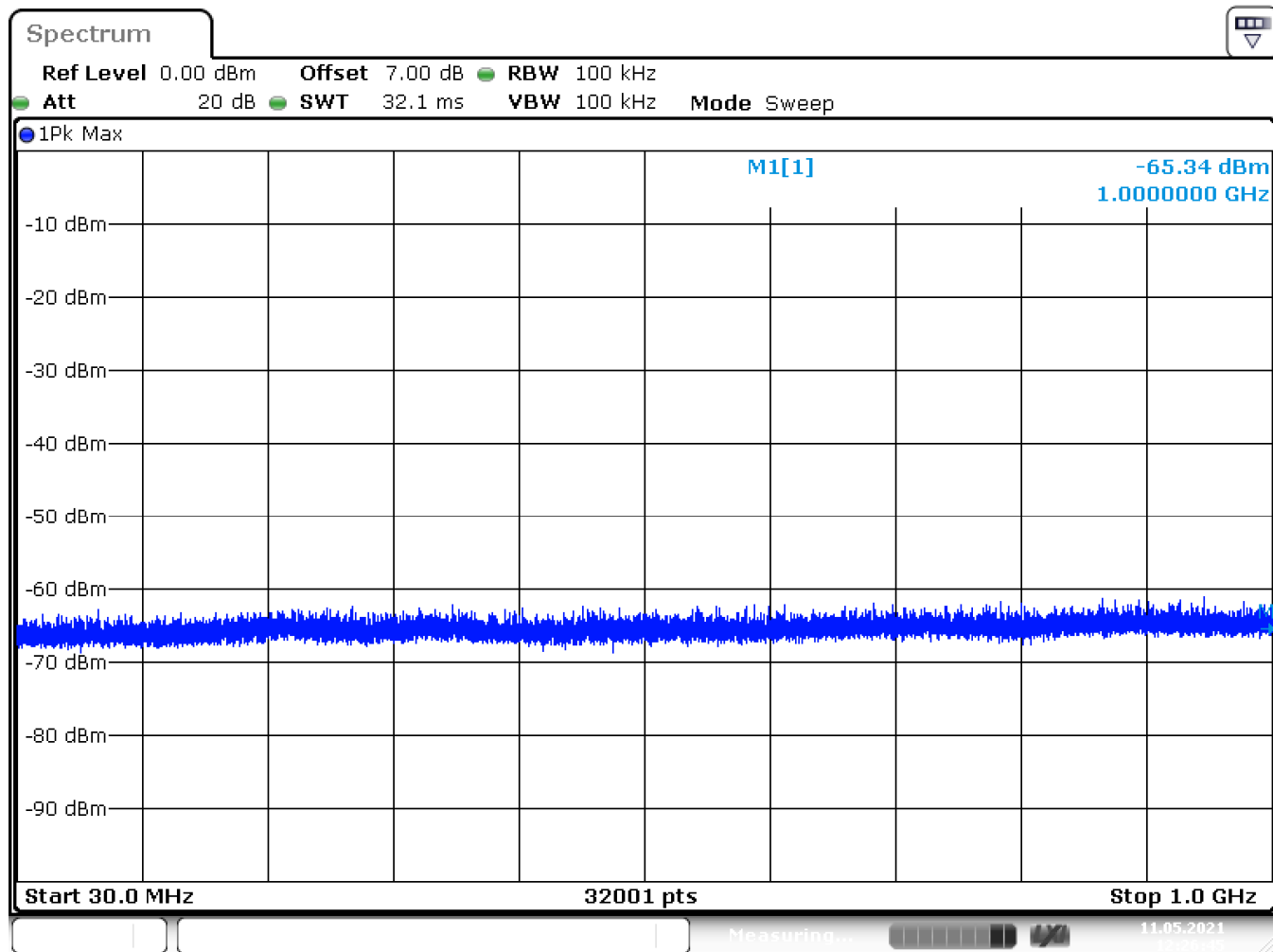
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5890 MHz

Modulated



Date: 11.MAY.2021 12:26:45

### LIMITS

### SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

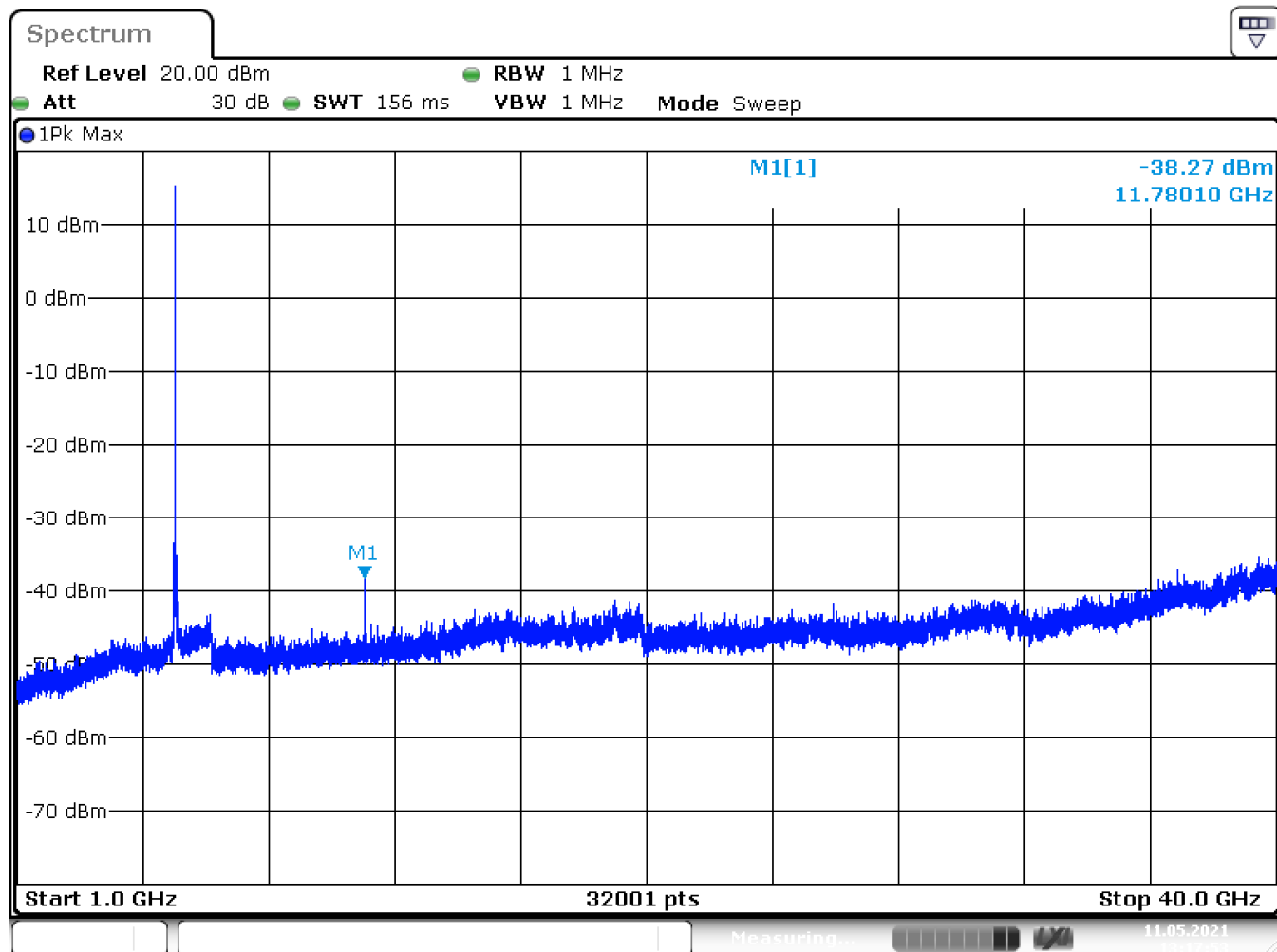
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5890 MHz

Modulated



Date: 11.MAY.2021 13:17:54

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

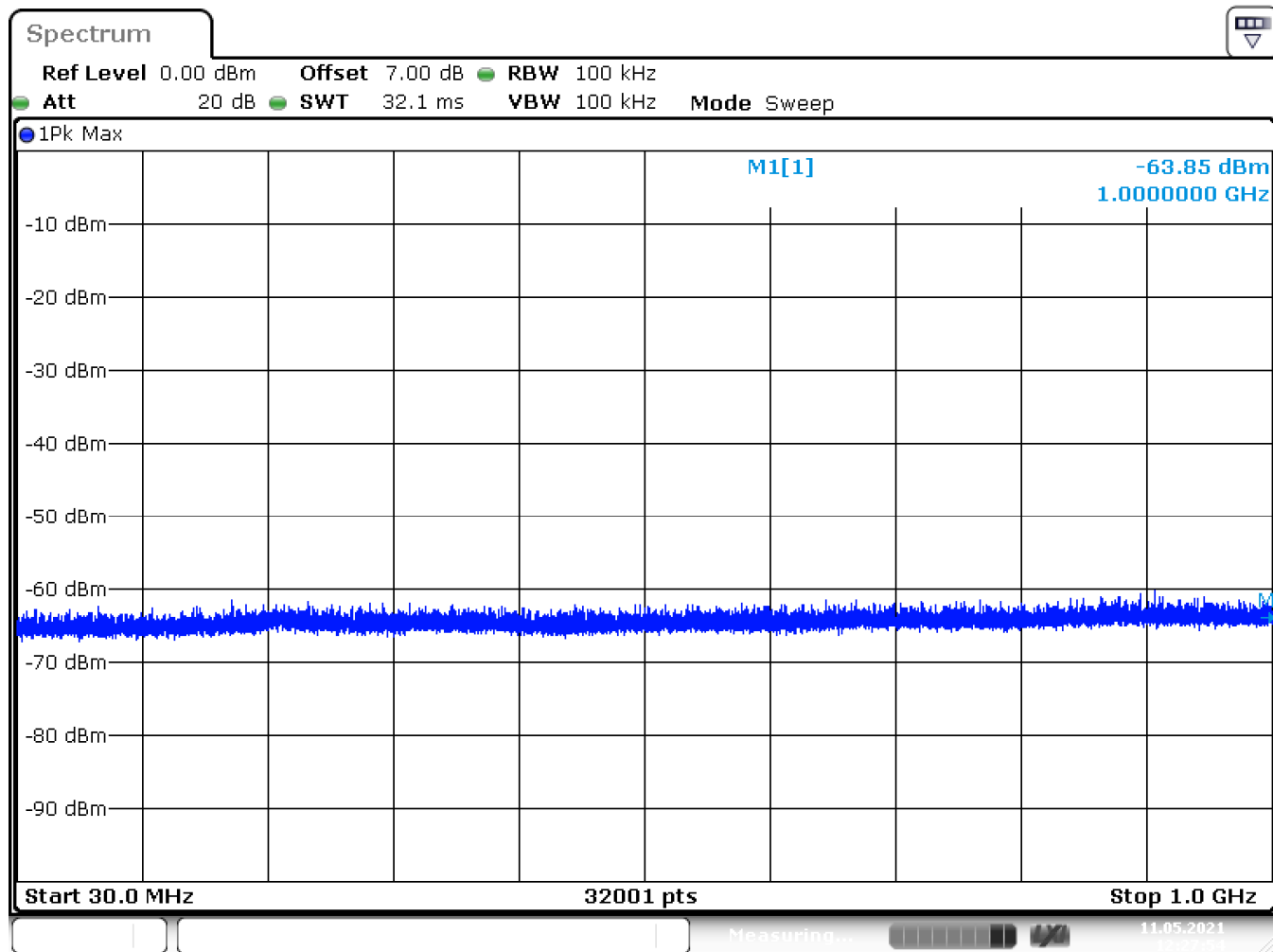
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5900 MHz

Modulated



Date: 11.MAY.2021 12:27:54

### LIMITS

### SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

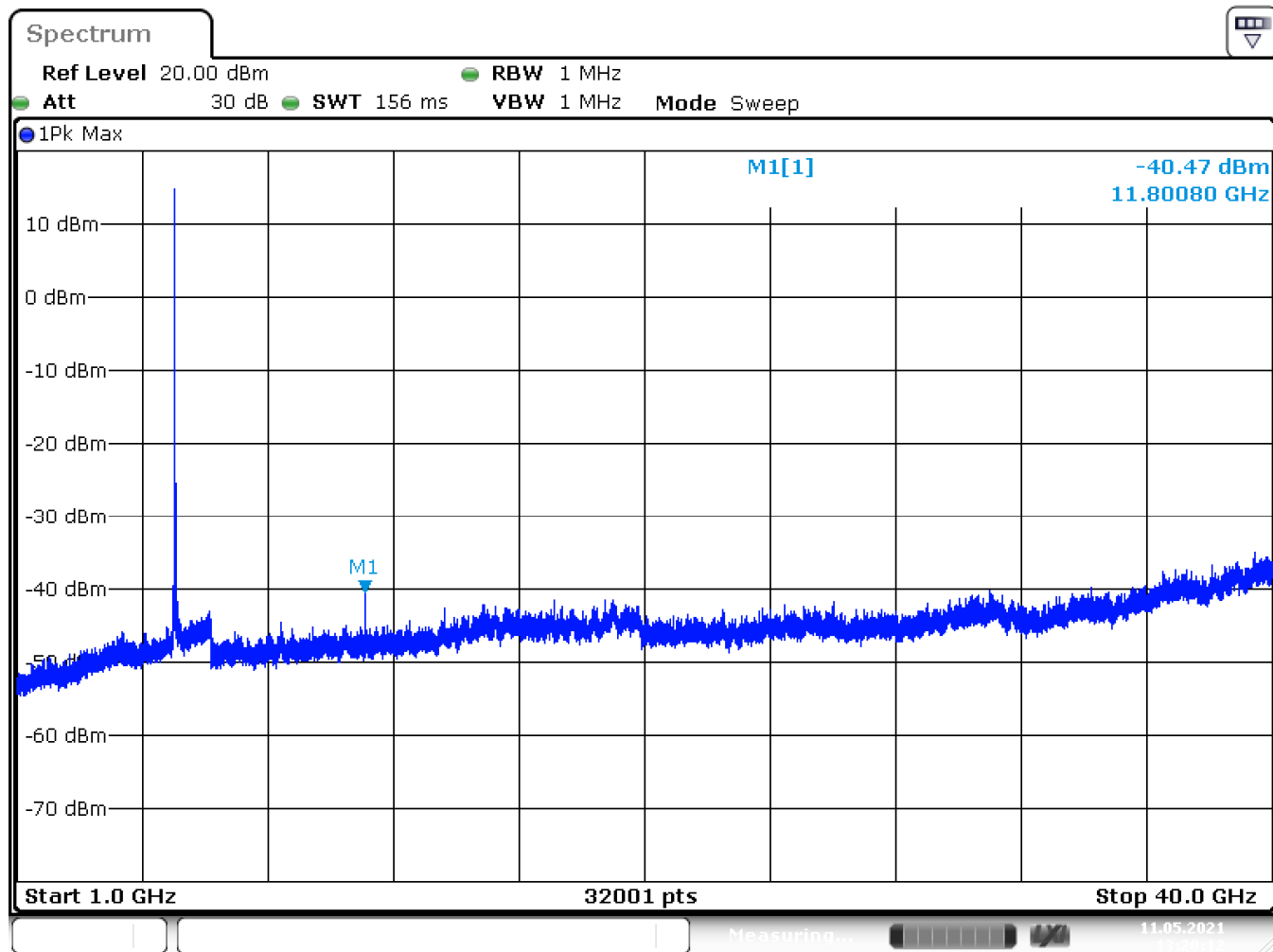
**Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2**

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5900 MHz

Modulated



Date: 11.MAY.2021 13:20:13

**LIMITS**

**SUBCLAUSE 8.10.2.2.2**

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

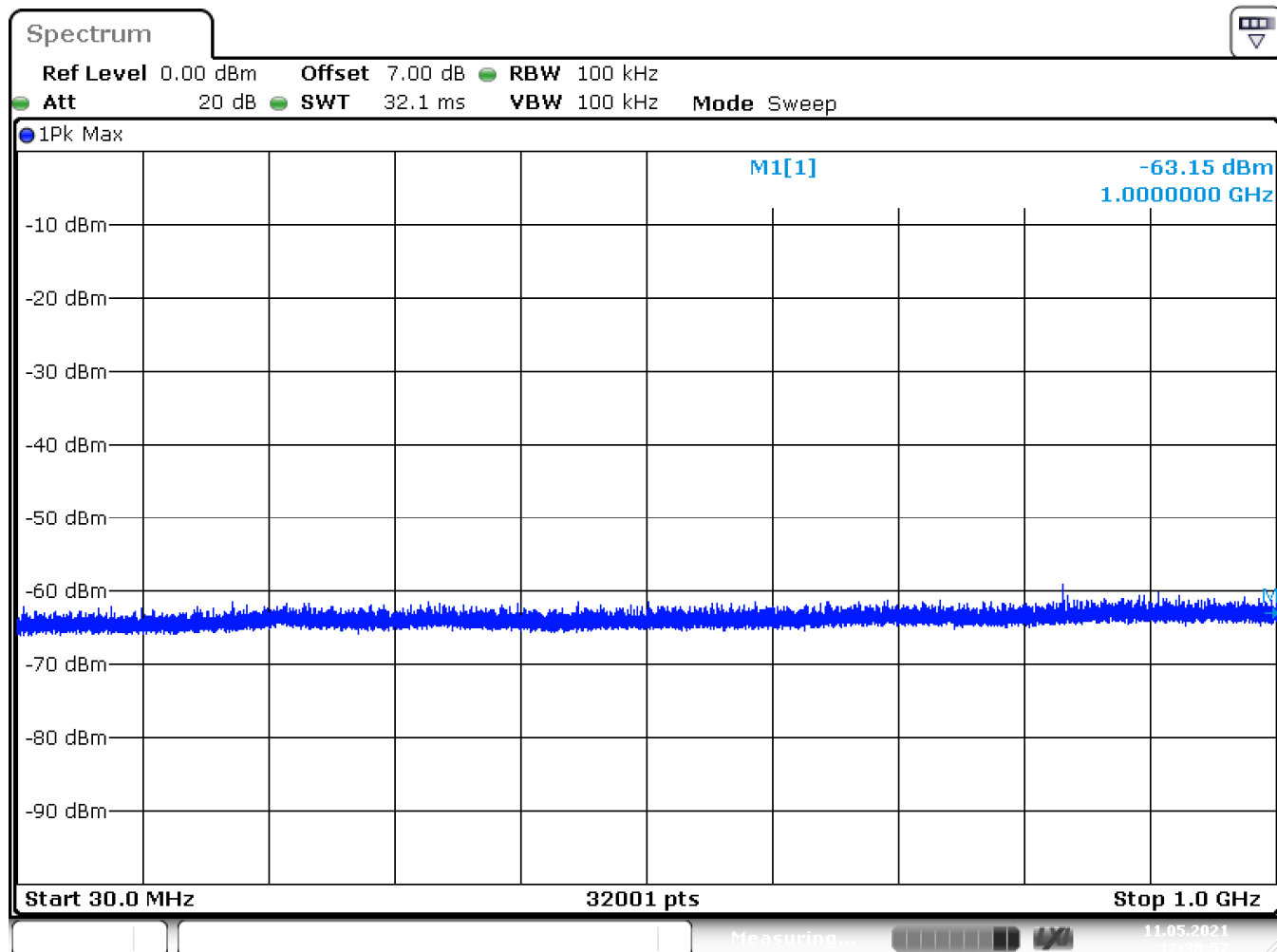
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5910 MHz

Modulated



Date: 11.MAY.2021 12:30:57

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

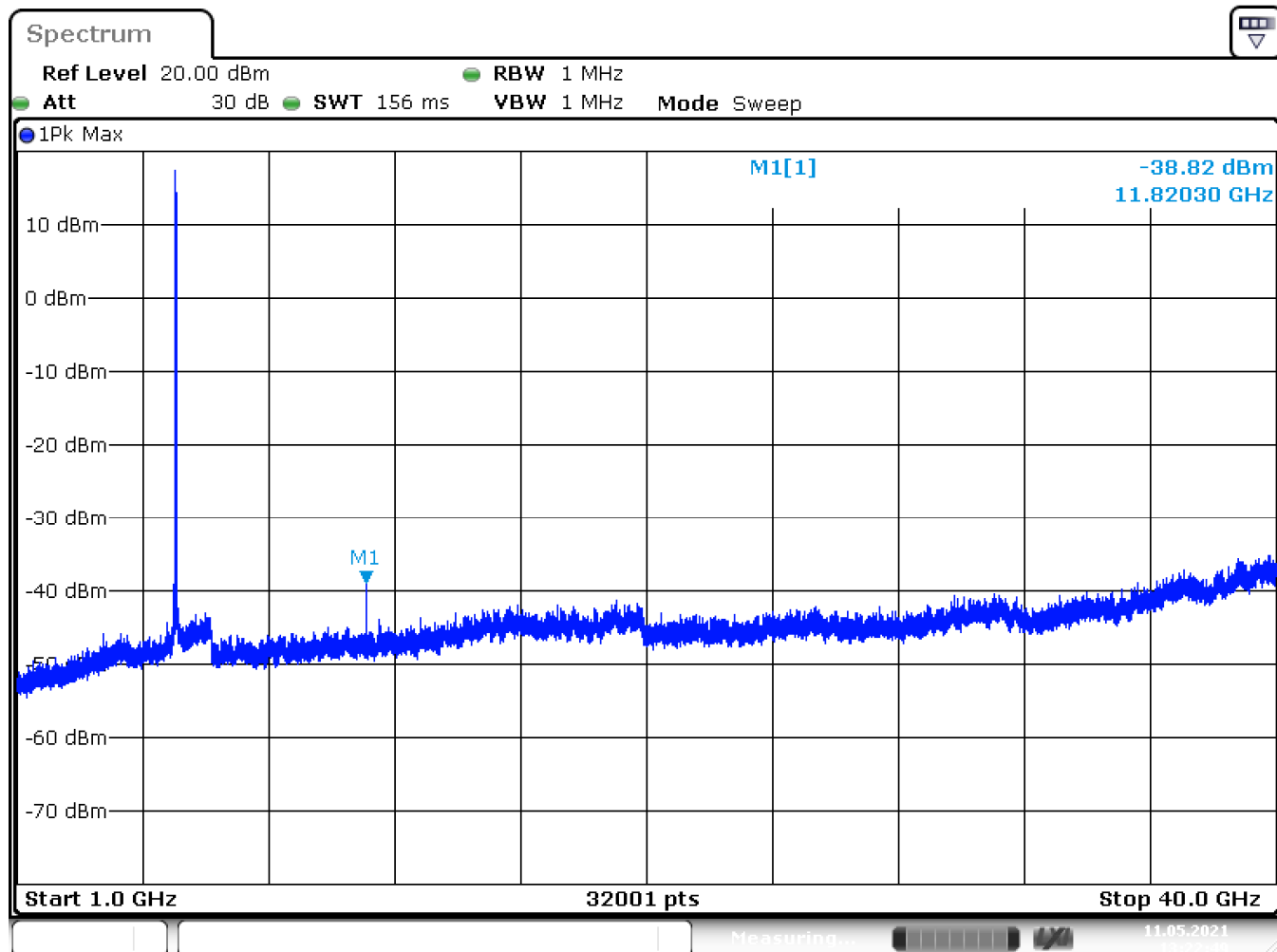
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5910 MHz

Modulated



Date: 11.MAY.2021 13:22:49

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

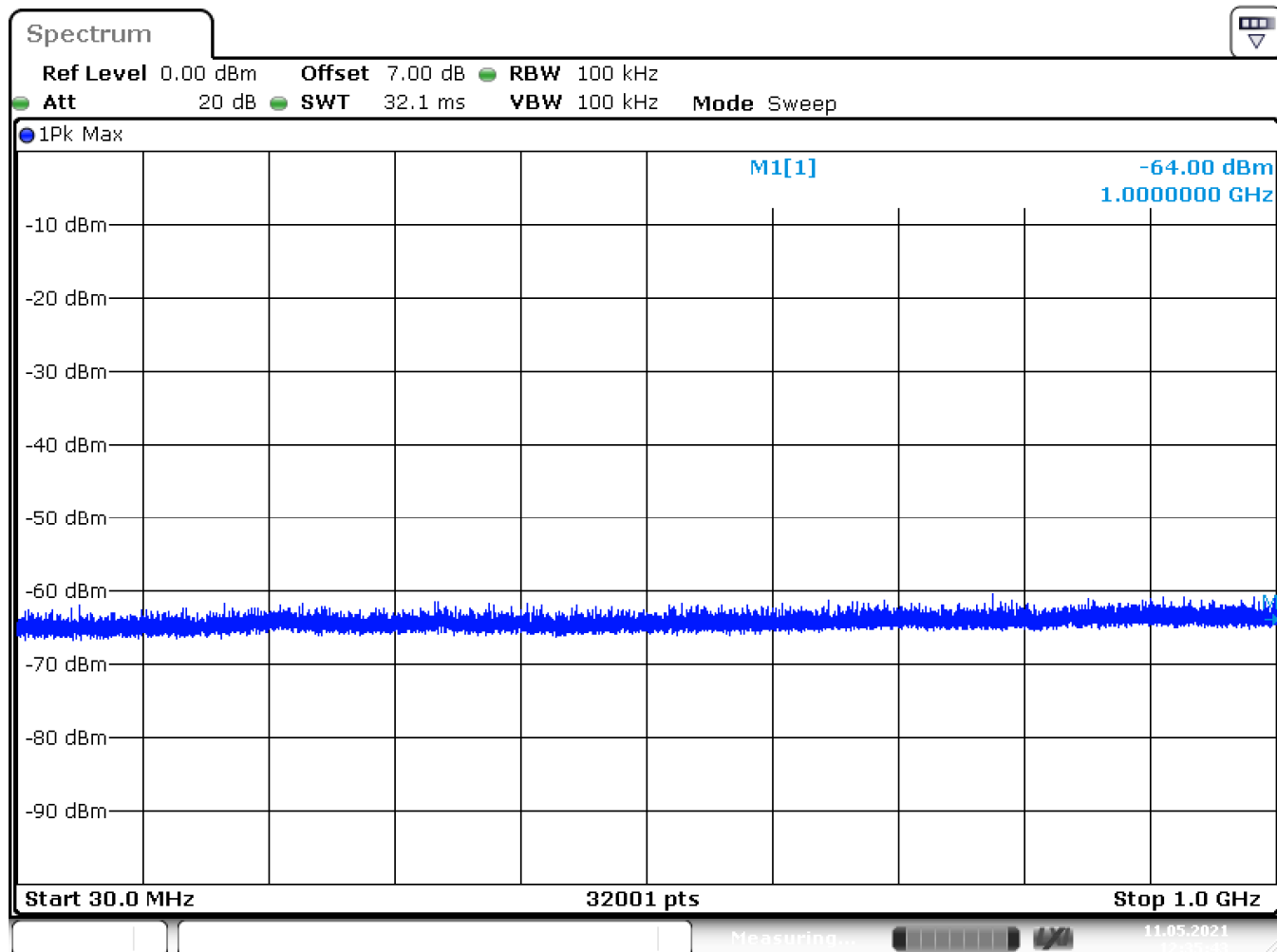
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5920 MHz

Modulated



Date: 11.MAY.2021 12:35:43

## LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205



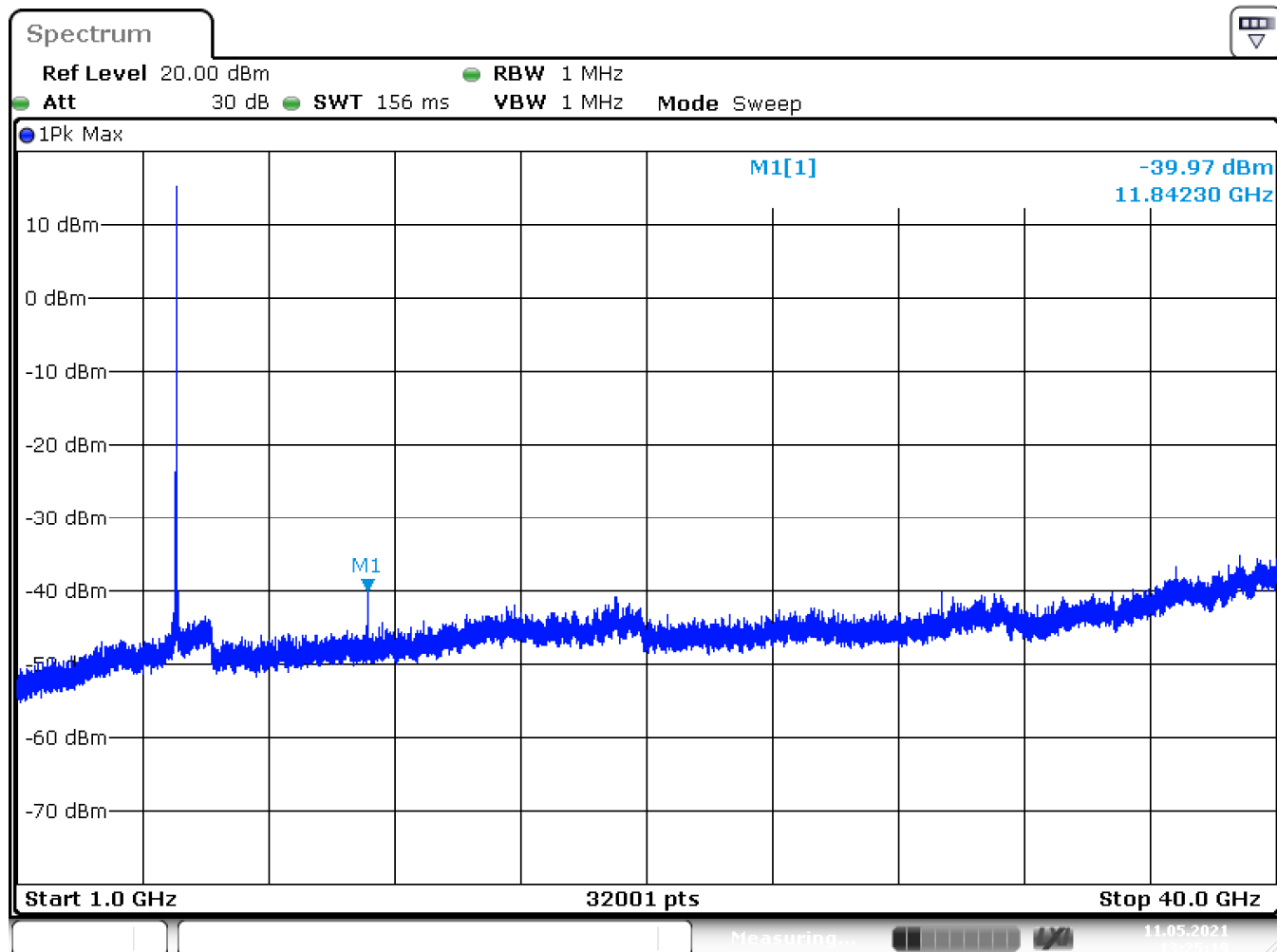
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sector 2, Channel 0

Transmitter operating – 5920 MHz

Modulated



Date: 11.MAY.2021 13:25:20

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-205

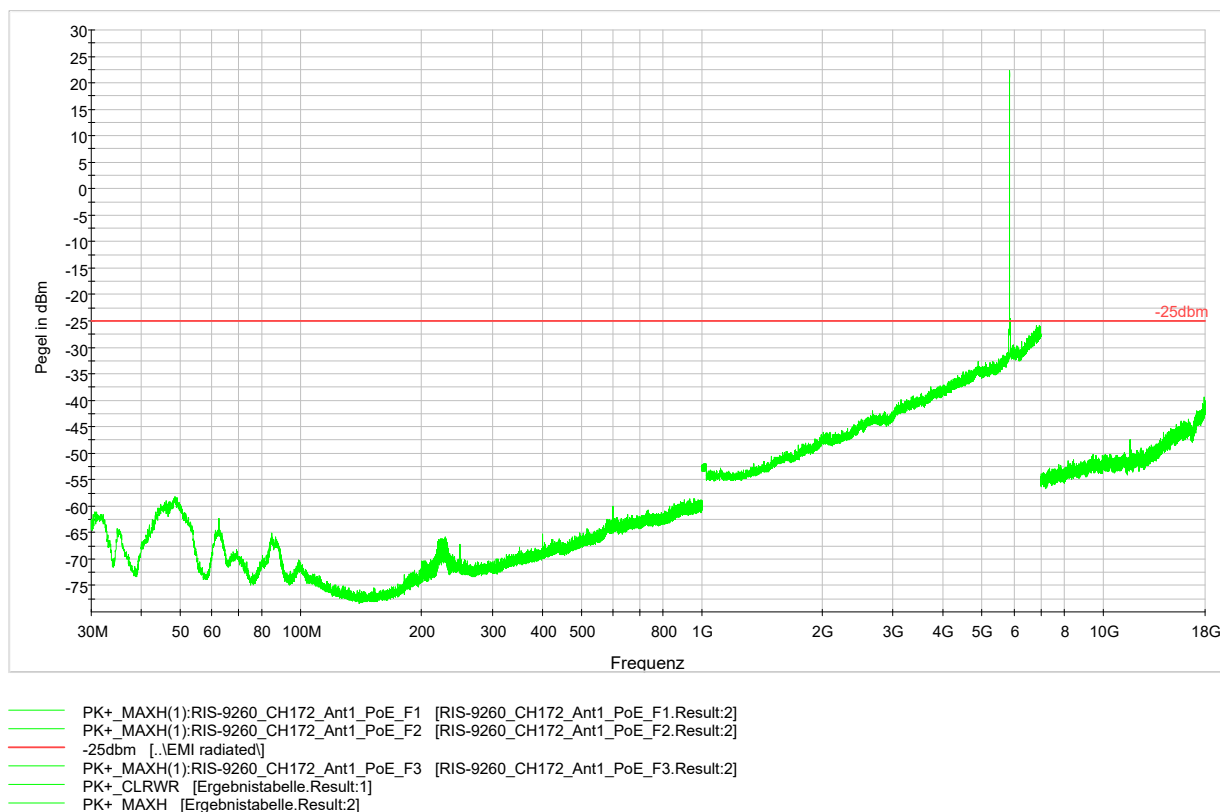
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (radiated measurement)

Measured Antennas: Section 1 at 5880 MHz; Section 2 at 5900 MHz

Transmitter operating

Modulated



Although the measurement above ends at 18 GHz, radiated measurements were made up to 40 GHz, but no graph is available. No emissions above noise level were found above 18 GHz.

### LIMITS

#### SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-100; EMV-101; EMV-102; EMV-103; EMV-110; EMV-111; EMV-112; EMV-200; EMV-202; NT-456

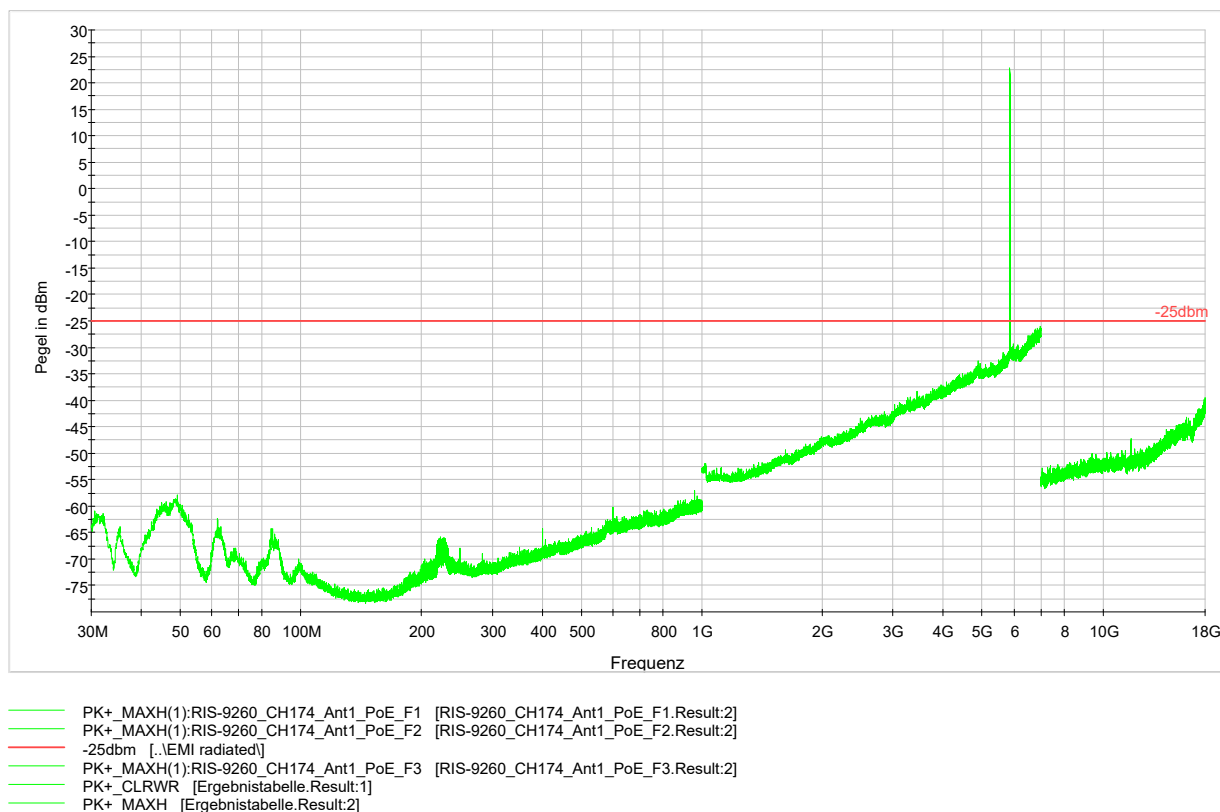
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (radiated measurement)

Measured Antennas: Section 1 at 5890 MHz; Section 2 at 5910 MHz

Transmitter operating

Modulated



Although the measurement above ends at 18 GHz, radiated measurements were made up to 40 GHz, but no graph is available. No emissions above noise level were found above 18 GHz.

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-100; EMV-101; EMV-102; EMV-103; EMV-110; EMV-111; EMV-112; EMV-200; EMV-202; NT-456

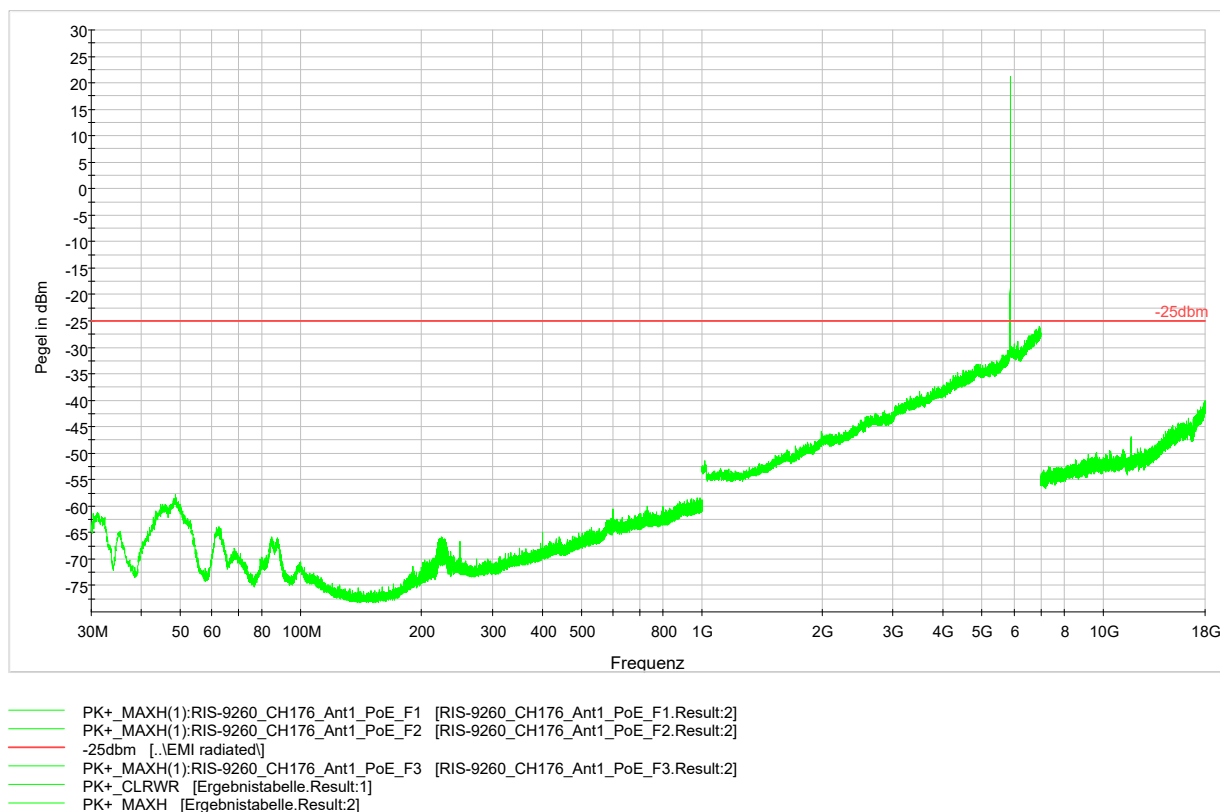
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (radiated measurement)

Measured Antennas: Section 1 at 5900 MHz; Section 2 at 5920 MHz

Transmitter operating

Modulated



Although the measurement above ends at 18 GHz, radiated measurements were made up to 40 GHz, but no graph is available. No emissions above noise level were found above 18 GHz.

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-100; EMV-101; EMV-102; EMV-103; EMV-110; EMV-111; EMV-112; EMV-200; EMV-202; NT-456

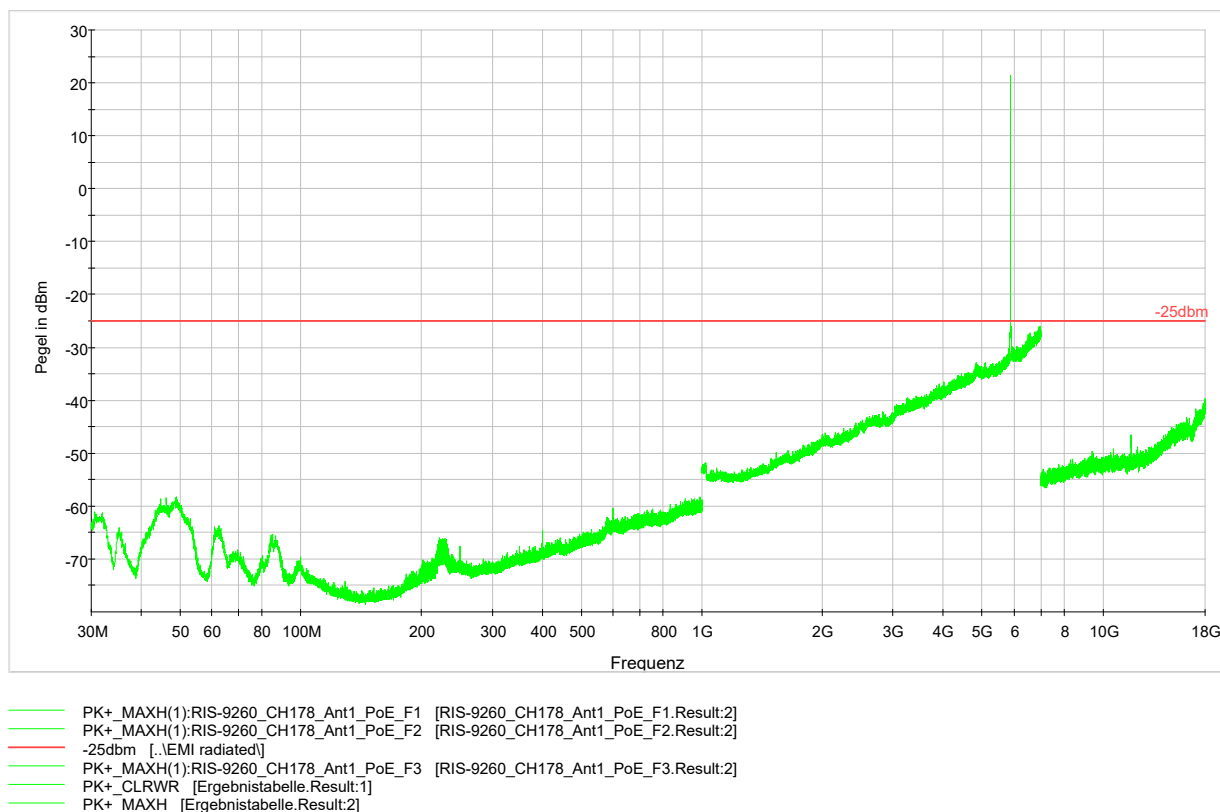
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (radiated measurement)

Measured Antennas: Section 1 at 5910 MHz; Section 2 at 5880 MHz

Transmitter operating

Modulated



Although the measurement above ends at 18 GHz, radiated measurements were made up to 40 GHz, but no graph is available. No emissions above noise level were found above 18 GHz.

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-100; EMV-101; EMV-102; EMV-103; EMV-110; EMV-111; EMV-112; EMV-200; EMV-202; NT-456

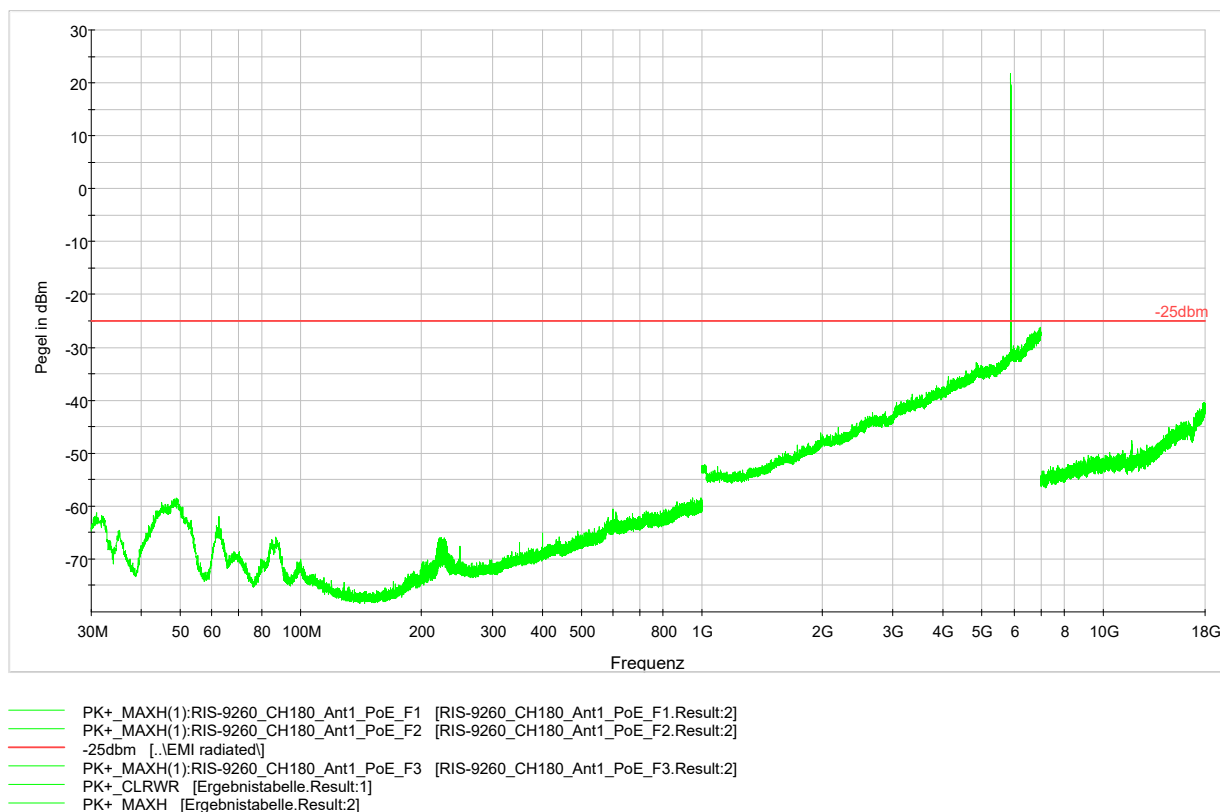
## Transmitter unwanted emissions outside the 5 GHz ITS frequency band SUBCLAUSE 8.10.2.2

Rated output power 27 dBm eirp (radiated measurement)

Measured Antennas: Section 1 at 5920 MHz; Section 2 at 5890 MHz

Transmitter operating

Modulated



Although the measurement above ends at 18 GHz, radiated measurements were made up to 40 GHz, but no graph is available. No emissions above noise level were found above 18 GHz.

### LIMITS SUBCLAUSE 8.10.2.2.2

The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges.

TEST EQUIPMENT USED: EMV-100; EMV-101; EMV-102; EMV-103; EMV-110; EMV-111; EMV-112; EMV-200; EMV-202; NT-456

#### 4.4 Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

#### LIMITS

#### SUBCLAUSE 8.10.6

**TABLE 10 DSRC Spectrum Mask<sup>A</sup>**

NOTE 1—Reduction in Power Spectral Density, dBr.

Class	± 4.5-MHz Offset	± 5.0-MHz Offset	± 5.5-MHz Offset	± 10-MHz Offset	± 15-MHz Offset
Class A	0	-10	-20	-28	-40
Class B	0	-16	-20	-28	-40
Class C	0	-26	-32	-40	-50
Class D	0	-35	-45	-55	-65

<sup>A</sup> From IEEE 802.11a. Copyright 1999 IEEE. All rights reserved.

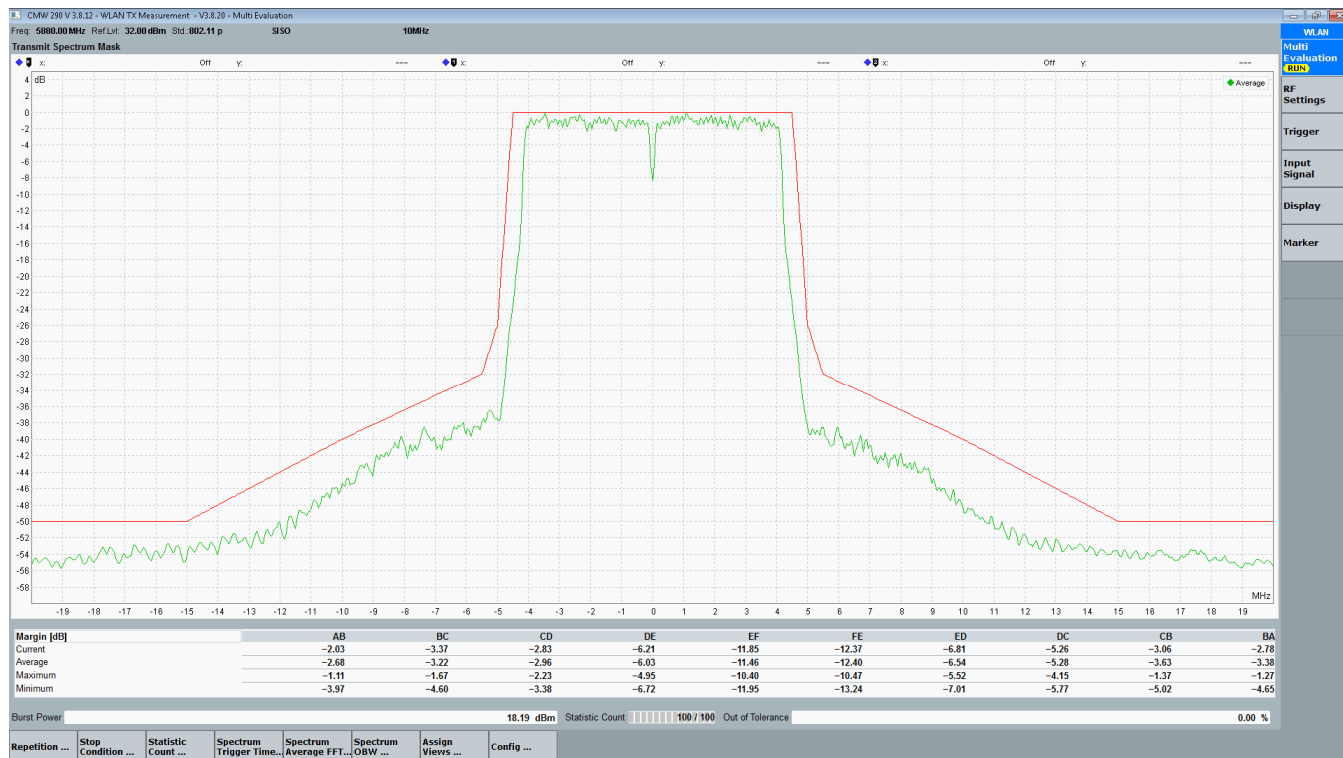
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 0 – data rate 3 MBps

Transmitter operating – 5880 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205



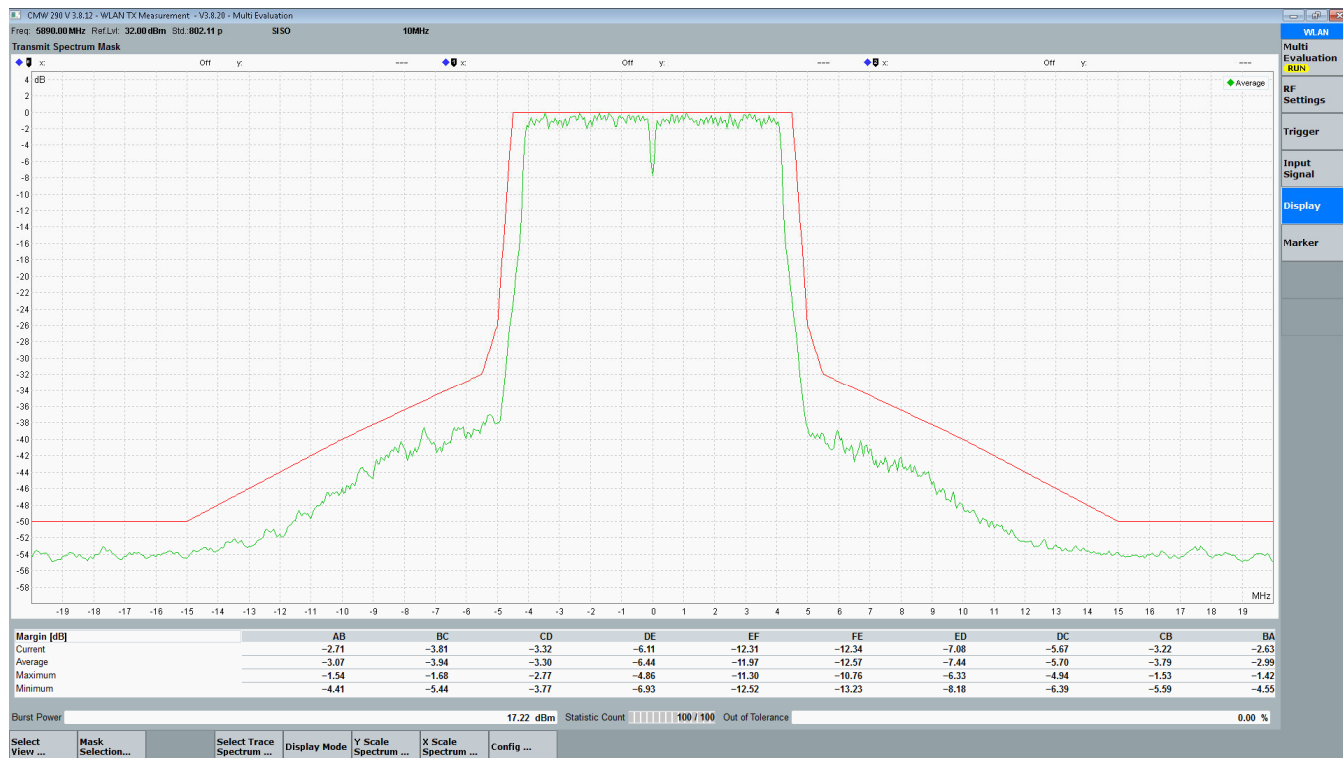
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 0 – data rate 3 MBps

Transmitter operating – 5890 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

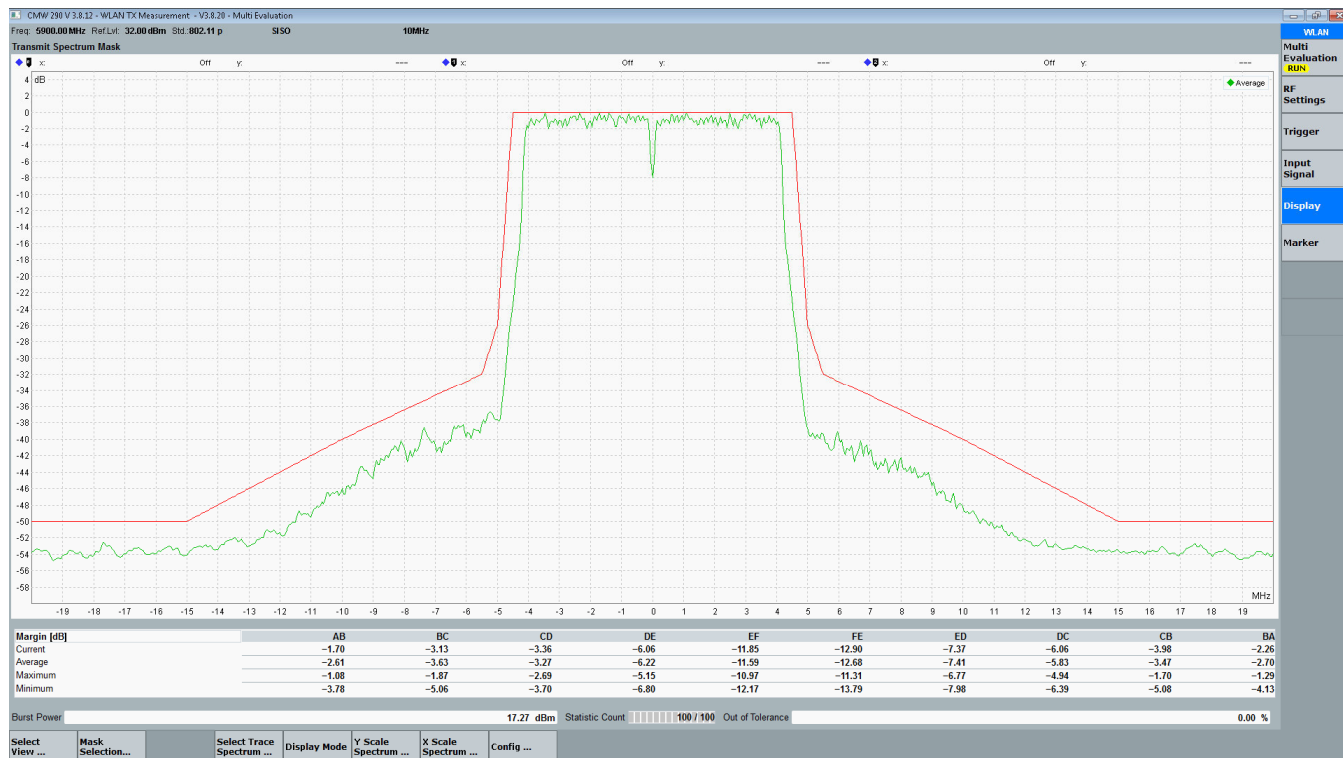
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 0 – data rate 3 MBps

Transmitter operating – 5900 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

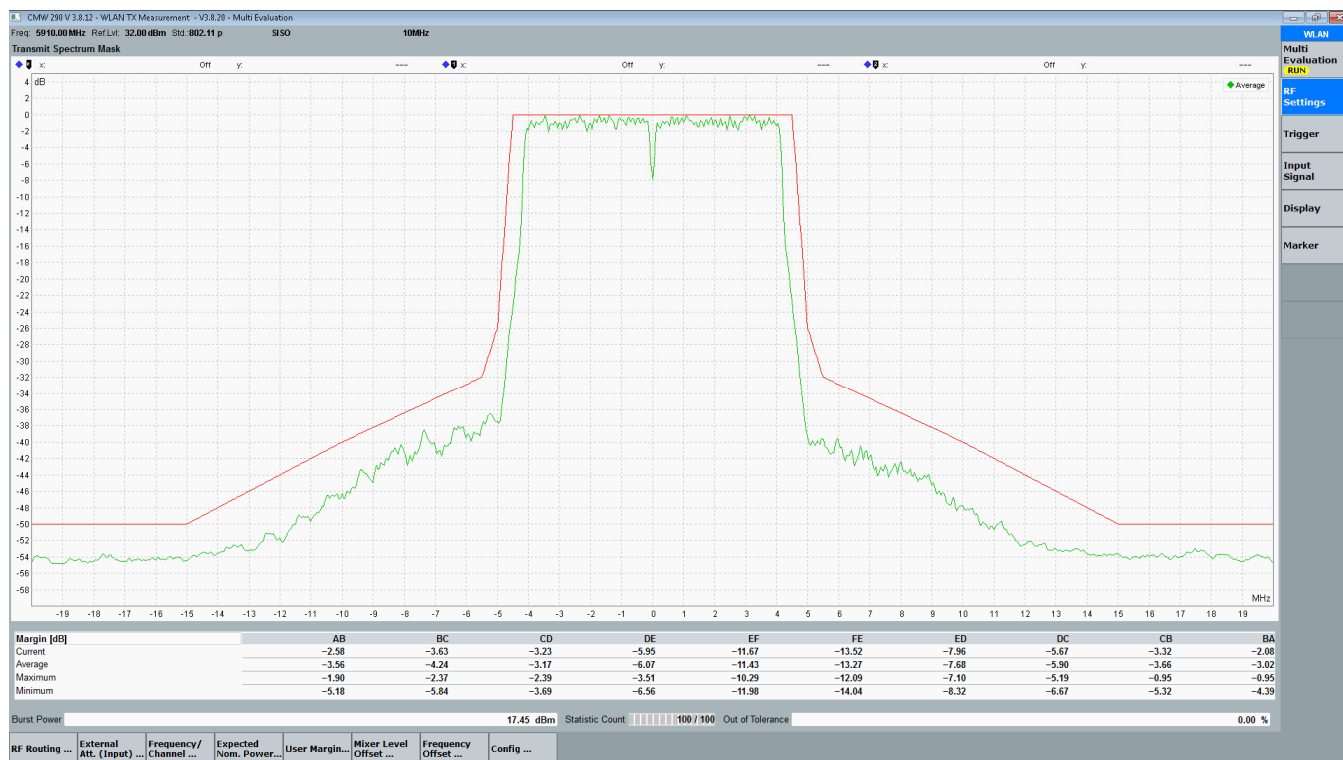
Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: 1 – data rate 3 MBps

Measured Antenna: Sector 1, Channel 0 – data rate 3 MBps

Transmitter operating – 5910 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

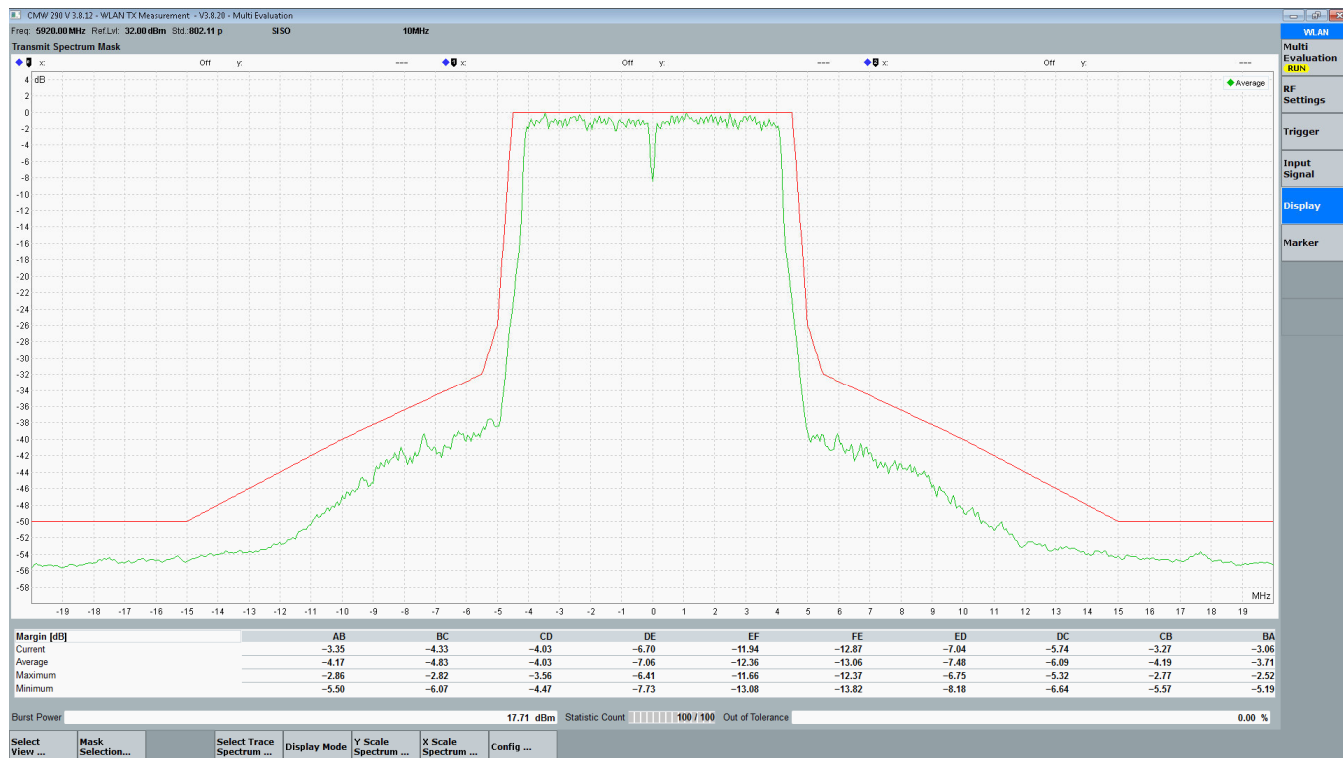
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 0 – data rate 3 MBps

Transmitter operating – 5920 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

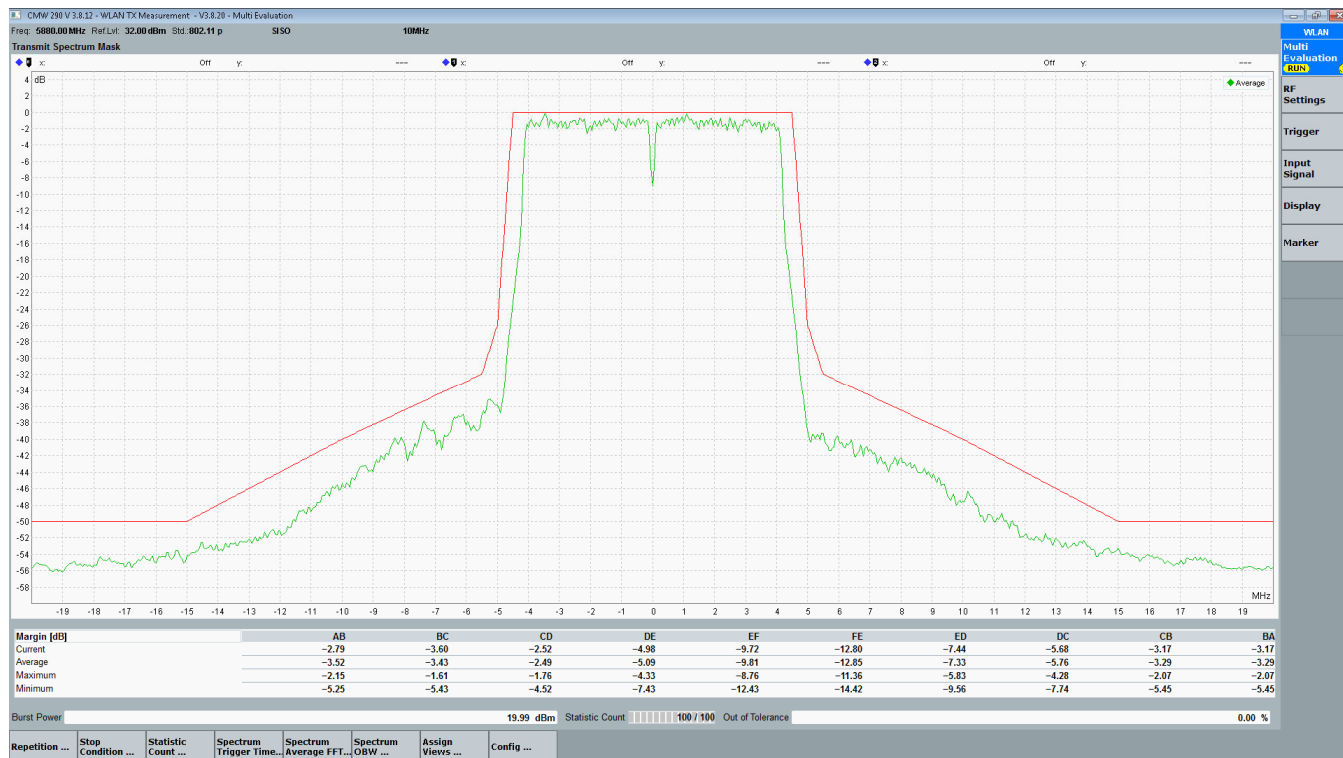
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 1 – data rate 3 MBps

Transmitter operating – 5880 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

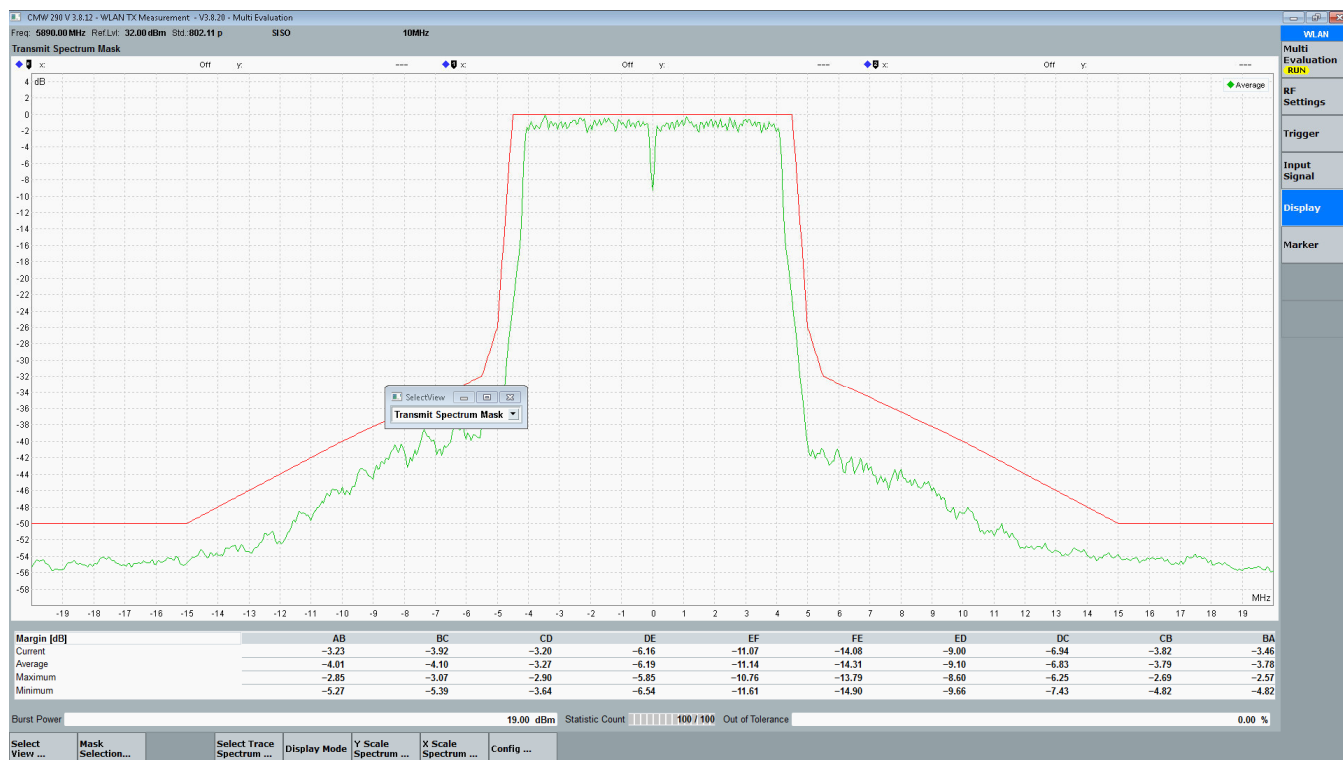
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 1 – data rate 3 MBps

Transmitter operating – 5890 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

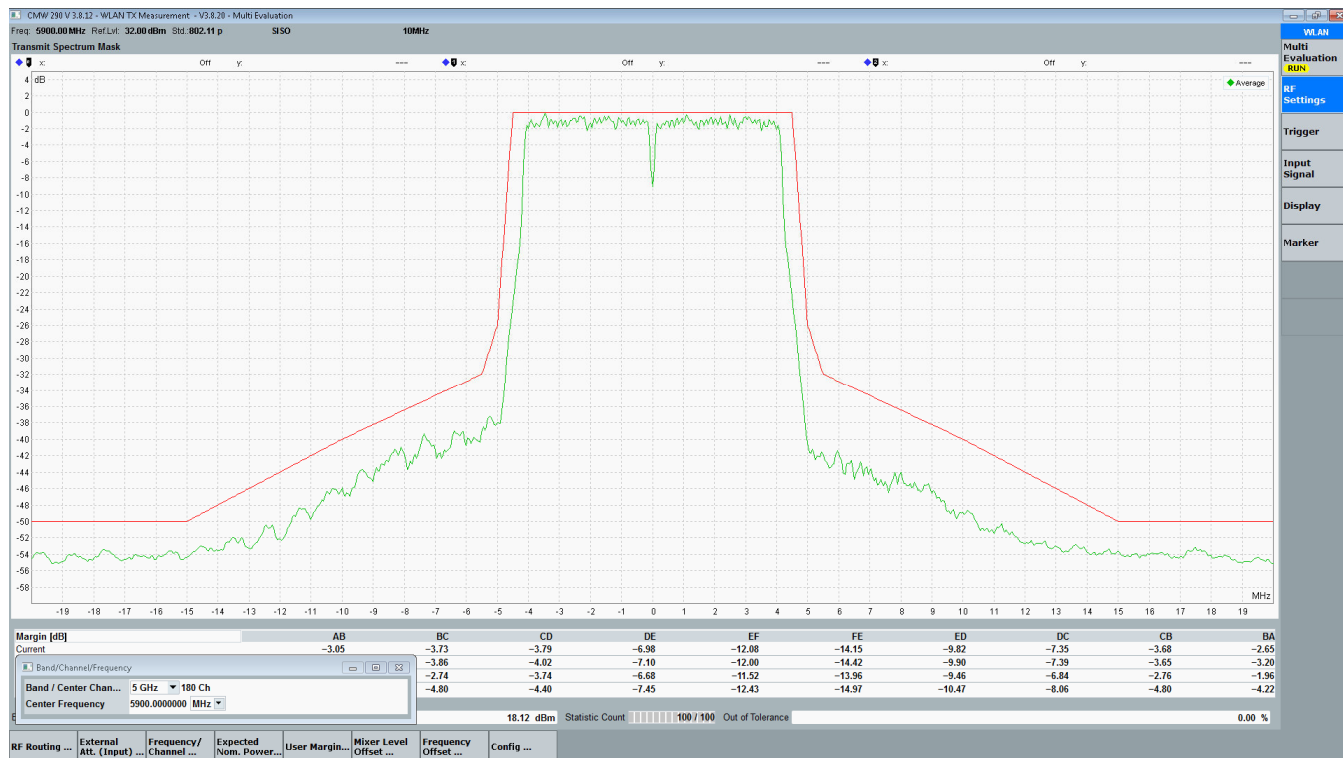
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 1 – data rate 3 MBps

Transmitter operating – 5900 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205



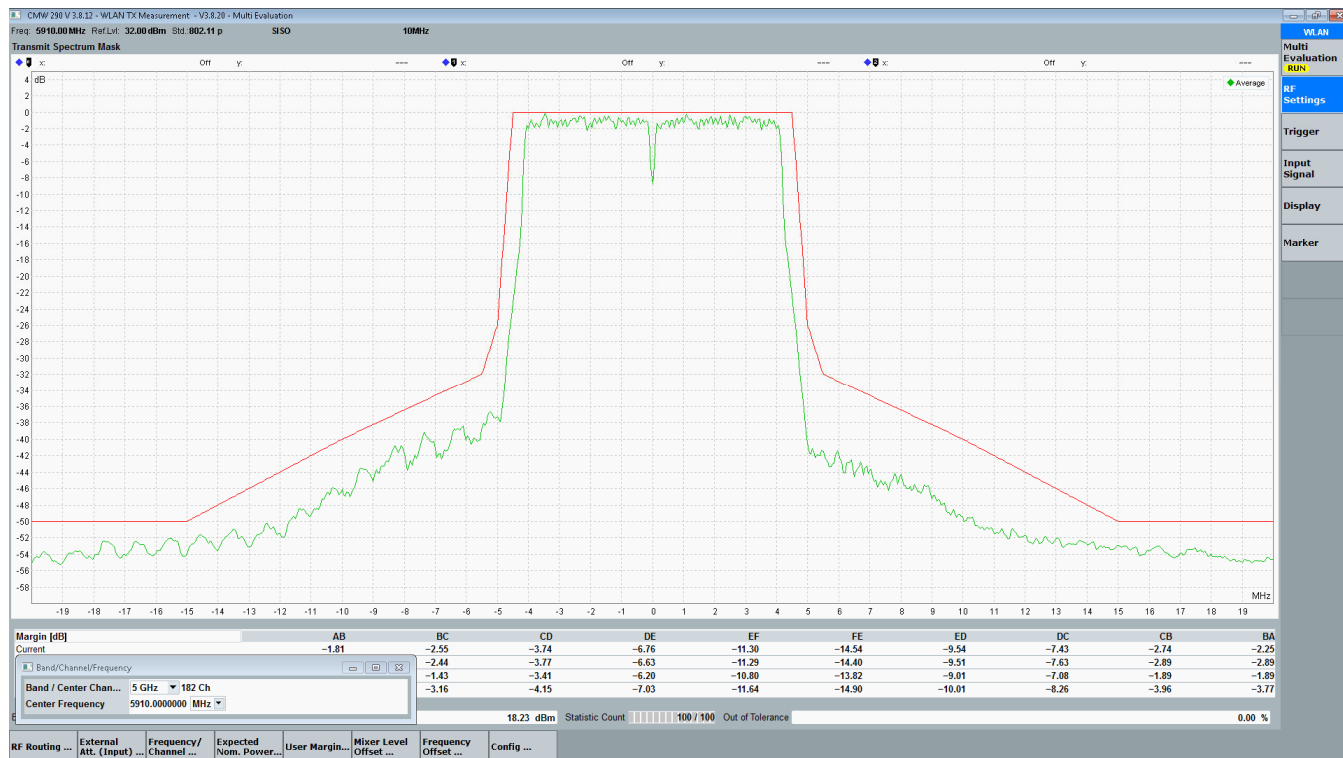
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 1 – data rate 3 MBps

Transmitter operating – 5910 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205



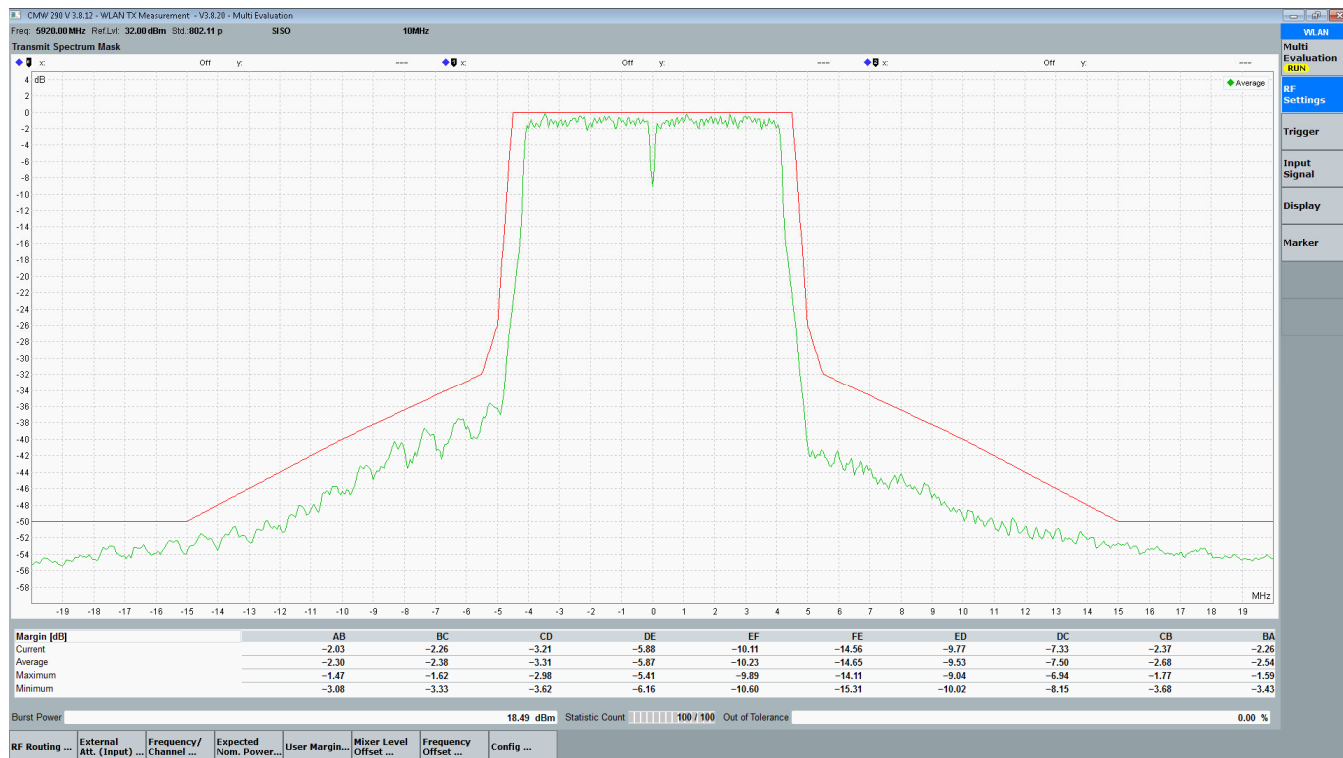
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Seson 1, Channel 1 – data rate 3 MBps

Transmitter operating – 5920 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

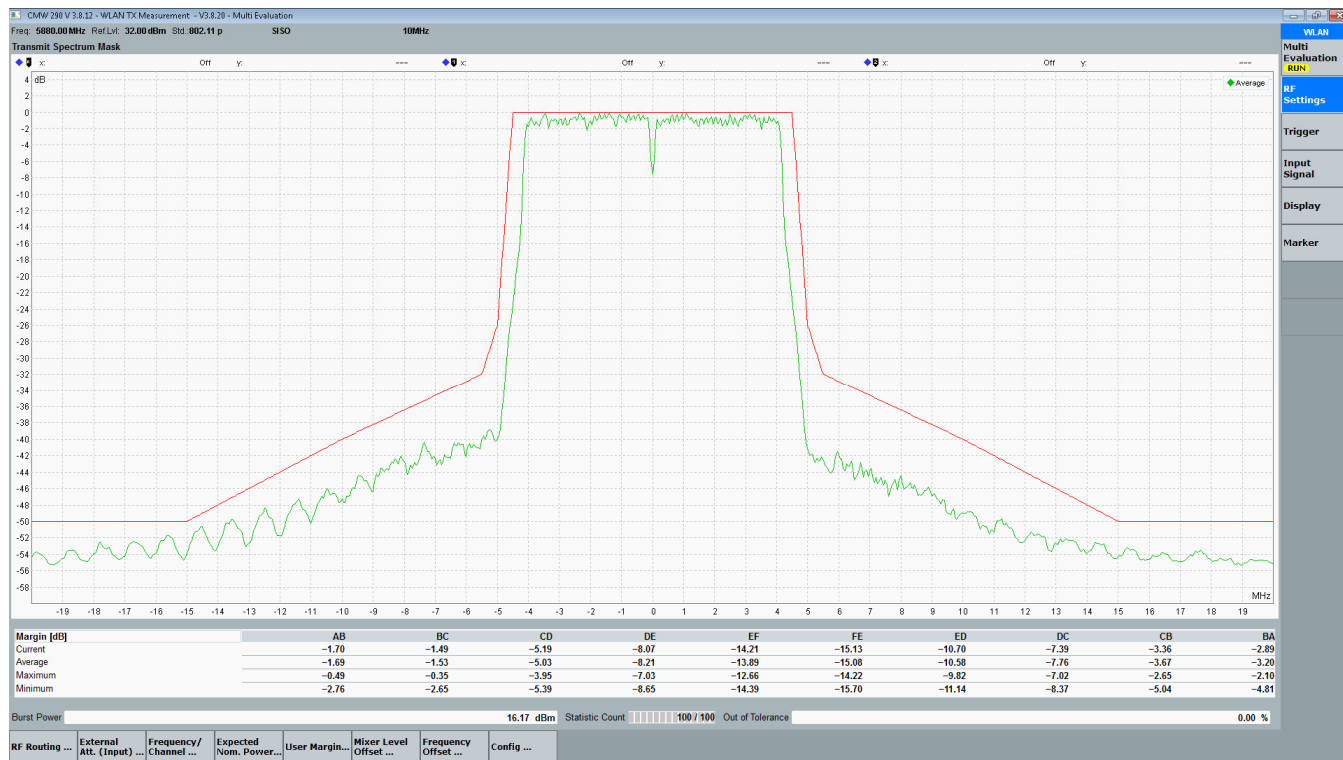
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Seson 2, Channel 0 – data rate 3 MBps

Transmitter operating – 5880 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

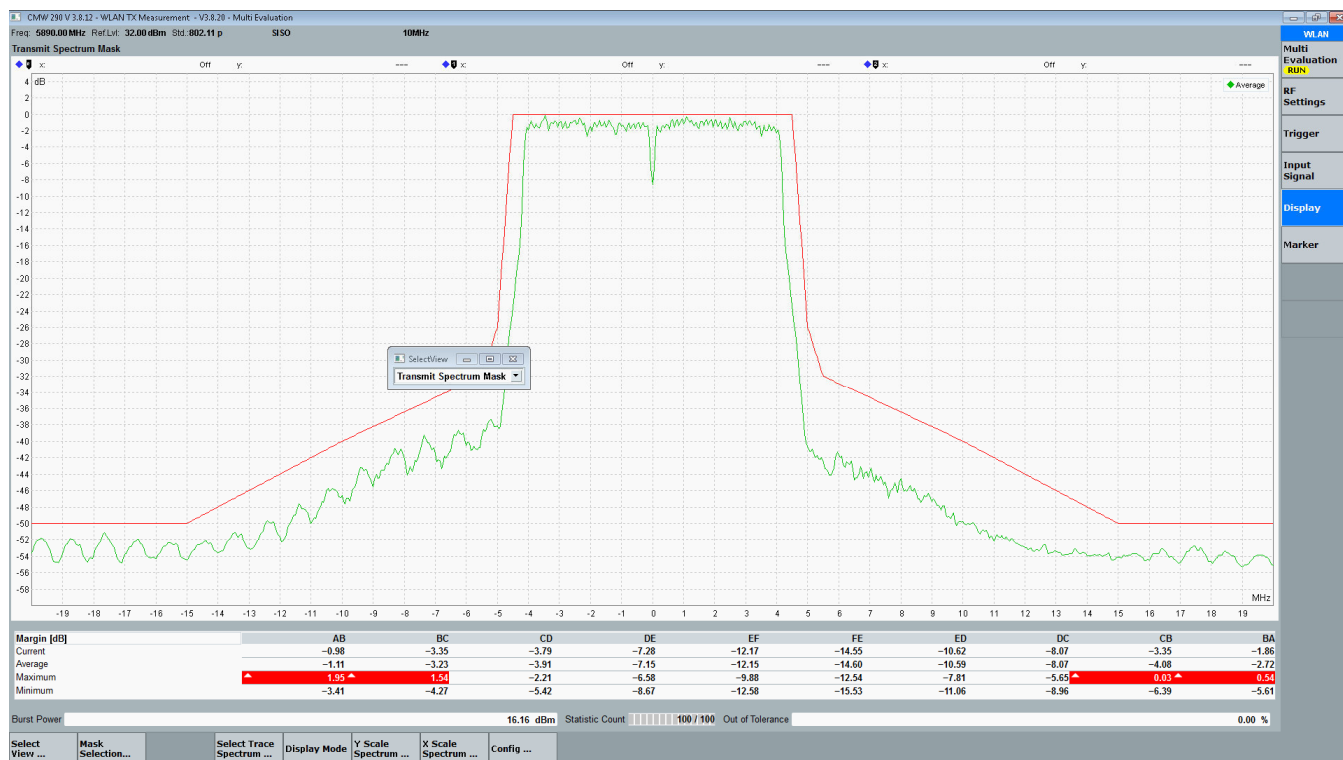
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Seson 2, Channel 0 – data rate 3 MBps

Transmitter operating – 5890 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

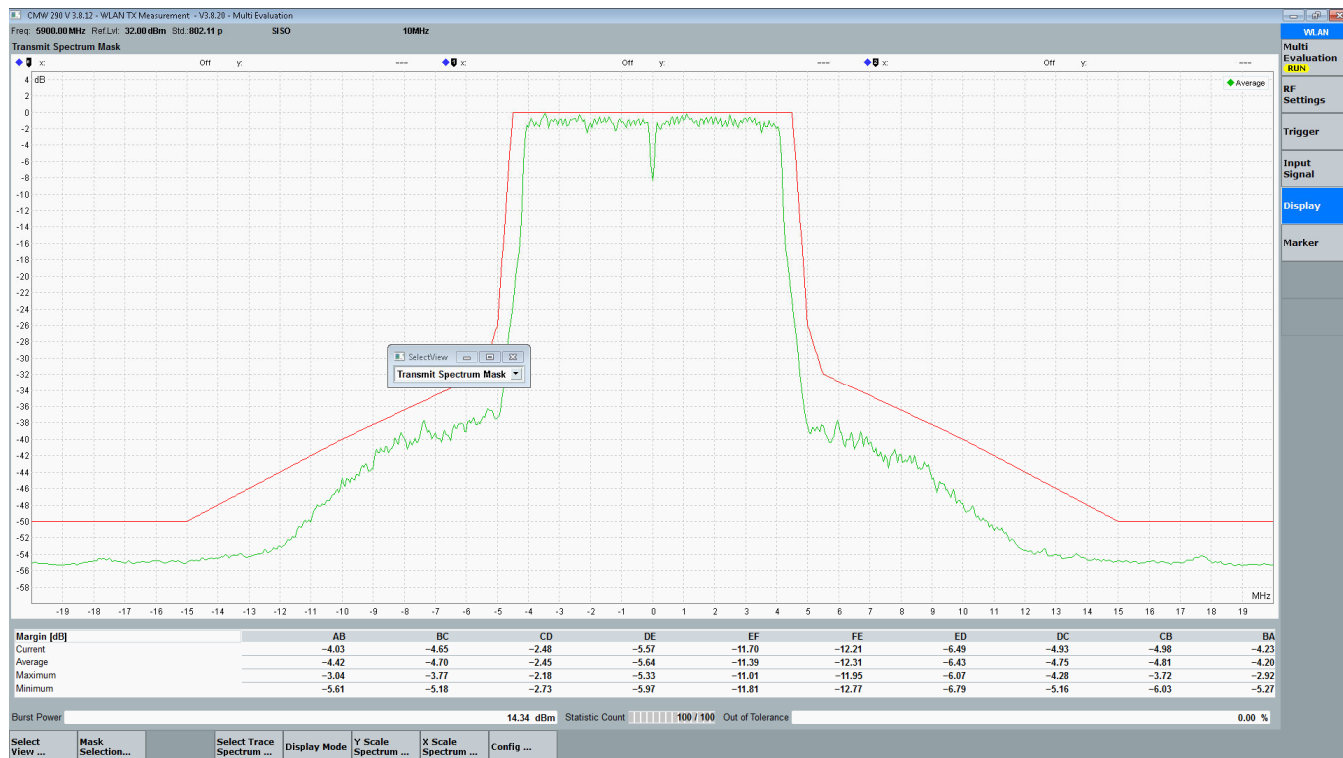
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Seson 2, Channel 0 – data rate 3 MBps

Transmitter operating – 5900 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

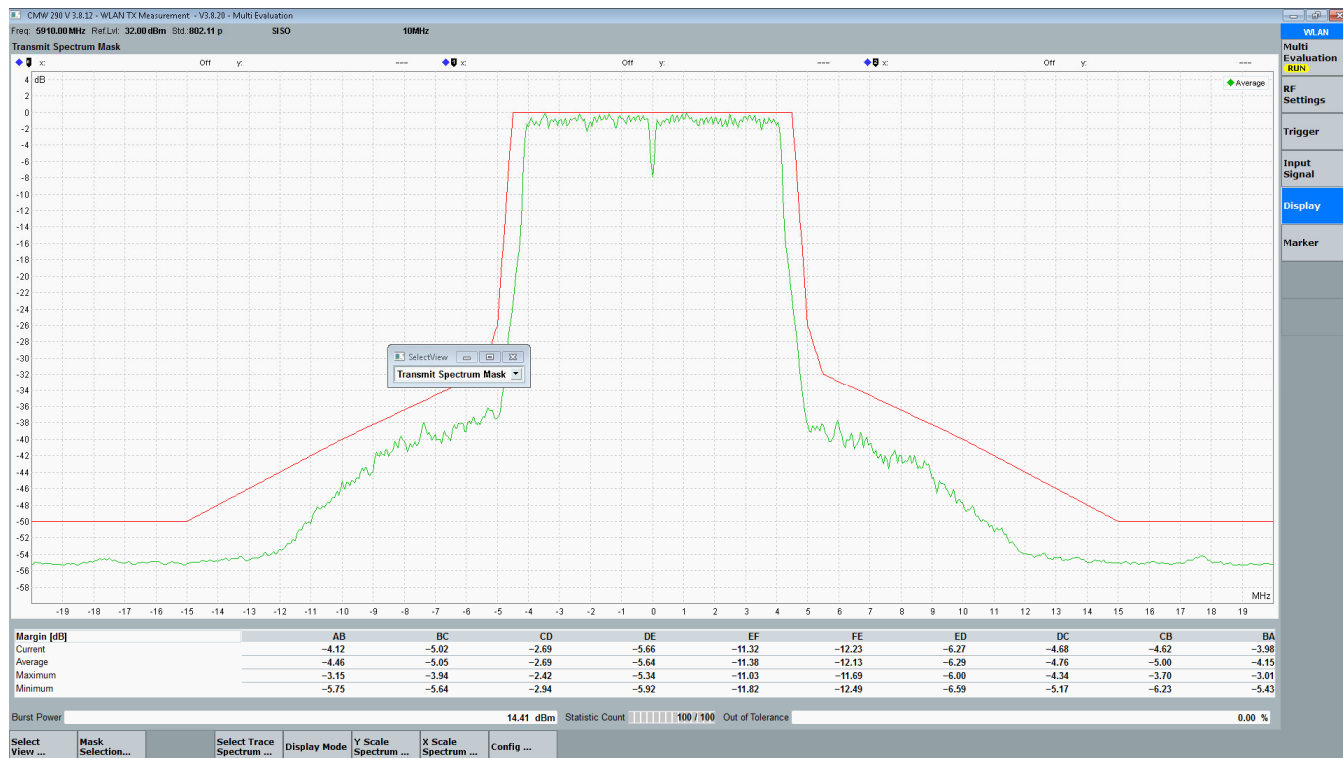
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 23 dBm eirp (conducted measurement)

Measured Antenna: Sectar 2, Channel 0 – data rate 3 MBps

Transmitter operating – 5910 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

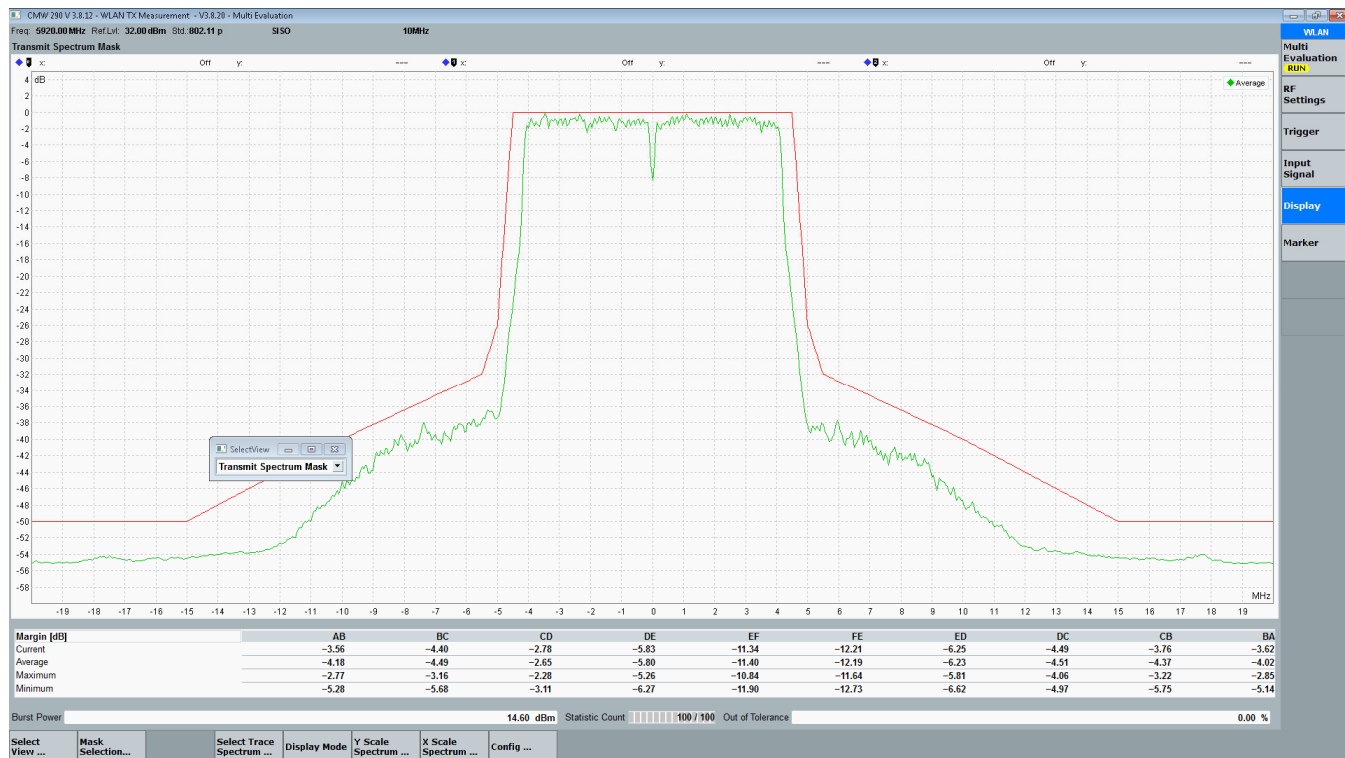
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Seson 2, Channel 0 – data rate 3 MBps

Transmitter operating – 5920 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205

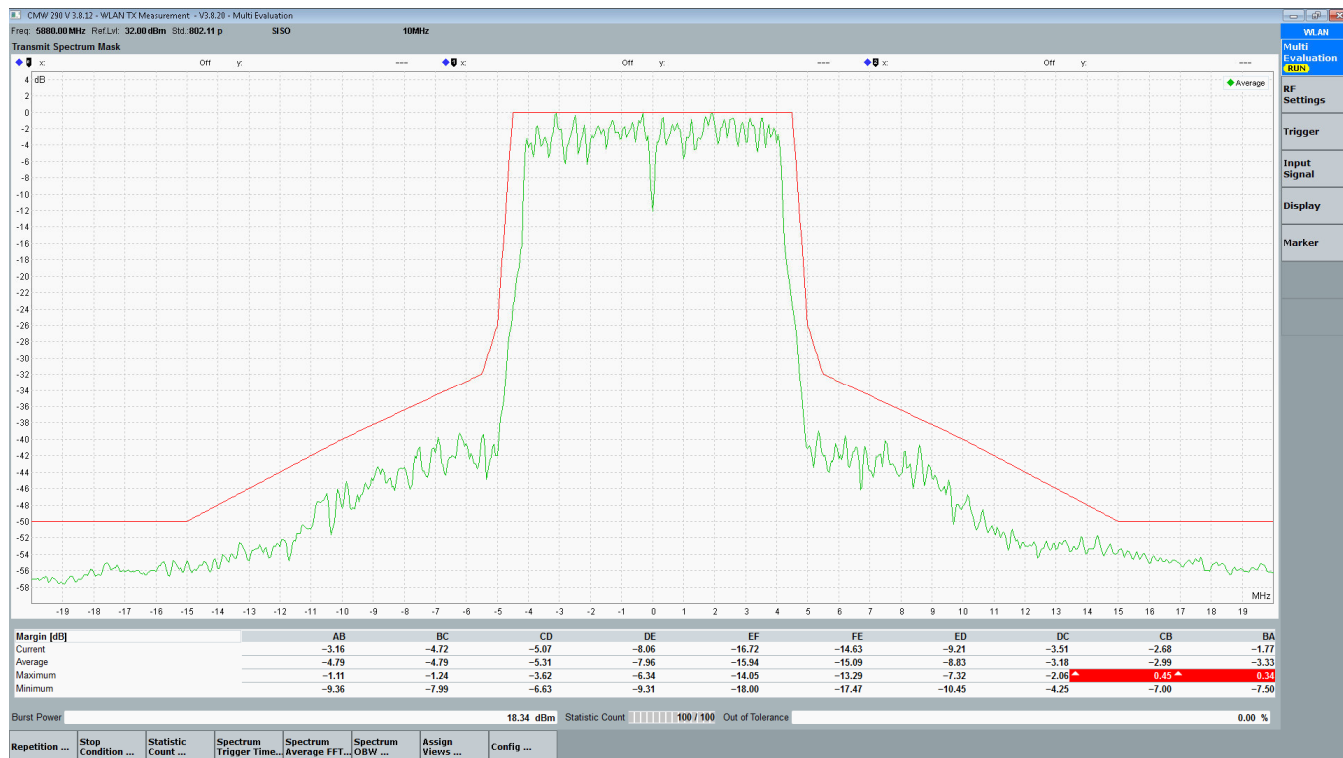
## Transmitter spectrum mask within the 5 GHz ITS frequency band for 10 MHz channels SUBCLAUSE 8.10.6

Rated output power 27 dBm eirp (conducted measurement)

Measured Antenna: Sectar 1, Channel 0 – data rate 27 MBps

Transmitter operating – 5880 MHz

Modulated



## LIMITS SUBCLAUSE 8.10.6

See page 47.

TEST EQUIPMENT USED: EMV-205