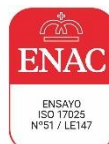


Test report No:
81844REM.001A1

Test report

ETSI EN 301 489-1 V2.2.3 (2019-11): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility; **ETSI EN 301 489-17 V3.3.1 (2024-09):** ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband and Wideband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility; **ETSI EN 301 489-19 V2.2.1 (2022-09):** ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band providing positioning, navigation, and timing data; Harmonised Standard for ElectroMagnetic Compatibility; **ETSI EN 301 489-52 V1.3.1 (2024-11):** ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication User Equipment (UE) radio and ancillary equipment; Harmonised Standard for ElectroMagnetic Compatibility & **55032 (2015) / AC (2016) / A11 (2020):** Electromagnetic compatibility of multimedia equipment - Emission Requirements & **EN 55035 (2017) / A11 (2020):** Electromagnetic compatibility of multimedia equipment - Immunity requirements

(*) Identification of item tested	R2EX All-In-One Unit
(*) Trademark	Marelli
(*) Model and /or type reference	HUR2XE10B1
Other identification of the product	N/A
(*) Features	AM/FM/DAB rx, BT 5.0, WLAN 5.8GHz, 2G/3G/4G modem, GNSS rx HW version: PTD3 SW version: R19.2
Manufacturer	Marelli Europe S.p.A. V.le A. Borletti 61/63 - 20011 Corbetta (MI) - ITALY
Test method requested, standard	ETSI EN 301 489-1 V2.2.3 (2019-11); ETSI EN 301 489-17 V3.3.1 (2024-09); ETSI EN 301 489-19 V2.2.1 (2022-09); ETSI EN 301 489-52 V1.3.1 (2024-11); EN 55032 (2015) / AC (2016) / A11 (2020) & EN 55035 (2017) / A11 (2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2026-02-09
Report template No	FDT08_26 (*) "Data provided by the client"



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Acronyms

Acronym ID	Acronym Description
CPL	Zones / Coupling Cables
CPL Type	Coupling Type
Code	EMC Test Code
Dwell	Dwell Time
Freq Rng	Frequency Range
Freq Rng [L]	Frequency Range [Lower Limit]
Freq Rng [U]	Frequency Range [Upper Limit]
Immunity Lvl	Immunity Level
Line	Conducted Emissions - Tested Line
MP	Measurement Point
OM	Operation Mode
Pol	Polarization
Pul	Pulses
Rep Freq	Repetition Frequency
S/	Sample
V	Verdict

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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.

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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 conducted disturbance characteristics of EUT from 150 kHz to 30 MHz is $I = \pm 3,9$ dB for quasi-peak measurements, $I = \pm 3,2$ dB for peak measurements ($k = 2$).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 5$ dB for quasi-peak measurements, $I = \pm 4,7$ 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 6000MHz is $I = \pm 4,8$ dB for average and $I = \pm 4,2$ dB for peaks 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").
2. The sample consists of a All-In-One Unit. AUTomotive All-In-One Unit, including Infotainment and Telematics functions.

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. The laboratory is not responsible for such information and it is not covered by accreditation.

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	81844B_25.1	All-In-One Unit	HUR2XE10B1	1J6JF900AC5F	2025-06-24	Element Under Test
	81844B_77.1	Shark Antenna	--	--	2025-07-17	Element Under Test
	81844B_78.1	Antenna TBM 2 LTE2	--	--	2025-07-17	Element Under Test
	81844B_1.1	Display R2EX	--	--	2025-06-09	Auxiliary Element
	81844B_4.1	TLS AUDIO	--	--	2025-06-09	Auxiliary Element
	81844B_5.1	TLS 1	--	--	2025-06-09	Auxiliary Element
	81844B_6.1	TLS 2	--	--	2025-06-09	Auxiliary Element
	81844B_7.1	USB213C	--	--	2025-06-09	Auxiliary Element
	81844B_8.1	USB Cable	--	--	2025-06-09	Auxiliary Element
	81844B_9.1	USB Adapter	--	--	2025-06-09	Auxiliary Element
	81844B_12.1	Fakra - Fakra 4 ways Cable (Long)	--	--	2025-06-09	Auxiliary Element
	81844B_14.1	Fakra - Fakra 4 ways Cable (Long)	--	--	2025-06-09	Auxiliary Element
	81844B_16.1	Fakra Cable	--	--	2025-06-09	Auxiliary Element
	81844B_23.1	CANBOX	--	2149-14	2025-06-24	Auxiliary Element
	81844B_44.1	MAIN Harness	--	--	2025-06-24	Auxiliary Element
S/02	81844B_80.1	All-In-One Unit	--	1JCGF900267F	2025-08-04	Element Under Test
	81844B_77.1	Shark Antenna	--	--	2025-07-17	Element Under Test
	81844B_78.1	Antenna TBM 2 LTE2	--	--	2025-07-17	Element Under Test
	81844B_1.1	Display R2EX	--	--	2025-06-09	Auxiliary Element
	81844B_4.1	TLS AUDIO	--	--	2025-06-09	Auxiliary Element
	81844B_5.1	TLS 1	--	--	2025-06-09	Auxiliary Element

Notes referenced to samples during the project.

Report No: 81844REM.001A1

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	Connector A (black, main harness)	>3	[X]	[]	[]		
	Connector B (grey, main harness)	>3	[X]	[]	[]		
	Connector C (FM/AM, DAB, WIFI/BT ANT1, WIFI/BT ANT2)	>3	[X]	[X]	[]		
	Connector D (display)	>3	[X]	[X]	[]		
	Connector E (GNSS, CAM, LTE, GSM)	>3	[X]	[X]	[]		
	Connector F (USB)	>3	[X]	[X]	[]		
Supplementary information to the ports..... :	the shielding in Connetor C and E is intended on each single signal, not on overall connector						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 13,5 Vdc (Vmin-Vmax: 9 - 16 Vdc)					
[]	DC: shielded cables: any voltage inside is <13.5Vdc						
Rated Power							
Clock frequencies.....							
Other parameters							
Software version	R19.2						
Hardware version	PTD3						
Dimensions in cm (W x H x D)							
Mounting position	[]	Table top equipment					

	☐	Wall/Ceiling mounted equipment		
	☐	Floor standing equipment		
	☐	Hand-held equipment		
	☒	Other: automotive interior environment, installation in the dashboard of vehicles		
Modules/parts.....:	Module/parts of test item		Type	Manufacturer
				
				
				
				
Accessories (not part of the test item)	Description		Type	Manufacturer
				
				
				
				
				
				
Documents as provided by the applicant	Description		File name	Issue date
				
				
				
				

⁽³⁾ Only for Medical Equipment

Identification of the client

Marelli Europe S.p.A.
V.le A. Borletti 61/63 - 20011 Corbetta (MI) - ITALY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U. Severo Ochoa 6. 29590 Campanillas (Málaga)
Date (start)	2025-07-10
Date (finish)	2025-11-10

Document history

Report number	Date	Description
81844REM.001	2026-01-28	First release
81844REM.001A1	2026-02-09	Second release. Test report updated due to minor typos (SW version modification). This modified test report cancels and replaces test report 81844REM.001.

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. = 860 mbar Max. = 1060 mbar

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. = 860 mbar Max. = 1060 mbar

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. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Antonio Ruiz Sánchez, Fernando Chito Solis, Iván Guerrero González, Maria Del Pilar Frias Lorite and Salvador Cuellar Guerrero.

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
04584	DISCHARGE TIP	ONYX	HAEFELY	--
04583	DISCHARGE TIP	ONYX	HAEFELY	--
07291	ARTIFICIAL V-NETWORK	NNBM 8124-200	SCHWARZBECK	2026-11-14
07293	ARTIFICIAL V-NETWORK	NNBM 8124-200	SCHWARZBECK MESS- ELEKTRONIK	2026-11-12
04790	ATENUADOR 6 DB, 200W, DC A 3GHZ	50FH0-006-200	JFW	2026-01-22
04786	AVG POWER SENSOR 6 GHZ	NRP-Z91	ROHDE AND SCHWARZ	2025-12-19
04787	AVG POWER SENSOR 6 GHZ	NRP-Z91	ROHDE AND SCHWARZ	2026-05-07
06232	AVG POWER SENSOR 6 GHZ	NRP6A	ROHDE AND SCHWARZ	2025-09-25
06233	AVG POWER SENSOR 6 GHZ	NRP6A	ROHDE AND SCHWARZ	2025-12-19
04630	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	2026-07-30
01591	COUPLING NETWORK	CNA200	EM TEST	--
01589	DAMPING SIMULATOR	LD200	EM TEST	--
04574	ELECTROSTATIC DISCHARGE SIMULATOR (ESD)	ONYX	HAEFELY	2026-12-11
01593	EMC AUTOMOTIVE TEST SYSTEM	RACK ISO	EM TEST	2026-07-09
08866	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-06-12
05862	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2027-04-04
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
06231	GENERADOR DE SEÑAL RF	SMB100A	ROHDE AND SCHWARZ	2026-01-09
05641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-10-23
03541	HYBRID BILOG ANTENNA 30MHz-6GHz	JB6	SUNOL SCIENCES CORPORATION	2028-04-17
01587	MICROPULSE SIMULATOR	MPG200	EM TEST	--
06236	POWER AMPLIFIER 250W/110W/100W 80MHz-1GHz/0,69GHz-3,2GHz/2,5GHz-6GHz	BBA150-BC250D110+E100	ROHDE AND SCHWARZ	--

Control No.	Equipment	Model	Manufacturer	Next Calibration
06234	POWER METER	NRP2	ROHDE AND SCHWARZ	--
07414	PREAMPLIFIER BOX	-	INTERNO	2026-01-13
03333	RED ARTIFICIAL ITE	T800	TESEQ	2027-02-21
04591	RF AMPLIFIER 125W 9KHz-400MHz	BBA100	ROHDE AND SCHWARZ	--
00784	RF CURRENT PROBE 20Hz-100MHz	9207-1	SOLAR ELECTRONICS COMPANY	2026-02-06
06064	SEMIANECHOIC ABSORBER LINED CHAMBER	SAC-3	Frankonia	--
06329	SHIELDED ROOM	--	FRANKONIA	--
06330	SHIELDED ROOM	--	FRANKONIA	--
04545	SIGNAL GENERATOR 9kHz-1.1GHz	SMC100A	ROHDE AND SCHWARZ	2026-10-31
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--
04635	SONDA DE INYECCIÓN DE CORRIENTE, 10kHz – 400MHz	F-120-6A	FCC	--
06138	SONDA DE TEMPERATURA Y HUMEDAD RELATIVA / TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2026-04-21
04573	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2026-04-22
04679	THREE-PHASE ARTIFICIAL V-NETWORK 32A	PMM L3-32	NARDA	2026-03-27
04629	THREE-PHASE COUPLING NETWORK 32A	CNI503A2	EM TEST	2026-07-30
05151	TRANSIENT LIMITER 10DB N CONNECTOR	VTSD 9561-F	SCHWARZBECK	2026-09-04
01588	TRANSIENT SIMULATOR	EFT200	EM TEST	--
04628	ULTRA COMPACT SIMULATOR	UCS 500N5	EM TEST	2026-07-25
01590	VOLTAGE DROP SIMULATOR	VDS200	EM TEST	--

Summary

Test Specification	Requirement – Test case	Verdict	Remark
ETSI EN 301 489-1 V2.2.3 (2019-11); ETSI EN 301 489-17 V3.3.1 (2024-09); ETSI EN 301 489-19 V2.2.1 (2022-09); ETSI EN 301 489-52 V1.3.1 (2024-11); EN 55032 (2015) / AC (2016) / A11 (2020) & EN 55035 (2017) / A11 (2020)	RE Radiated emission. Electromagnetic field measure	P	---
	CE Continuous conducted emission	P	---
	HA Harmonic current emissions	N/A	(1)
	FLK Voltage changes, voltage fluctuations and flicker	N/A	(1)
	RI Radiated RF Electromagnetic field immunity test	P	---
	CI Immunity to conducted disturbances, induced by radiofrequency fields	P	---
	EFT Electrical fast transient / burst immunity test	P	---
	SUR Surges immunity test	N/A	(1)
	ESD Electrostatic discharge immunity test	P	---
	VDI Voltage dips, short interruptions and voltage variations immunity test	N/A	(1)
	PUL Vehicular transients and surges	P	--
Supplementary information and remarks: (1) According to ETSI EN 301 489-1, this test isn't applicable because EUT is powered in DC. (2) Test applicable only for vehicular environment.			

Appendix A: Test results

Appendix A content

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RE Radiated emission. Electromagnetic field measure25

RI Radiated RF Electromagnetic field immunity test33

CE Continuous conducted emission34

CI Immunity to conducted disturbances, induced by radiofrequency fields47

EFT Electrical fast transient / burst immunity test48

PUL Vehicular transients and surges49

ESD Electrostatic discharge immunity test50

APPENDIX B: PHOTOGRAPHS51

Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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. Cellular searching networks. Bluetooth and WiFi off. GNSS Module pending to receive satellites signals. Power supply: 13.5Vdc.
OM/02	EUT ON. MS allocated a channel. GSM 900. Bluetooth with communication established. WiFi 5GHz without communication established. GNSS module (GPS) receiving a valid position signal. Power supply: 13,5Vdc.
OM/03	EUT ON. MS allocated a channel. GSM 1800. WiFi 5GHz with communication established. Bluetooth without communication established. GNSS module (Glonass) receiving a valid position signal. Power supply: 13,5Vdc.
OM/04	EUT ON. MS allocated a channel. LTE Band 28. Bluetooth and WiFi 5GHz without communication established. Power supply: 13,5Vdc.
OM/05	EUT ON. MS allocated a channel. LTE Band 3. Bluetooth and WiFi 5GHz without communication established. GNSS module (GPS) receiving a valid position signal. Power supply: 13,5Vdc.
OM/06	EUT ON. MS allocated a channel. LTE Band 40. Bluetooth and WiFi 5GHz without communication established. GNSS module (Galileo) receiving a valid position signal. Power supply: 13,5Vdc
OM/07	EUT ON. MS allocated a channel. WCDMA Band III. Audio function enabled Power supply: 13,5Vdc.
OM/08	EUT ON. Radio Receiving broadcast signal at 98 MHz FM. Power supply: 13,5Vdc.
OM/09	EUT ON. Radio Receiving broadcast signal at 540 kHz AM. Power supply: 13,5Vdc
OM/10	EUT ON. Radio Receiving broadcast signal at 202,928MHz DAB. Power supply: 13,5Vdc.

Fails criteria for immunity test

According to ETSI EN 301 489-1 V2.2.3 (2019-11):

6.1 Performance criteria for continuous phenomena applied to transmitters and receivers

During the test, the equipment shall:

- continue to operate as intended;
- not unintentionally transmit;
- not unintentionally change its operating state;
- not unintentionally change critical stored data.

6.2 Performance criteria for transient phenomena applied to transmitters and receivers

For all ports and transient phenomena with the exception described below, the following applies:

- The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data.
- After application of the transient phenomena, the equipment shall operate as intended.

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

- For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
- For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

According to ETSI EN 301 489-17 V3.3.1 (2024-09):

6.1 General performance criteria

The applicable performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

6.2 Performance table

6.2.1 Performance criteria overview

Criteria	During test	After test (i.e. as a result of the application of the test)
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
NOTE: Operate as intended during the test shall be considered as: • For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. • For equipment that does not support a PER or a FER, (e.g. audio equipment and equipment transmitting sporadic messages) the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.		

6.3 Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

6.4 Performance criteria for Transient phenomena

The performance criteria B shall apply for transient phenomena, except for voltage dips greater than or equal to 100 ms, voltage interruptions of 5 000 ms duration, and surges of 10/700 µs for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

According to ETSI EN 301 489-19 V2.2.1 (2022-09):

6.0 Introduction

Only the performance criteria specified in the present document or in ETSI EN 301 489-1 [1] where referenced shall apply.

The equipment shall meet the minimum performance criteria as specified in clauses 6.1 and 6.2 as appropriate.

For the purpose of the present document two categories of performance criteria apply:

- Performance criteria for continuous phenomena.
- Performance criteria for transient phenomena.

6.1 Performance criteria for Continuous phenomena

During the test, the equipment shall operate as intended, e.g. not unintentionally change its operating state and not unintentionally change critical stored data.

After the test, the equipment shall operate as intended, e.g. have no loss of function and have no loss of critical stored data.

6.2 Performance criteria for Transient phenomena

After the test, functions shall be self-recoverable and the equipment shall operate as intended and the equipment shall have no loss of critical stored data.

According to ETSI EN 301 489-52 V1.3.1 (2024-11):

6.1 Performance criteria for Continuous phenomena

6.1.1 GSM and voice call

6.1.1.1 Performance criteria for Continuous phenomena applied to Transmitters (CT)

With a link established, during the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz.

In idle mode, the transmitter shall not operate unintentionally.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained.

6.1.1.2 Performance criteria for Continuous phenomena applied to Receivers (CR)

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

In the case of narrow band responses, the procedure in clause 4.4.1 shall be followed.

During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained.

6.1.2 UTRA

In the data transfer mode, the performance criteria can be one of the following:

- if the BER (as referred in clause 5.3.1 of ETSI TS 134 109 [4]) is used, it shall not exceed 0,001 during the test sequence;
- if the BLER (as referred in ETSI TS 134 109 [4]) is used, it shall not exceed 0,01 during the test sequence.

The BLER calculation shall be based on evaluating the CRC on each transport block. Details are specified in annex C.

In the case of narrow band responses, the procedure in clause 4.4.2.1 shall be followed.

When testing a voice call, the performance criteria in clause 6.1.1 shall apply.

6.1.3 E-UTRA, E-UTRA with LAA, inband or guard band NB-IoT, Standalone NB-IoT

In data transfer mode, the data throughput of the EUT shall not fall below 95 % of the maximum data throughput. Details are specified in annex C.

In the case of narrow band responses, the procedure in clause 4.4.2.2 shall be followed.

When testing a voice call, the performance criteria in clause 6.1.1 shall apply.

6.1.4 NR

In data transfer mode, the data throughput of the EUT shall not fall below 95 % of the maximum data throughput. Details are specified in annex C.

In the case of narrow band responses, the procedure in clause 4.4.3 shall be followed.

When testing a voice call, the performance criteria in clause 6.1.1 shall apply.

6.2 Performance criteria for Transient phenomena

At the conclusion of each exposure of the transient phenomena, the EUT shall operate without loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended without loss of user control functions or critical stored data.

In addition, where the EUT supports idle mode, it should be verified that the transmitter shall not unintentionally operate when transient phenomena are applied.

According to EN 55035 (2017) / A11 (2020):

General:

General performance criteria are defined in 8.2, 8.3 and 8.4. These criteria shall be used during the testing of primary functions where no relevant annex is applicable.

When assessing the impact of a disturbance on a function, the assessment should take into consideration the function's performance prior to the application of the disturbance and only identify as failures those changes in performance that are a result of the disturbance.

Performance criteria A:

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criteria B:

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criteria C:

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Monitoring for immunity test

For every operation mode, the monitoring performed over the samples under test is shown in the following table:

Id	Continuous Phenomena Monitoring	Transient Phenomena Monitoring
OM/01	N/A	N/A
OM/02	By means of a base station (CMW500), it is monitored that the RXQUAL of the downlink does not exceed the value of three, measured during each individual exposure in the test sequence. By means of a "PERBluetooth.exe" software, it is monitored that the minimum performance level is a PER less than or equal to 10 % during the test. By means of a vector signal generator, coordinates are sent to give a valid position to EUT. It is verified that EUT receives these coordinates correctly during the test	After the test, it is monitored that EUT remains working as intended with no degradation of performance, no loss of function and no loss of critical stored data. By means of a spectral analyzer, it is monitored no undesired signal are produced after the test. At the conclusion of each exposure of the transient phenomena, the EUT operates without loss of the communication link.
OM/03	By means of a base station (CMW500), it is monitored that the RXQUAL of the downlink does not exceed the value of three, measured during each individual exposure in the test sequence. By means of a spectral analyzer, it is monitored no undesired signal are produced during testing. By means of a "PERWiFi.exe" software, it is monitored that the minimum performance level is a PER less than or equal to 10 % during the test.	After the test, it is monitored that EUT remains working as intended with no degradation of performance, no loss of function and no loss of critical stored data. By means of a spectral analyzer, it is monitored no undesired signal are produced after the test. At the conclusion of each exposure of the transient phenomena, the EUT operates without loss of the communication link.
OM/04	By means of a base station (CMW500), it is monitored the data throughput of the EUT does not fall below 95 % of the maximum data throughput. By means of a vector signal generator, coordinates are sent to give a valid position to EUT. It is verified that EUT receives these coordinates correctly during the test.	After the test, it is monitored that EUT remains working as intended with no degradation of performance, no loss of function and no loss of critical stored data. By means of a spectral analyzer, it is monitored no undesired signal are produced after the test. At the conclusion of each exposure of the transient phenomena, the EUT operates without loss of the communication link.
OM/05	By means of a base station (CMW500), it is monitored the data throughput of the EUT does not fall below 95 % of the maximum data throughput. By means of a vector signal generator, coordinates are sent to give a valid position to EUT. It is verified that EUT receives these coordinates correctly during the test. Also, it is monitored that EUT remains	After the test, it is monitored that EUT remains working as intended with no degradation of performance, no loss of function and no loss of critical stored data. By means of a spectral analyzer, it is monitored no undesired signal are produced after the test. At the conclusion of each exposure of the transient phenomena, the EUT operates without loss of the communication link.

Id	Continuous Phenomena Monitoring	Transient Phenomena Monitoring
	working as intended with no loss of function.	
OM/06	By means of a base station (CMW500), it is monitored the data throughput of the EUT does not fall below 95 % of the maximum data throughput. By means of a vector signal generator, coordinates are sent to give a valid position to EUT. It is verified that EUT receives these coordinates correctly during the test. Also, it is monitored that EUT remains working as intended with no loss of function.	After the test, it is monitored that EUT remains working as intended with no degradation of performance, no loss of function and no loss of critical stored data. By means of a spectral analyzer, it is monitored no undesired signal are produced after the test. At the conclusion of each exposure of the transient phenomena, the EUT operates without loss of the communication link.
OM/07	By means of a base station (CMW500), it is monitored the BER of the EUT does not exceed 0,001 during the test sequence. During the test, uplink and downlink speech output levels are at least 35 dB less than the recorded reference levels; it is measured using an Audio Analyzer. Also, it is monitored that EUT remains working as intended with no loss of function.	By means of a base station (CMW500), it is monitored the BER of the EUT does not exceed 0,001 during the test sequence. During the test, uplink and downlink speech output levels are at least 35 dB less than the recorded reference levels; it is measured using an Audio Analyzer. Also, it is monitored that EUT remains working as intended with no loss of function.
OM/08	Testing with Performance Criteria A is not required by Group 2 MME equipments according to EN55035	It was monitored that EUT operates with no user noticeable loss or functions about FM radio receiver. It is monitored that undesired status changes or parameter variations do not occur in the Display (distortion, change of contrast, brightness, freezing or image loss). It is verified that the touch screen remains working correctly.
OM/09	Testing with Performance Criteria A is not required by Group 2 MME equipments according to EN55035	It was monitored that EUT operates with no user noticeable loss or functions about AM radio receiver. It is monitored that undesired status changes or parameter variations do not occur in the Display (distortion, change of contrast, brightness, freezing or image loss). It is verified that the touch screen remains working correctly.
OM/10	Testing with Performance Criteria A is not required by Group 2 MME equipments according to EN55035	It was monitored that EUT operates with no user noticeable loss or functions about AM radio receiver. It is monitored that undesired status changes or parameter variations do not occur in the Display (distortion, change of contrast, brightness, freezing or image loss). It is verified that the touch screen remains working correctly.

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	Fail criteria
ETSI EN 301 489-1 V2.2.3 (2019-11); ETSI EN 301 489-17 V3.3.1 (2024-09); ETSI EN 301 489-19 V2.2.1 (2022-09); ETSI EN 301 489-52 V1.3.1 (2024-11); EN 55032 (2015) / AC (2016) / A11 (2020) & EN 55035 (2017) / A11 (2020)	EN 55032 (2015) / AC (2016) / A11 (2020)	CE Continuous conducted emission	N/A
	EN 55032 (2015) / AC (2016) / A11 (2020)	RE Radiated emission. Electromagnetic field measure	N/A
	EN 61000-3-2 (2014)	HA Harmonics current emission	N/A
	EN 61000-3-3 (2013)	FLK Voltage fluctuations and flicker	N/A
	EN 61000-4-3 (2006) / A1 (2008) / A2 (2010)	RI Radiated RF Electromagnetic field immunity test	A
	EN 61000-4-6 (2014)	CI Immunity to conducted disturbances, induced by radiofrequency fields	A
	EN 61000-4-11 (2004)	VDI Voltage dips, short interruptions and voltage variations immunity test	*See in the test case
	EN 61000-4-4 (2012)	EFT Electrical fast transient / burst immunity test	B
	EN 61000-4-5 (2014) / A1 (2017)	SUR Surge immunity test	B
	EN 61000-4-2 (2009)	ESD Electrostatic discharge immunity test	B
ETSI EN 301 489-1 V2.2.3 (2019-11); ETSI EN 301 489-17 V3.3.1 (2024-09); ETSI EN 301 489-19 V2.2.1 (2022-09) & ETSI EN 301 489-52 V1.3.1 (2024-11)	ISO 7637-2 (2004)	PUL Vehicular transients and surges	See in test case

Test Cases Details

RE Radiated emission. Electromagnetic field measure

Limits for Class B measured at 3m:

Frequency Range (MHz)	Measured field limit at 3 m (dBµV/m) Quasi-Peak measurement
30 to 230	40
230 to 1000	47

Frequency Range (MHz)	Measured field limit at 3 m (dBµV/m)	
	Peak	Average
1000 to 3000	70	50
3000 to 6000	74	54

Results

SI	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR	[1000, 6000]	P
02	OM/08	RE0208LR	[30, 1000]	P
02	OM/09	RE0209LR	[30, 1000]	P
02	OM/10	RE0210LR	[30, 1000]	P
02	OM/10	RE0210HR	[1000, 6000]	P

Verdict

Pass

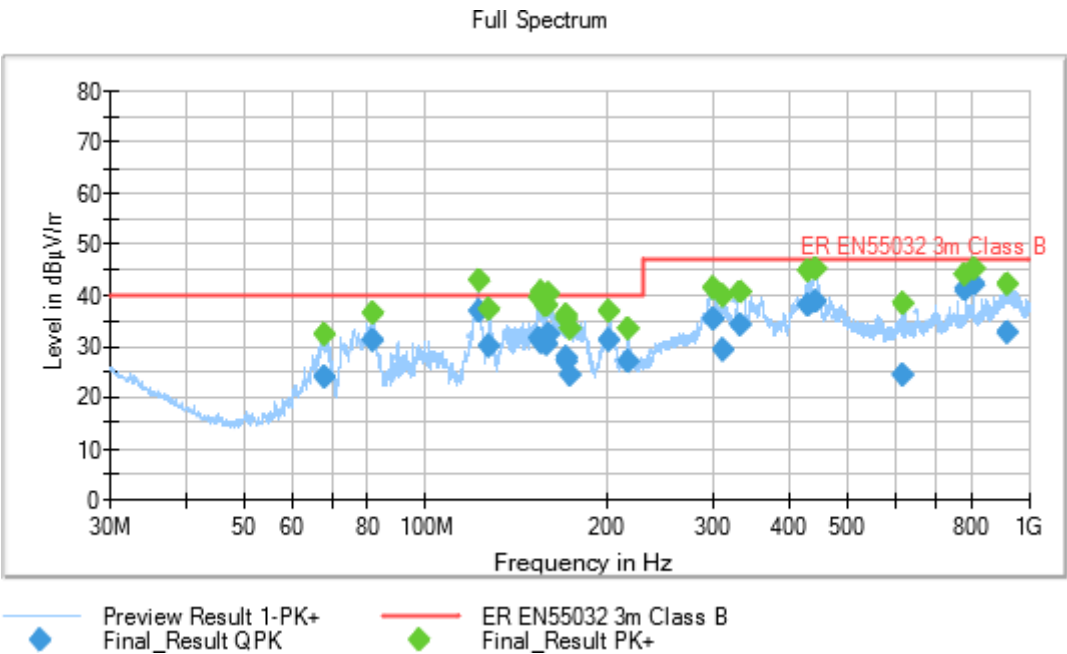
Attachments

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

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
67.832000	23.94	---	40.00	16.06	121.0	V	-126.0
67.832000	---	32.17	---	---	121.0	V	-126.0
82.057000	---	36.30	---	---	100.0	V	139.0
82.057000	30.99	---	40.00	9.01	100.0	V	139.0
122.451000	---	42.68	---	---	100.0	V	-96.0
122.451000	36.73	---	40.00	3.27	100.0	V	-96.0
127.707000	29.88	---	40.00	10.12	100.0	V	-137.0
127.707000	---	37.34	---	---	100.0	V	-137.0
154.013000	---	39.54	---	---	114.0	V	141.0
154.013000	31.54	---	40.00	8.46	114.0	V	141.0
155.626000	---	40.46	---	---	126.0	V	123.0
155.626000	30.78	---	40.00	9.22	126.0	V	123.0
157.905000	---	37.96	---	---	126.0	V	-105.0
157.905000	30.60	---	40.00	9.40	126.0	V	-105.0
159.231000	30.51	---	40.00	9.49	126.0	V	170.0
159.231000	---	37.80	---	---	126.0	V	170.0
160.471000	32.18	---	40.00	7.82	100.0	V	164.0
160.471000	---	40.04	---	---	100.0	V	164.0
171.342000	---	36.19	---	---	147.0	V	95.0

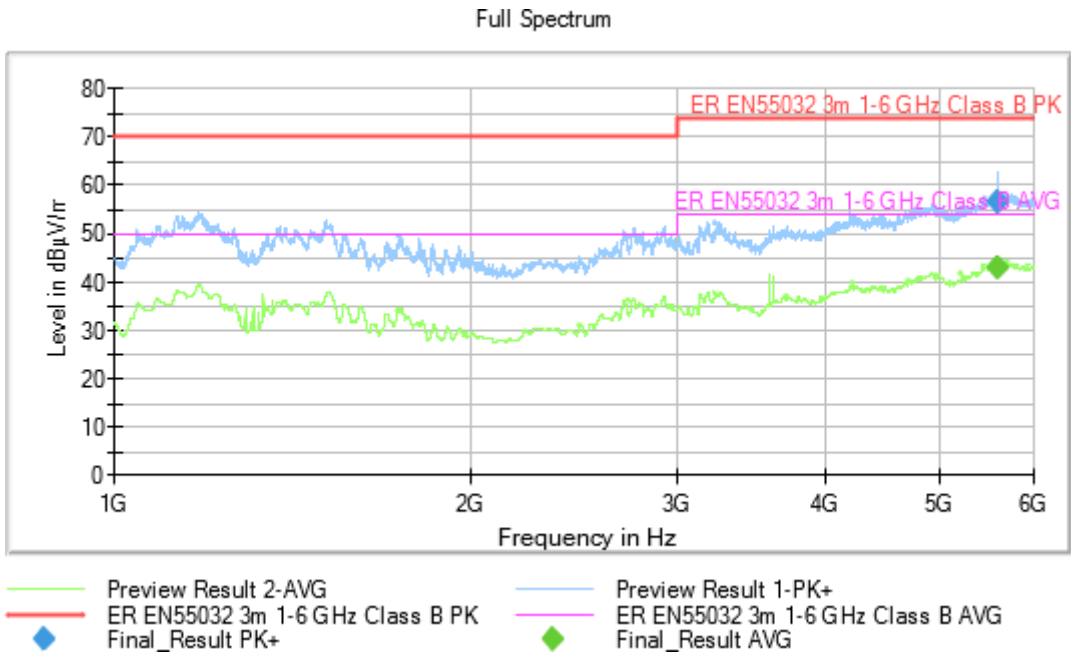
Frequency (MHz)	QuasiPeak (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
171.342000	27.55	---	40.00	12.45	147.0	V	95.0
171.633000	26.93	---	40.00	13.07	136.0	V	96.0
171.633000	---	35.33	---	---	136.0	V	96.0
173.957000	24.19	---	40.00	15.81	138.0	V	31.0
173.957000	---	33.21	---	---	138.0	V	31.0
201.848000	30.97	---	40.00	9.03	100.0	V	104.0
201.848000	---	36.94	---	---	100.0	V	104.0
216.209000	26.96	---	40.00	13.04	114.0	V	-180.0
216.209000	---	33.45	---	---	114.0	V	-180.0
300.740000	---	41.31	---	---	115.0	H	-169.0
300.740000	35.15	---	47.00	11.85	115.0	H	-169.0
310.585000	29.10	---	47.00	17.90	144.0	H	137.0
310.585000	---	39.99	---	---	144.0	H	137.0
333.245000	---	40.60	---	---	100.0	H	159.0
333.245000	34.28	---	47.00	12.72	100.0	H	159.0
429.842000	37.91	---	47.00	9.09	123.0	V	78.0
429.842000	---	44.58	---	---	123.0	V	78.0
445.059000	---	45.28	---	---	163.0	H	99.0
445.059000	38.70	---	47.00	8.30	163.0	H	99.0
620.709000	---	38.30	---	---	178.0	H	126.0
620.709000	24.21	---	47.00	22.79	178.0	H	126.0
786.437000	---	43.98	---	---	142.0	V	-10.0
786.437000	40.78	---	47.00	6.22	142.0	V	-10.0
810.991000	42.27	---	47.00	4.73	126.0	V	-63.0
810.991000	---	45.05	---	---	126.0	V	-63.0
921.470000	---	42.19	---	---	137.0	H	-18.0
921.470000	32.60	---	47.00	14.40	137.0	H	-18.0

EMC Test Code = RE0101HR Frequency Range MHz = [1000, 6000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

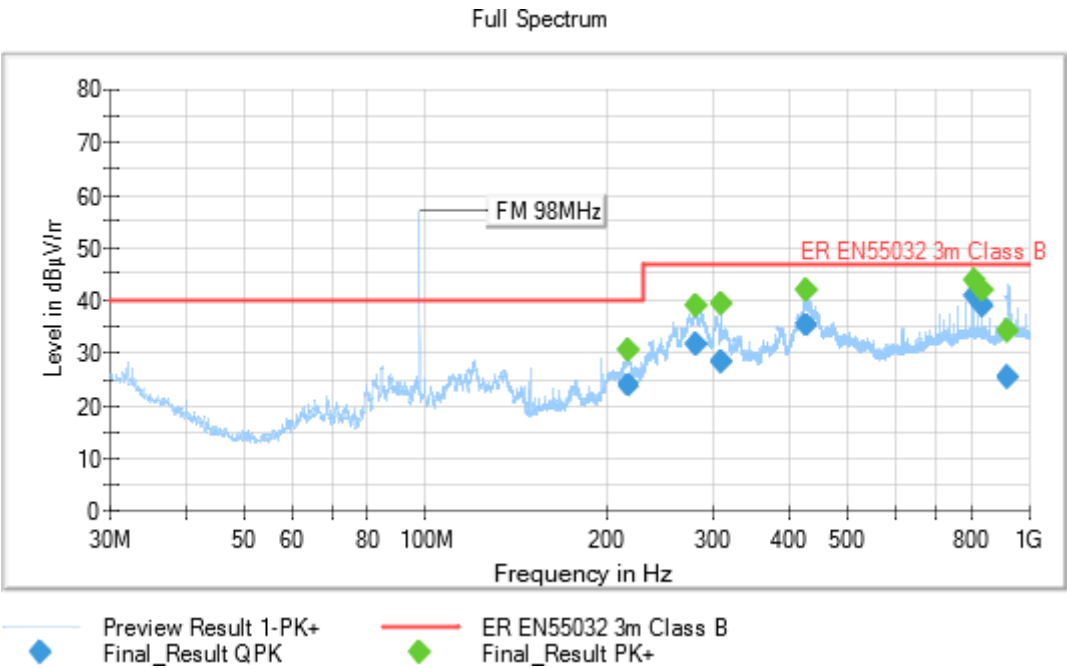
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
5611.830000	---	42.92	54.00	11.08	150.0	V	83.0
5611.830000	56.57	---	74.00	17.43	150.0	V	83.0

EMC Test Code = RE0208LR Frequency Range MHz = [30, 1000]

Sample ID: S/02

Operation Mode: OM/08

Images:



Tables:

Radiated Emission

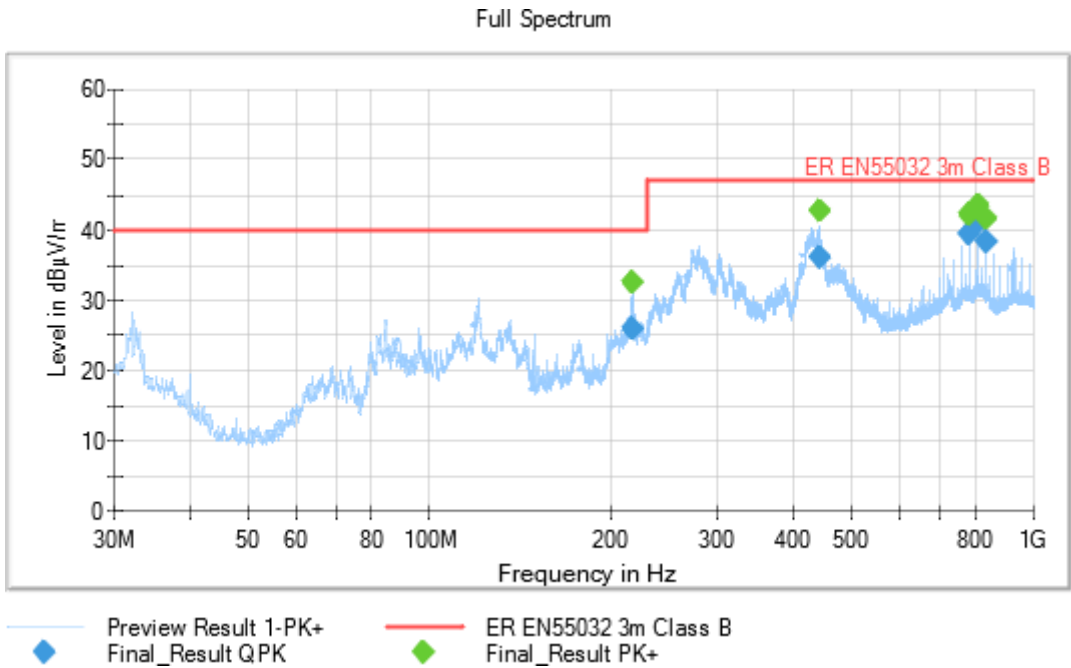
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
217.453000	---	30.48	---	---	146.0	H	44.0
217.453000	23.92	---	40.00	16.08	146.0	H	44.0
280.790000	---	38.73	---	---	126.0	H	99.0
280.790000	31.48	---	47.00	15.52	126.0	H	99.0
308.393000	28.09	---	47.00	18.91	121.0	H	27.0
308.393000	---	39.10	---	---	121.0	H	27.0
428.196000	35.07	---	47.00	11.93	115.0	V	12.0
428.196000	---	41.69	---	---	115.0	V	12.0
811.008000	40.79	---	47.00	6.21	137.0	V	-12.0
811.008000	---	43.52	---	---	137.0	V	-12.0
835.588000	39.01	---	47.00	7.99	126.0	V	-46.0
835.588000	---	41.79	---	---	126.0	V	-46.0
925.049000	---	34.04	---	---	303.0	H	-58.0
925.049000	25.27	---	47.00	21.73	303.0	H	-58.0

EMC Test Code = RE0209LR Frequency Range MHz = [30, 1000]

Sample ID: S/02

Operation Mode: OM/09

Images:



Tables:

Radiated Emission

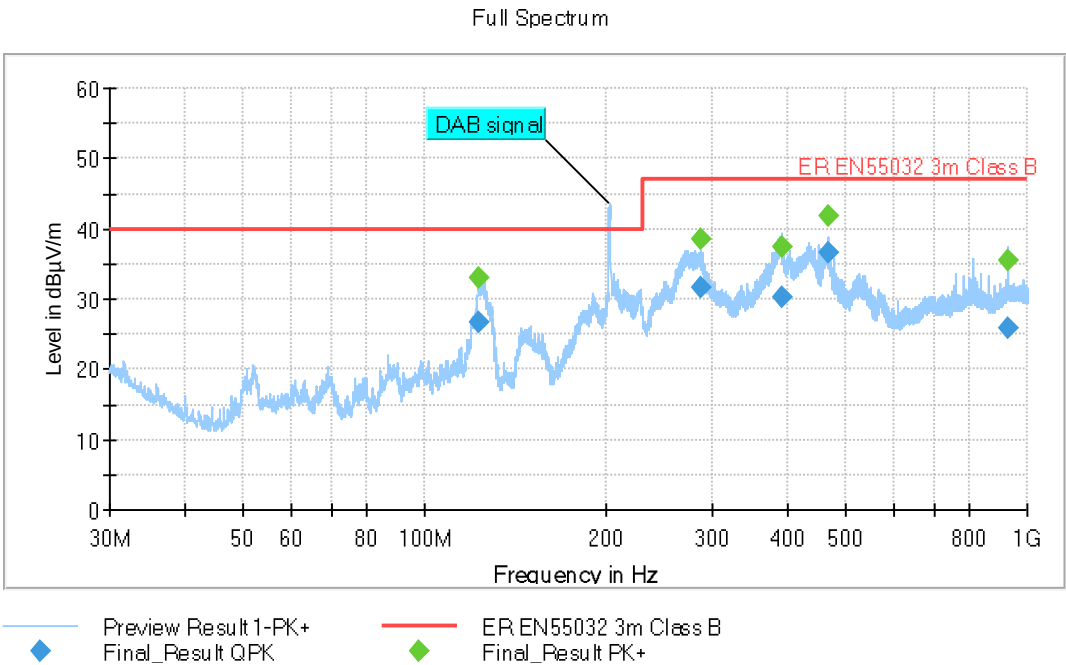
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
216.360000	25.95	---	40.00	14.05	136.0	H	48.0
216.360000	---	32.48	---	---	136.0	H	48.0
443.910000	---	42.69	---	---	100.0	H	141.0
443.910000	36.19	---	47.00	10.81	100.0	H	141.0
786.450000	39.40	---	47.00	7.60	126.0	V	-43.0
786.450000	---	42.19	---	---	126.0	V	-43.0
811.020000	40.96	---	47.00	6.04	136.0	V	-14.0
811.020000	---	43.54	---	---	136.0	V	-14.0
835.590000	38.33	---	47.00	8.67	126.0	V	-58.0
835.590000	---	41.64	---	---	126.0	V	-58.0

EMC Test Code = RE0210LR Frequency Range MHz = [30, 1000]

Sample ID: S/02

Operation Mode: OM/10

Images:



Tables:

Radiated Emission

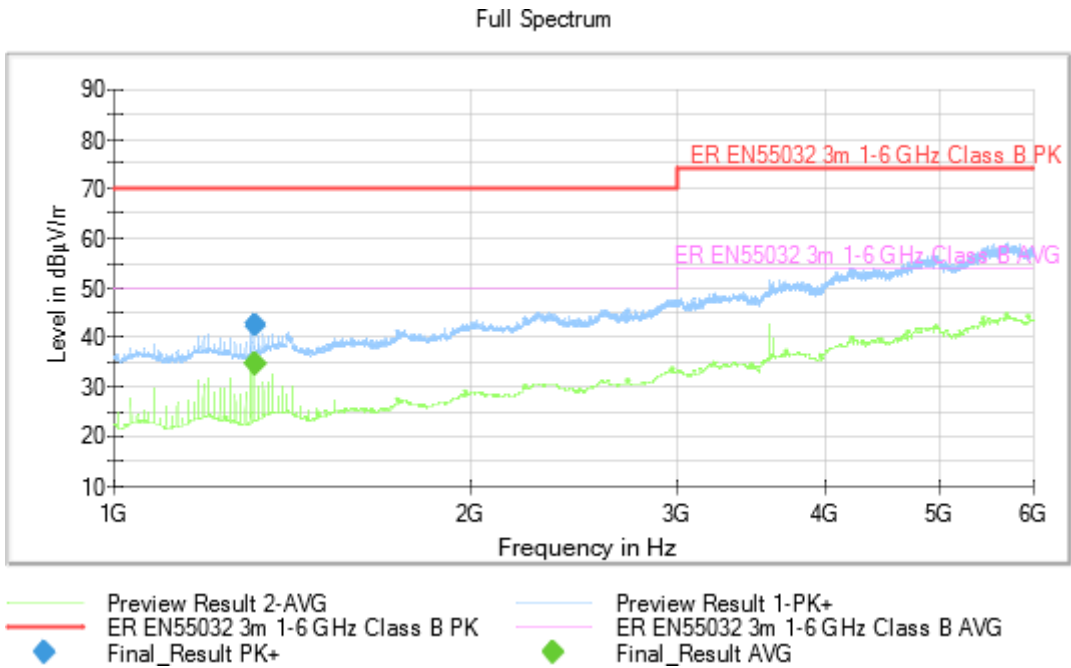
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
122.850000	---	32.96	---	---	114.0	V	31.0
122.850000	26.61	---	40.00	13.39	114.0	V	31.0
286.680000	---	38.47	---	---	126.0	H	11.0
286.680000	31.75	---	47.00	15.25	126.0	H	11.0
390.930000	---	37.56	---	---	125.0	V	-154.0
390.930000	30.27	---	47.00	16.73	125.0	V	-154.0
466.920000	36.69	---	47.00	10.31	161.0	H	-11.0
466.920000	---	41.97	---	---	161.0	H	-11.0
926.370000	25.78	---	47.00	21.22	293.0	V	-21.0
926.370000	---	35.47	---	---	293.0	V	-21.0

EMC Test Code = RE0210HR Frequency Range MHz = [1000, 6000]

Sample ID: S/02

Operation Mode: OM/10

Images:



Tables:

Radiated Emission

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1315.140000	---	34.68	56.00	21.32	150.0	H	99.0
1315.140000	42.21	---	76.00	33.79	150.0	H	99.0

RI Radiated RF Electromagnetic field immunity test

Levels

Levels according to ETSI EN 301 489-1/-17/-19/-52:

RANGE	FREQUENCY	MODULATION	STEP	LEVEL
A	80-1000MHz	AM 1 kHz Depth: 80%	1%	3 V/m
B	1000MHz – 6000MHz	AM 1 kHz Depth: 80%	1%	3 V/m

Levels according to EN 55035:

RANGE	FREQUENCY	MODULATION	STEP	LEVEL
C	80-1000MHz	AM 1 kHz Depth: 80%	1%	3 V/m
D	1800 MHz	AM 1 kHz Depth: 80%	± 1%	3 V/m
E	2600 MHz	AM 1 kHz Depth: 80%	± 1%	3 V/m
F	3500 MHz	AM 1 kHz Depth: 80%	± 1%	3 V/m
G	5000 MHz	AM 1 kHz Depth: 80%	± 1%	3 V/m

Results

S/	OM	CPL	Freq Rng	Immunity Lvl (V/m)	Pol	Dwell (s)	Step Size (%)	Comments	Verdict
01	OM/02 to OM/07	EUT front side; EUT left side; EUT right side; EUT rear side	A	3	H/V	2	1	No fails detected.	P

Verdict

Pass

CE Continuous conducted emission

Limits for Class B according to ETSI EN 301489-1/-17/-19/-52: Mains ports DC

Frequency Range (MHz)	Limit (dB μ V)	
	Quasi Peak	Average
0.15 to 0.5	79	66
0.5 to 30	73	60

Limits according to EN 55032:

- Antenna ports differential Voltage Emissions

FREQUENCY RANGE (MHz)	LIMIT (dB μ V) Impedance 75 Ω	LIMIT (dB μ V) Impedance 50 Ω
30 to 2150	46	44.24

- Antenna ports asymmetric mode Conducted Emissions

FREQUENCY RANGE (MHz)	LIMIT (dB μ V)	
	QUASI-PEAK	AVERAGE
0,15 – 0,5	84-74	74-64
0,5 - 30	74	64

Results

SI	OM	Code	Line	Freq Rng (MHz)	V
01	OM/01	CE0101NE	N	[0.15, 30]	P
01	OM/01	CE0101PO	L1	[0.15, 30]	P
01	OM/02	CE0102NE	N	[0.15, 30]	P
01	OM/02	CE0102PO	L1	[0.15, 30]	P
01	OM/03	CE0104NE	N	[0.15, 30]	P
01	OM/03	CE0104PO	L1	[0.15, 30]	P
02	OM/08	CE0208_Antenna Port_Asymmetric mode	Antenna Port_Asymmetric mode	[0.15, 30]	P
02	OM/08	CE0208_Antenna Port_Differential Mode	Antenna Port_Differential Mode	[30, 1000]	P
02	OM/09	CE0209_Antenna Port_Asymmetric Mode	Antenna Port_Asymmetric mode	[0.15, 30]	P
02	OM/09	CE0209_Antenna Port_Differential Mode	Antenna Port_Differential Mode	[30, 1000]	P
02	OM/10	CE0210_Antenna Port_Asymmetric Mode	Antenna Port_Asymmetric mode	[0.15, 30]	P
02	OM/10	CE0210_Antenna Port_Differential Mode	Antenna Port_Differential Mode	[30, 1000]	P

Verdict

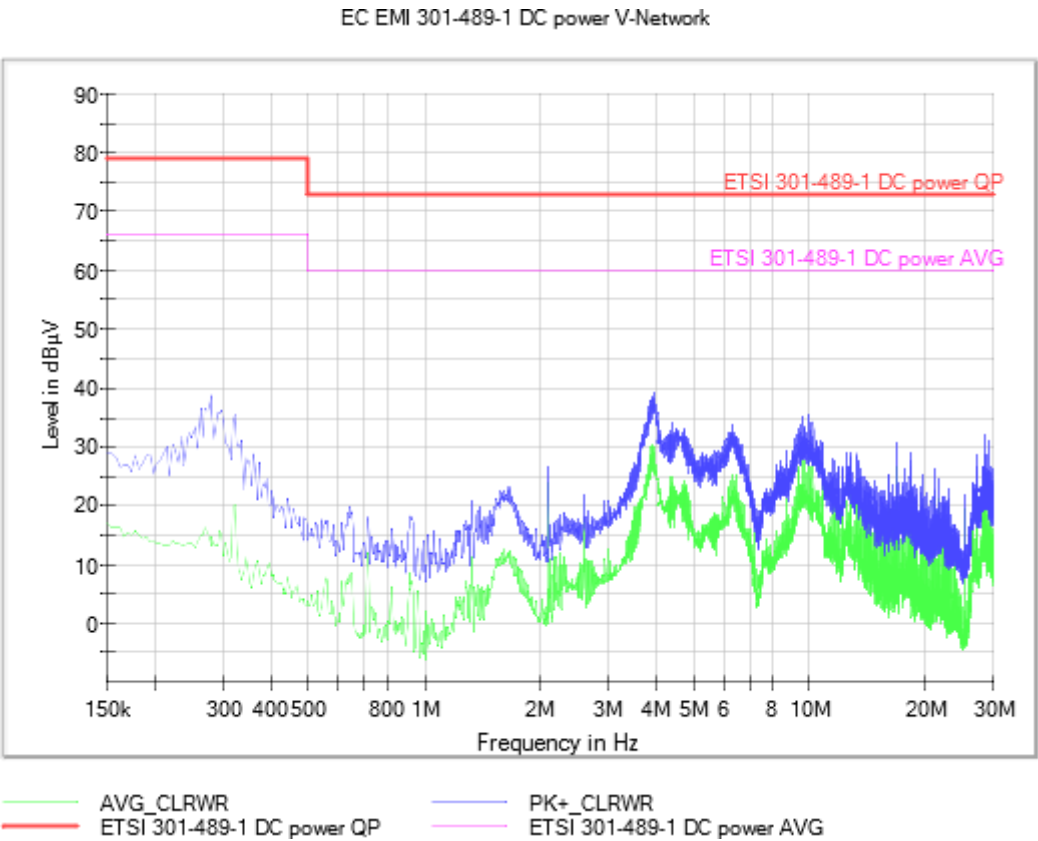
Pass

Attachments

EMC Test Code = CE0101NE Conducted Emissions - Tested Line = Negative wire
Frequency Range MHz = [0.15, 30]

Sample ID: S/01
Operation Mode: OM/01

Images:



Tables:

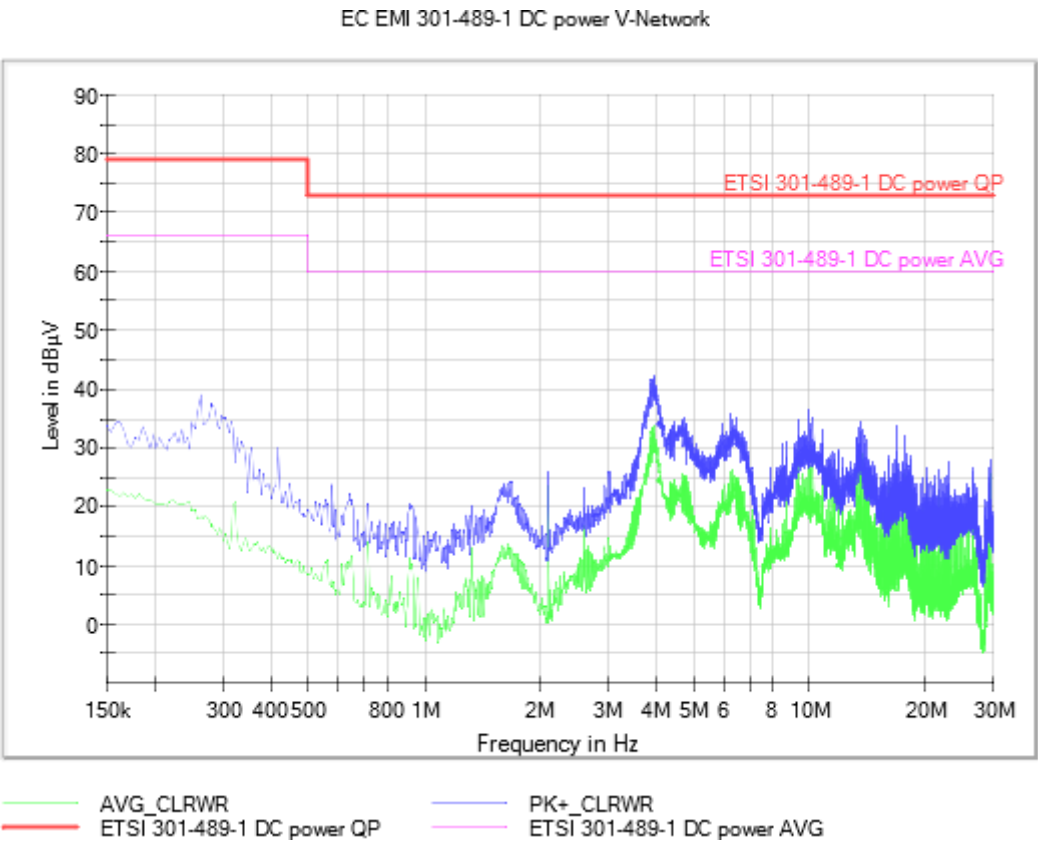
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line
3.954000	39.2	30.0	N

EMC Test Code = CE0101PO Conducted Emissions - Tested Line = Positive wire
Frequency Range MHz = [0.15, 30]

Sample ID: S/01
Operation Mode: OM/01

Images:



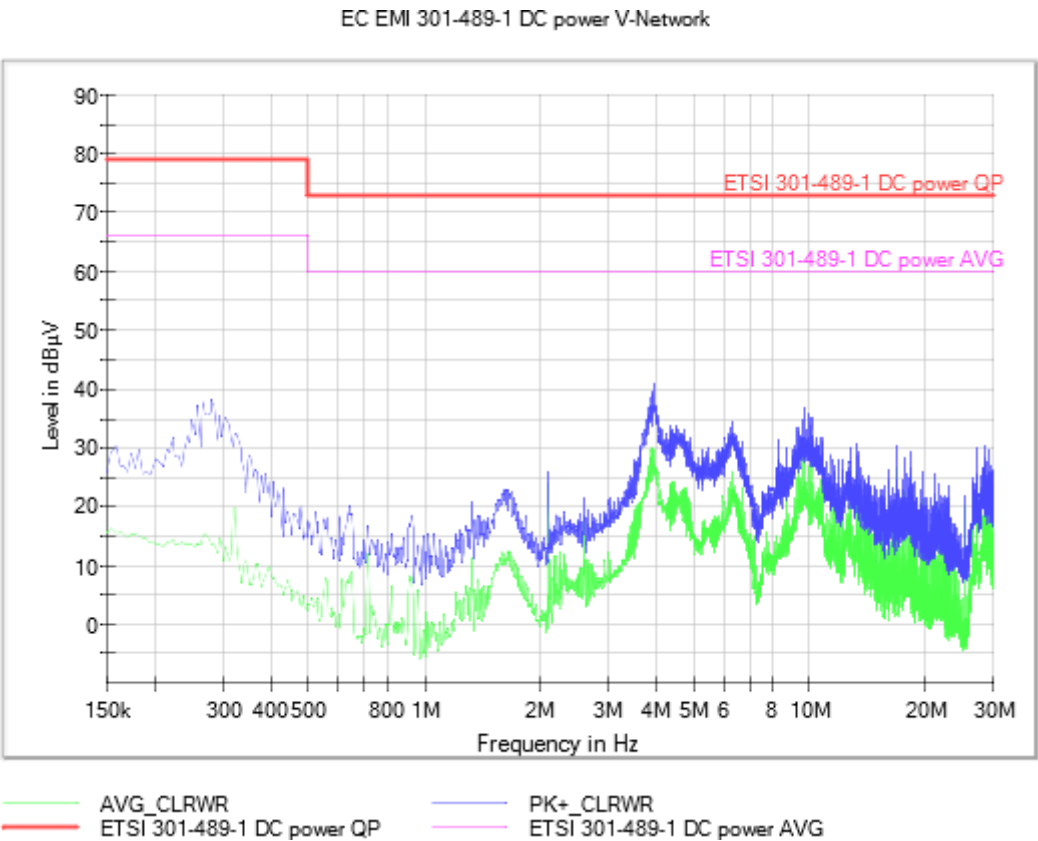
Tables:
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line
3.954000	42.2	33.9	L1

EMC Test Code = CE0102NE Conducted Emissions - Tested Line = Negative wire
Frequency Range MHz = [0.15, 30]

Sample ID: S/01
Operation Mode: OM/02

Images:



Tables:

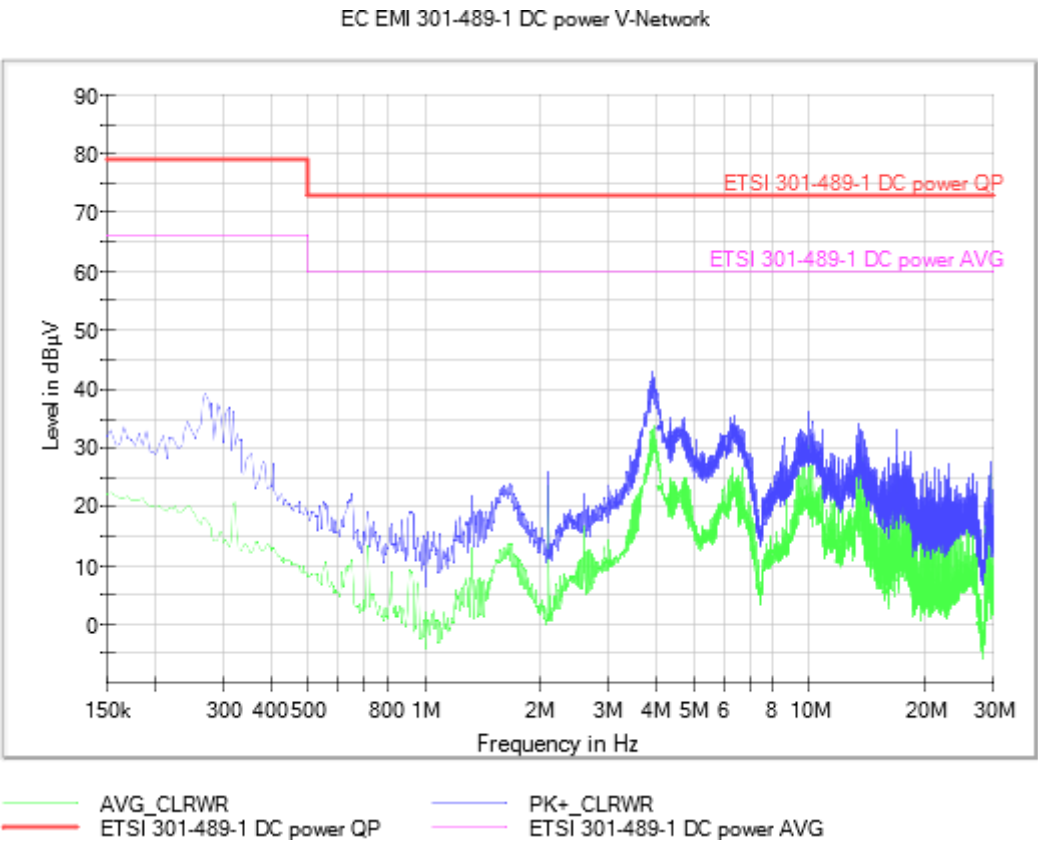
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line
3.954000	41.1	29.7	N

EMC Test Code = CE0102PO Conducted Emissions - Tested Line = Positive wire
Frequency Range MHz = [0.15, 30]

Sample ID: S/01
Operation Mode: OM/02

Images:



Tables:

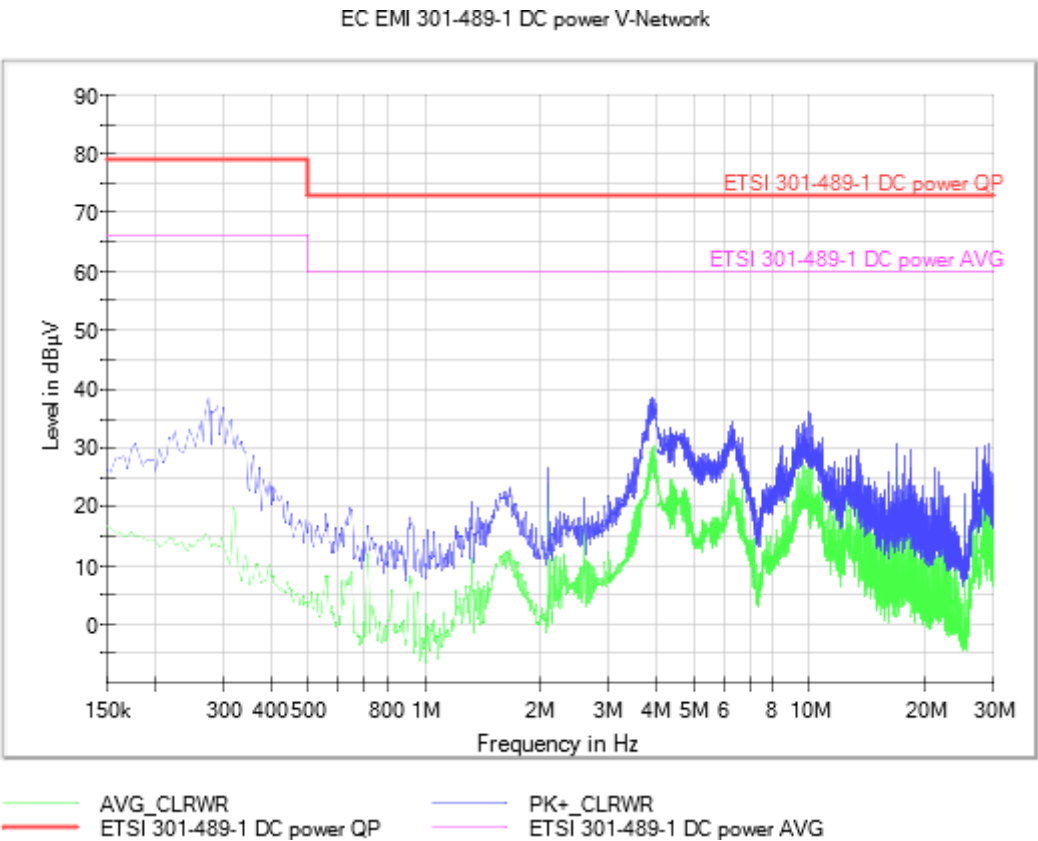
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line
3.934000	43.1	33.1	L1

EMC Test Code = CE0103NE Conducted Emissions - Tested Line = NE
Frequency Range MHz = [0.15, 30]

Sample ID: S/01
Operation Mode: OM/04

Images:



Tables:

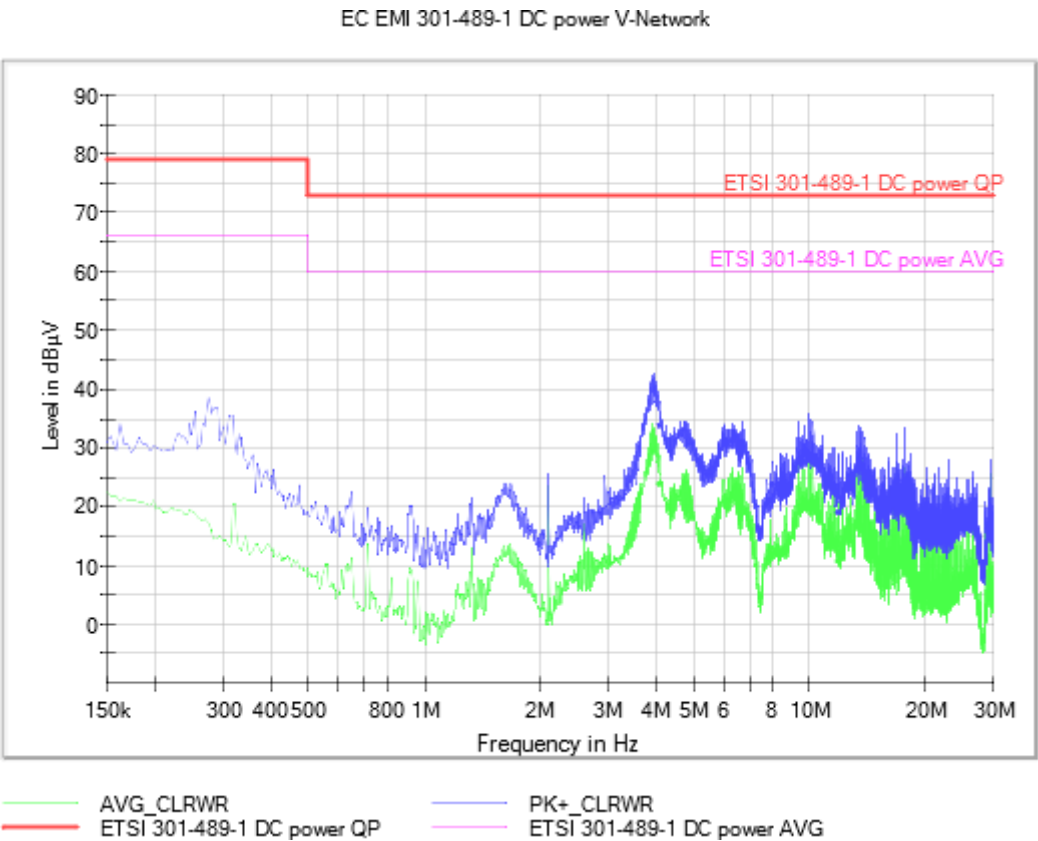
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line
3.914000	38.8	30.2	N

EMC Test Code = CE0103PO Conducted Emissions - Tested Line = PO
Frequency Range MHz = [0.15, 30]

Sample ID: S/01
Operation Mode: OM/04

Images:



Tables:
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)	Line
3.978000	43.0	32.5	L1

EMC Test Code = CE0208_Antenna
Port_Asymmetric mode

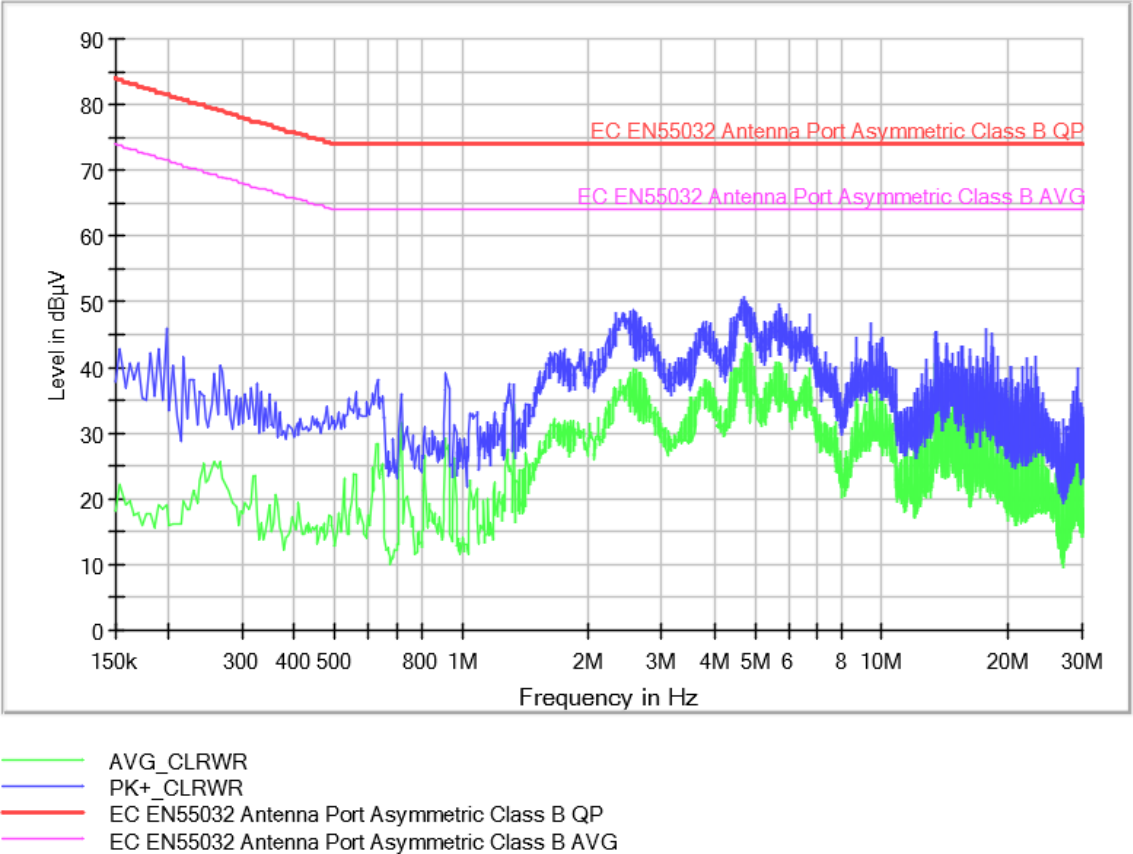
Conducted Emissions - Tested Line = _Antenna
Port_Asymmetric mode

Frequency Range MHz = [0.15, 30]

Sample ID: S/02

Operation Mode: OM/08

Images:



Tables:

Continuous Conducted Emissions

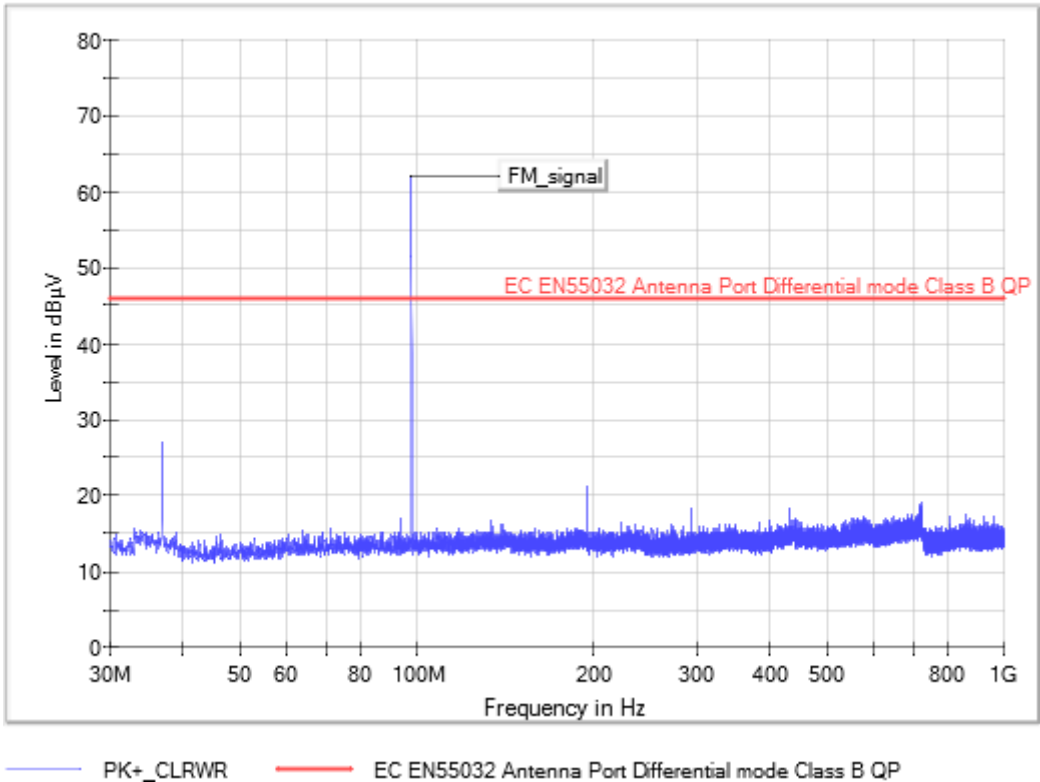
Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)
4.702000	51.0	41.8

EMC Test Code =
CE0207_AntennaPort_DifferentialMode
Frequency Range MHz = [30, 1000]

Conducted Emissions - Tested Line =
_AntennaPort_DifferentialMode

Sample ID: S/02
Operation Mode: OM/08

Images:



Tables:
Continuous Conducted Emissions

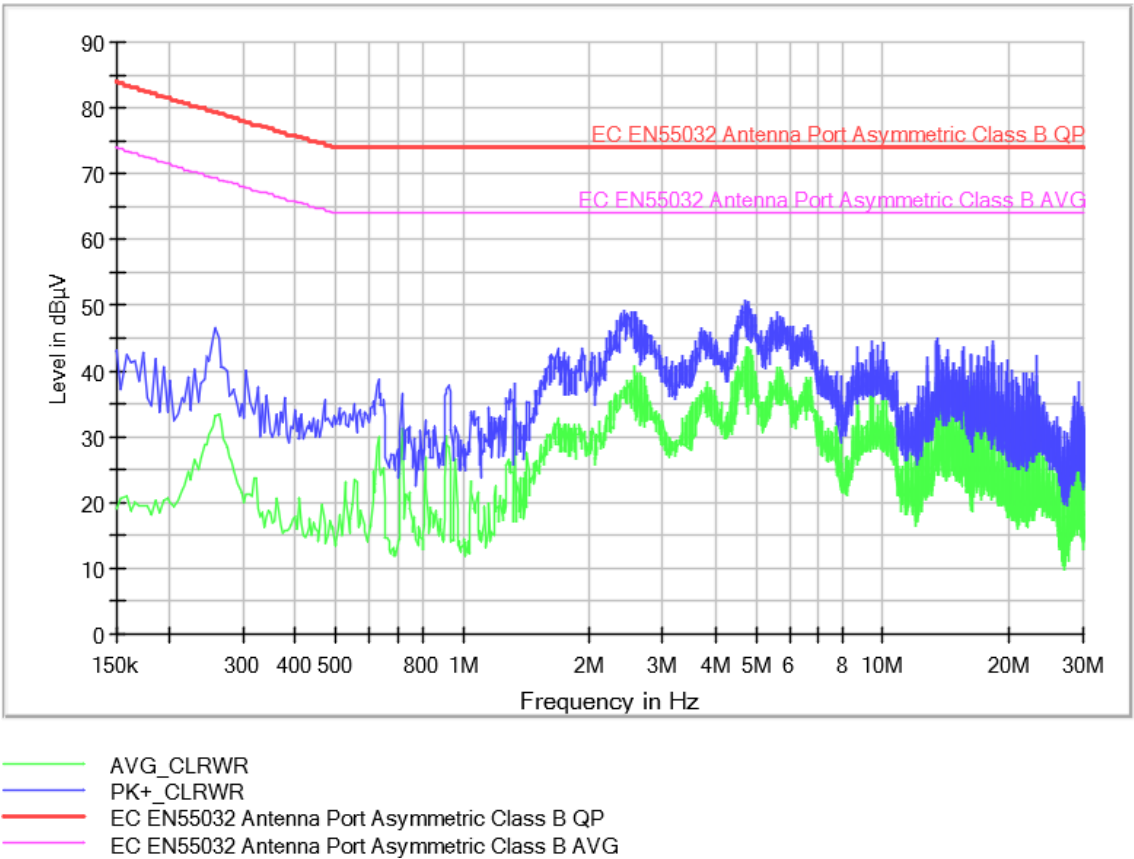
Frequency (MHz)	PK+_CLRWR (dBµV)
98.000000	62.1

EMC Test Code =
CE0208_AntennaPort_AsymmetricMode
Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line =
_AntennaPort_AsymmetricMode

Sample ID: S/02
Operation Mode: OM/09

Images:



Tables:
Continuous Conducted Emissions

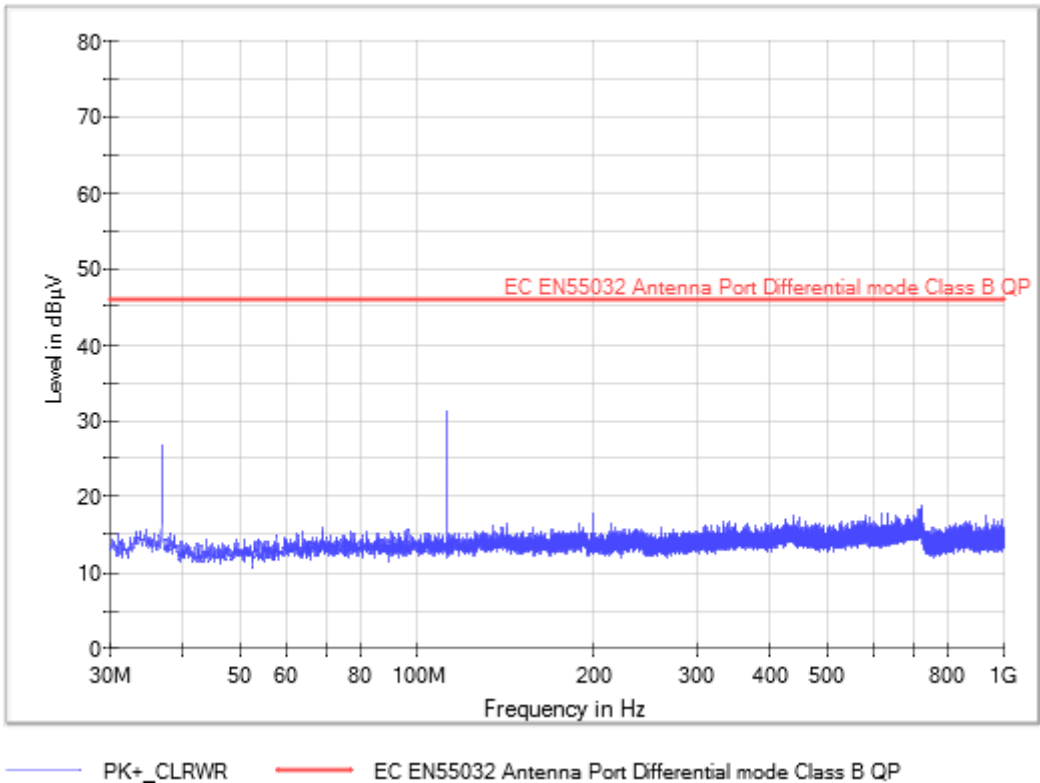
Frequency (MHz)	PK+_CLRWR (dBµV)	AVG_CLRWR (dBµV)
4.702000	51.1	42.2

EMC Test Code =
CE0208_AntennaPort_DifferentialMode
Frequency Range MHz = [30, 1000]

Conducted Emissions - Tested Line =
_AntennaPort_DifferentialMode

Sample ID: S/02
Operation Mode: OM/09

Images:



Tables:
Continuous Conducted Emissions

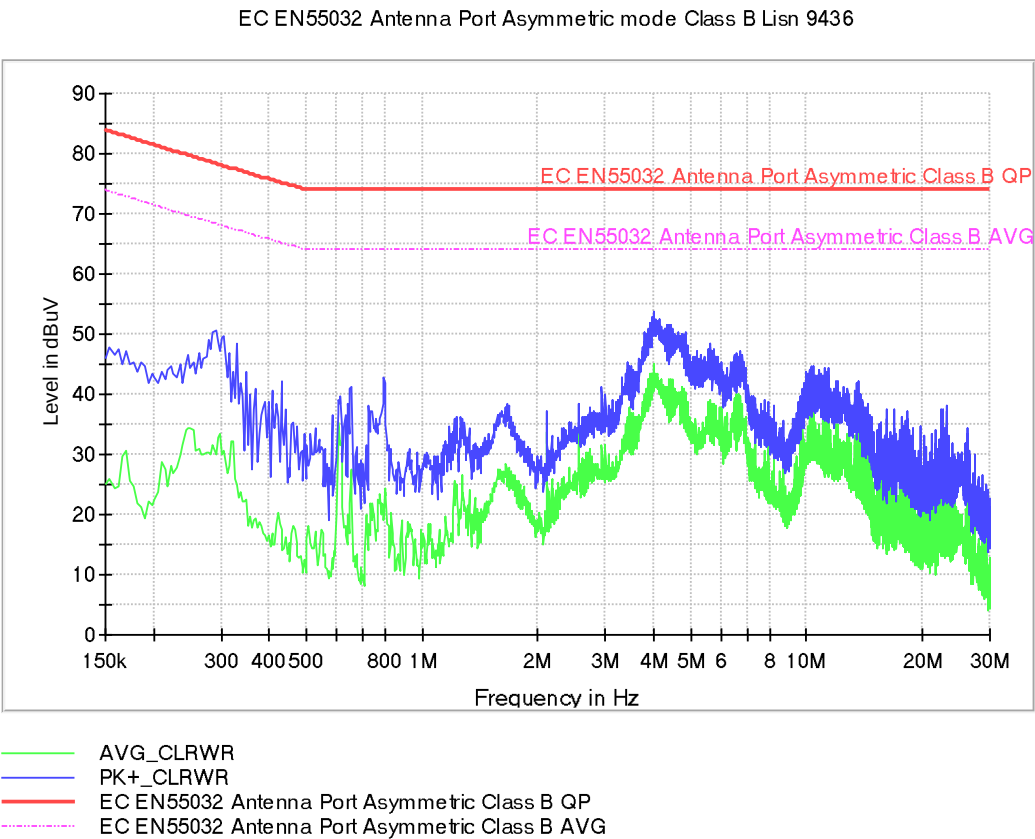
Frequency (MHz)	PK+_CLRWR (dBµV)
112.520000	31.3

EMC Test Code =
CE0208_AntennaPort_AsymmetricMode
Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line =
_AntennaPort_AsymmetricMode

Sample ID: S/02
Operation Mode: OM/10

Images:



Tables:
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBμV)	AVG_CLRWR (dBμV)
3.994000	53.8	44.9

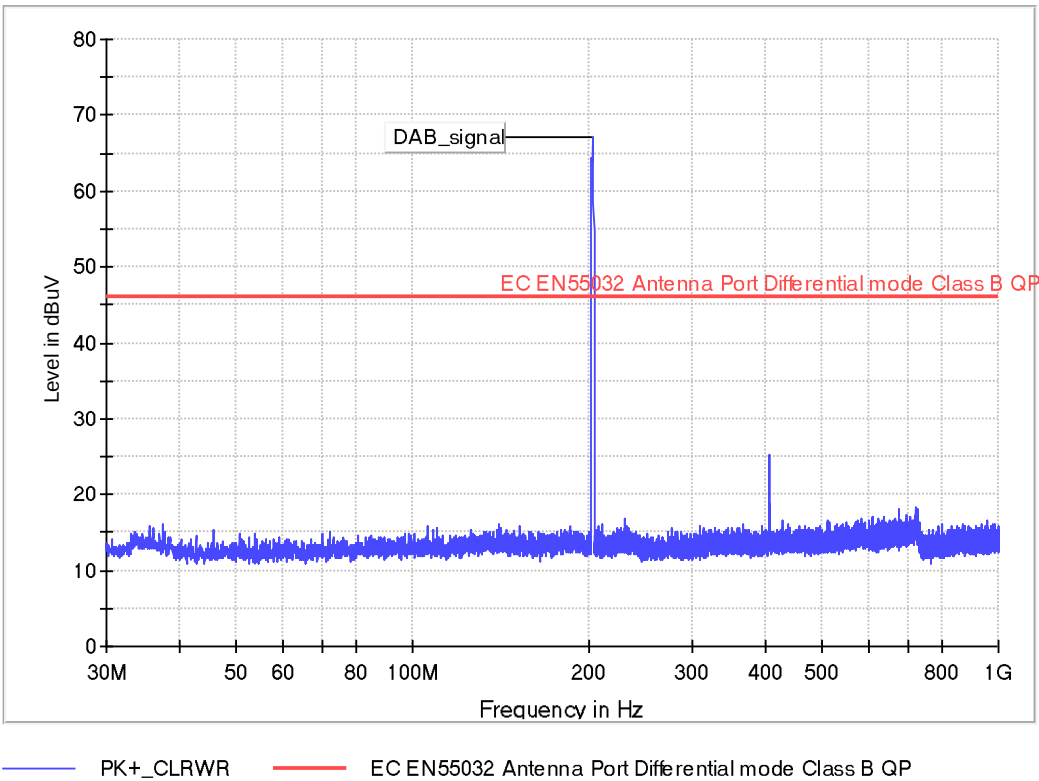
EMC Test Code =
CE0208_AntennaPort_DifferentialMode
Frequency Range MHz = [30, 1000]

Conducted Emissions - Tested Line =
_AntennaPort_DifferentialMode

Sample ID: S/02
Operation Mode: OM/10

Images:

EC EN55032 Antenna Port Differential mode FM Power divider 6044



Tables:
Continuous Conducted Emissions

Frequency (MHz)	PK+_CLRWR (dBμV)
202.640000	67.2

CI Immunity to conducted disturbances, induced by radiofrequency fields

Levels according to ETSI EN 301 489-1/-17/:

Range	Frequency	Modulation	Step	Level
A	150 kHz - 80 MHz	AM 1 kHz Depth: 80%	1%	3 Vrms

Levels according to EN 55035:

Range	Frequency	Modulation	Step	Level
B	150 kHz - 10 MHz	AM 1 kHz Depth: 80%	1%	3 Vrms
C	10 MHz - 30 MHz	AM 1 kHz Depth: 80%	1%	3 Vrms to 1 Vrms
D	30 MHz - 80 MHz	AM 1 kHz Depth: 80%	1%	1 Vrms

Results

S/	OM	CPL	Range	Immunity Lvl (Vrms)	Dwell (s)	Step Size (%)	Comments	V
01	OM/02 to OM/07	Antenna ports	A	3	2	1	No fails detected.	P
01	OM/02 to OM/07	Display port	A	3	2	1	No fails detected.	P
01	OM/02 to OM/07	Harness	A	3	2	1	No fails detected.	P
01	OM/02 to OM/07	USB port	A	3	2	1	No fails detected.	P

Verdict

Pass

EFT Electrical fast transient / burst immunity test

Levels according to EN55035

Application	Level (kV)	Repetition Rate (kHz)
DC network power ports	±0.5	5
Aanalogue/digital data ports	±0.5	5

Results

SI	OM	CPL	Immunity Lvl (kV)	Rep Freq (kHz)	Comments	V
02	OM/08	Antenna ports	±0.5	5	No fails detected.	P
02	OM/08	Display port	±0.5	5	No fails detected.	P
02	OM/08	Harness	±0.5	5	No fails detected.	P
02	OM/08	USB port	±0.5	5	No fails detected.	P
02	OM/09	Antenna ports	±0.5	5	No fails detected.	P
02	OM/09	Display port	±0.5	5	No fails detected.	P
02	OM/09	Harness	±0.5	5	No fails detected.	P
02	OM/09	USB port	±0.5	5	No fails detected.	P
02	OM/10	Antenna ports	±0.5	5	No fails detected.	P
02	OM/10	Display port	±0.5	5	No fails detected.	P
02	OM/10	Harness	±0.5	5	No fails detected.	P
02	OM/10	USB port	±0.5	5	No fails detected.	P

Verdict

Pass

PUL Vehicular transients and surges

Levels

Pulse	Standard	Level	Burst cycle / Repetition rate	Test time / Pulses
1	ISO 7637-2	III (-75 V)	0,5 – 5 s	10 pulses
2a	ISO 7637-2	III (+37 V)	0,2 – 5 s	10 pulses
2b	ISO 7637-2	III (+10 V)	0,5 – 5 s	10 pulses
3a	ISO 7637-2	III (-112 V)	90 – 100 ms	20 min
3b	ISO 7637-2	III (+75 V)	90 – 100 ms	20 min
4	ISO 7637-2	III (-6V)	N/A	10 pulses

Test pulse number	Immunity test level	Performance Criteria
1	III	Transient phenomena ⁽¹⁾
2a	III	Transient phenomena ⁽¹⁾
2b	III	Transient phenomena ⁽¹⁾
3a	III	Continuous phenomena
3b	III	Continuous phenomena
4	III	Transient phenomena ⁽¹⁾

Note 1: The performance criteria for transient phenomena shall apply (see clause 6.2), with the exception that a communication link need not to be maintained during the EMC exposure and may have to be re-established.

Results

S/	OM	Pul	Comments	V
01	OM/02 to OM/07	1	No fails detected.	P
01	OM/02 to OM/07	2a	No fails detected.	P
01	OM/02 to OM/07	2b	No fails detected.	P
01	OM/02 to OM/07	3a	No fails detected.	P
01	OM/02 to OM/07	3b	No fails detected.	P
01	OM/02 to OM/07	4	No fails detected.	P

Verdict

Pass

ESD Electrostatic discharge immunity test

Levels

Coupling	Level
Direct contact discharge (DC):	±4kV
Indirect contact discharge: -Horizontal indirect contact (ICH) -Vertical indirect contact (ICV)	±4kV
Air discharge (DA):	±2kV ±4kV ±8kV

Results

SI	OM	CPL	CPL Type	Immunity Lvl (kV)	Comments	V
01	OM/02 to OM/07	EUT rear side; EUT right side; EUT left side; EUT frontal.	ICH/ICV	±4	No fails detected	P
02	OM/08	EUT rear side; EUT right side; EUT left side; EUT frontal.	ICH/ICV	±4	No fails detected.	P
02	OM/09	EUT rear side; EUT right side; EUT left side; EUT frontal.	ICH/ICV	±4	No fails detected.	P
02	OM/10	EUT rear side; EUT right side; EUT left side; EUT frontal.	ICH/ICV	±4	No fails detected.	P

Verdict

Pass

Appendix B: Photographs

