



Test report

Number: T251-0646/16 A2
Project file: C20161291
Date: 2016-09-29
Pages: 66

Product: Wireless Communication module

Model: Flush RF Module

Ratings: 24 V DC
Protection class: III.

Trademark: Qubino, NETIChome

Applicant: Goap d.o.o. Nova Gorica
Ul. Klementa Juga 7, SI-5250 Solkan, Slovenia

Manufacturer: Goap d.o.o. Nova Gorica
Ul. Klementa Juga 7, SI-5250 Solkan, Slovenia

Place of manufacture: DEC elettronica srl, Via dell'Artigianato 12/1, IT-31040 Chiarano (TV), Italy
ASTREL S.R.L., Via Isonzo 21/E, IT-34070 Mossa (GO), Italy

Summary of testing

Testing method: FCC Part 15, Subpart C

Testing location: SIQ Ljubljana, Trpinčeva ulica 37 A, SI-1000 Ljubljana, Slovenia

Remarks: Date of receipt of test items: 2016-03-24
Number of items tested: 1
Date of performance of tests: 2016-06-08
The test results presented in this report relate only to the items tested.
The product complies with the requirements of the testing methods.
/

Tested by: Andrej Škof

Approved by: Luka Tosetto

The report shall not be reproduced except in full.



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1 GENERAL

History sheet			
Date	Report No.	Change	Revision
2016-06-13	T251-0646/16	Initial Test Report issued.	--
2016-09-02	T251-0646/16 A1	Corrected initial test report due to required changes in: - general product information, - test setup picture	1.0
2016-09-29	T251-0646/16 A2	- Added Occupied Bandwidth emission test procedure. - Updated Occupied Bandwidth result table. - Added additional note at Occupied Bandwidth and Emission of the Carrier result table.	2.0

Environmental conditions:

Ambient temperature: 15°C to 35°C

Relative humidity: 30% to 60%

Atmospheric pressure: 860 mbar to 1060 mbar

1.1 Equipment under test

Wireless Communication module

Model: Flush RF Module

1.1.1 General product information

Tested SIQ sample number: S20162816

Antenna of the device is designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device as required per section 15.203 of FCC part 15. Antenna is permanently attached without possibility of replacement by user which according to this section, is considered sufficient to comply with the provisions of this section.

Operating Channels/frequencies:

Channel	Frequency (MHz)
1 (Lo)	908,4
0 (Hi)	916,0



Picture of EUT



1.2 ANSI C63.4 Subpart selection

Subpart C: Intentional Radiators

1.3 Class statement requirements

- The Class A statement cautions that operation of the device in a residential area is likely to cause harmful interference.
- The Class B statement offers several suggestions for minimizing interference to radio or TV receivers, including reorienting the receiving antenna and moving the Class B device farther away from the receiver.

1.4 Occupied bandwidth measurement

Fundamental frequency	Minimum resolution bandwidth
9 kHz to 30 MHz	1 kHz
30 to 1000 MHz	10 kHz
1000 MHz to 40 GHz	100 kHz

1.5 Quasi-peak detector

Frequency range	Bandwidth (-6dB)
10 Hz to 20 kHz	Full range (wideband)
10 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz

1.6 Peak, rms, and average detectors

Frequency range	Bandwidth (-6dB)
10 Hz to 20 kHz	10, 100, 1000 Hz
10 kHz to 150 kHz	1 and 10 kHz
150 kHz to 30 MHz	1 and 10 kHz
30 MHz to 1 GHz	10 and 100 kHz
1 GHz to 40 GHz	0.1, 1.0 and 10 MHz

2 LIMITS FOR ALL SUBPARTS

2.1 Subpart C: Intentional Radiators

2.1.1 Conducted emission limits:

CLASS B limits:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 – 56*	56 – 46*
0.5 to 5.0	56	46
5.0 to 30.0	60	50

* Decreases with the logarithm of the frequency.

The shown limits in table shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

- For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.
- For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.
- Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as appropriate.



2.1.2 Section 15.209, Radiated emission:

Limit:

Frequency Range (MHz)	Limits (dBμV/m)		Test distance (m)
	VERTICAL	HORIZONTAL	
0,009 to 0,490	$20 \cdot \log(2400/F(\text{kHz}))$	$20 \cdot \log(2400/F(\text{kHz}))$	300
0,490 to 1,705	$20 \cdot \log(2400/F(\text{kHz}))$	$20 \cdot \log(2400/F(\text{kHz}))$	30
1,705 to 30,0	30	30	30
30 to 88	40**	40**	3
88 to 216	43.5**	43.5**	3
216 to 960	46**	46**	3
Above 960	54	54	3

** Except as provided in paragraph below, fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz.

Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

2.1.3 Section 15.215, 20 dB Bandwidth

Test specification: FCC Part 15 Section 15.215(c)

Intentional radiators operating under the alternative provisions to the general emission limits must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Limit:

Frequency band (MHz)
902 – 928

2.1.4 Section 15.249(a), Radiated emission of Carrier

Limit:

Fundamental Frequency (MHz)	Field strength of fundamental (mV/m)	Field strength of harmonics (μV/m)	Test distance (m)
902-928	50	500	3

NOTE (Additional provisions to the general radiated emission limitations – 15.215): In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission as per clause 15.209.

3 ALL TEST EQUIPMENT AND THEIR DESCRIPTION

3.1 General information

Description	Model No.	SIQ No.	Last calibration	Calibrated until	Calibration period	Used
Rohde-Schwarz, RFI receiver	ESU8	105187	2015-11	2017-11	24 months	
Rohde-Schwarz, RFI receiver	ESU26	100428	2016-02	2018-02	24 months	X
Rohde & Schwarz, Artificial main network	ESH2-Z5	106899	2015-05	2017-05	24 months	X
ETS, Anechoic chamber	3m	103949	2014-11	2016-11	24 months	X
R&S, Antenna	HFH2-Z2	/	2015-09	2017-09	24 months	X
EMCO, Antenna	3142B	104351	2015-09	2017-09	24 months	X
EMCO, Antenna	3115	103002	2015-09	2017-09	24 months	X
Heinrich Deisel, Turn table	DS 420.00	103337	NA	NA	NA	X
Antenna tower	/	/	NA	NA	NA	X
Controller for turn table and antenna tower	/	/	NA	NA	NA	X

3.2 Other instrument information and auxiliary equipment

Description	Model No.	Bandwidth	Detector functions	Antenna factors	Cable loss	Range
Rohde-Schwarz, AMN	ENV216	/	/	/	/	9 kHz do 30 MHz
Rohde-Schwarz, RFI receiver	ESU8	200Hz, 9kHz, 120kHz, 1MHz	Peak, Q-peak, Average	/	/	20 Hz – 8 GHz
Rohde-Schwarz, RFI receiver	ESU26	200Hz, 9kHz, 120kHz, 1MHz	Peak, Q-peak, Average	/	/	20 Hz – 26.5 GHz
Hewlett Packard, RF Spectrum Analyzer	8593E	200Hz, 9kHz, 120kHz, 1MHz	Peak, Q-peak, Average	/	/	9 kHz – 26.5 GHz
Rohde & Schwarz, Artificial main network	ESH 2-Z5	/	/	/	/	9 kHz – 30 MHz
ETS, Anechoic chamber	3m	/	/	/	/	30 MHz – 18 GHz
EMCO, Antenna	model 3142	/	/	See tables below	/	26 MHz – 2 GHz
EMCO, Antenna	model 3115	/	/	See tables below	/	1 GHz – 18 GHz
Schwarzbeck Mess-Elektronik, Horn antenna	BBHA9120E	/	/	See tables below	/	450 MHz – 6 GHz
SIQ, Conducted emission cable	SIQ	/	/	/	See tables below	/
SIQ, Radiated emission cable	SIQ	/	/	/	See tables below	/

3.2.1 Cable loss and attenuation of radiated emission

3.2.1.1 Conducted emission cable (SIQ-K024)

Point	Frequency (9kHz-30MHz)	Cable length (meters)	Loss (dB)
1	190 kHz	1	0,4
2	530 kHz	1	0,26
3	2,53 MHz	1	0,16
4	5,19 MHz	1	0,07
5	11,05 MHz	1	0,03
6	22,01 MHz	1	0,06
7	24,03 MHz	1	0,04

3.2.1.2 Radiated emission attenuation

Point	Frequency (30 MHz – 26,5 GHz)	Attenuation (dB)
1	30 MHz	0,501
2	150 MHz	1,174
3	400 MHz	2,034
4	800 MHz	2,995
5	1 GHz	3,416
6	1,363	1,666667
7	2,686	3,583333
8	5,332	5,25
9	7,978	6,25
10	10,624	7,5
11	13,27	8,333333
12	15,916	9,166666
13	18,562	9,833333
14	21,208	10,66667
15	23,854	11,5
16	26,5	12,16667



4 CONVERSION FACTORS AND ALL OTHER FORMULAS

Unit	Conversion unit	Formula of conversion
$\text{dB}\mu\text{V}$	$\text{dB}\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m} = \text{dB}\mu\text{V} + \text{AF}$
$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m} = 20\log(X(\mu\text{V}/\text{m})/1\mu\text{V})$

	Test distance stated in standard	Test distance of measurement	Conversion factor
Class B	3 m	3 m	/
Class A	10 m	3 m	20dB/decade

5 GENERAL AND SPECIAL CONDITIONS DESCRIPTION

5.1 General condition description

Interconnect and power cabling (or wiring)

5.1.1 Test arrangement for conducted emissions

Interconnecting cables that hang closer than 40 cm to the ground-plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground-plane.

All other equipment powered from additional LISN(s).

Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

LISN at least 80 cm from nearest part of EUT chassis.

Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

Non-EUT components of EUT system being tested.

Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground-plane.

5.1.2 Test arrangement for conducted emissions- floor-standing equipment

Excess I/O cables shall be bundled in the center. If bundling is not possible, the cables shall be arranged in serpentine fashion. Bundling shall not exceed 40 cm in length.

Excess power cords shall be bundled in the center or shortened to appropriate length.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. If bundling is not possible, the cable shall be arranged in serpentine fashion.

EUT and all cables shall be insulated, if required, from the ground-plane by up to 12 mm of insulating material.

EUT connected to one LISN. LISN can be placed on top of, or immediately beneath, the ground-plane.

All other equipment powered from a second LISN or additional LISN(s).

Multiple outlet strip can be used for multiple power cords of non-EUT equipment.



5.1.3 Test arrangement for radiated emissions tabletop equipment

Interconnecting cables that hang closer than 40 cm to the ground-plane shall be folded back and forth in the center, forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance. The total length shall not exceed 1 m.

If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground-plane with the receptacle flush with the ground-plane.

Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

Non-EUT components of EUT system being tested.

Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

No vertical conducting plane used.

Power cords drape to the floor and are routed over to receptacle.

5.1.4 Test arrangement for radiated emissions floor-standing equipment

Excess I/O cables shall be bundled in center. If bundling is not possible, the cables shall be arranged in serpentine fashion. Bundling not to exceed 40 cm in length.

Excess power cords shall be bundled in the center or shortened to appropriate length.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. If bundling is not possible, the cable shall be arranged in a serpentine fashion.

EUT and all cables shall be insulated, if required, from the ground-plane by up to 12 mm of insulating material.

If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground-plane with the receptacle flush with the ground plane.

Overhead cable trays and suspended ceilings

5.1.5 Test arrangement for floor-standing equipment

Only one vertical riser may be used where typical of system under test.

Excess power cord shall be bundled in the center or shortened to appropriate length.

EUT and cables shall be insulated from ground-plane by up to 12 mm. Where the manual has specified or there exists a code of practice for installation of the EUT, the test arrangement shall allow the use of this practice for the tests.

Power cords being measured connected to one LISN. All other system power cords powered through other LISN(s). A multiple receptacle strip may be used for other power cords.

For *conducted* tests, the LISNs may be placed on top of or immediately beneath and bonded directly to the ground-plane. For *radiated* tests, the LISN(s), if used, should be installed under, with the receptacle flush with the ground-plane.

5.1.6 Placement and manipulation of interconnect cabling (or wiring) of tabletop equipment

LISN(s) may have to be positioned to the side of the table to meet the criterion that the LISN receptacle shall be 80 cm away from the EUT. LISN(s) may be above ground-plane only for conducted emission measurements.

Accessories, such as ac power adapter, if typically table-mounted, shall occupy peripheral positions as is applicable.

Accessories, which are typically floor-mounted, shall occupy a floor position directly below the portion of the EUT to which they are typically connected. T

Table length may be extended beyond 1.5 m with peripherals aligned with the back edge. The table depth may be extended beyond 1 m. The 40 cm distance to the vertical conducting plane shall be maintained for conducted emission testing.



Placement of wall-mounted equipment

5.1.7 Test configuration/arrangement for combination floor-standing and tabletop equipment

Interconnecting cables that hang closer than 40 cm to the ground-plane shall be folded back and forth in the center, forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance.

If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground-plane with the receptacle flush with the ground-plane.

Cables of hand-operated devices, such as keyboards, mice, etc., have to be placed as for normal use.

Non-EUT components of EUT system being tested.

I/O cable to floor-standing unit drapes to the ground-plane and shortened or excess bundled. Cables not reaching the metal ground-plane are draped to the height of the connector or 40 cm, whichever is lower.

Power cords and signal cables shall drape to the floor. No extension cords shall be used to the power receptacles.

The floor-standing unit can be placed under the table if its height permits.

5.2 Special condition description

If for some reason the above measurement conditions can't be met, the description below should be used as an appropriate measurement condition and placement.

(Description is written additionally as the measurements differ – all is within test procedure)

6 TEST SUMMARY

STANDARDS (details on first page)	Tested		Sample	
	yes	no	pass	not pass
ANSI C63.4-2014; FCC Part 15, Subpart C	☒	☐	☒	☐

Test	Section within the report	Conclusion
Conducted emission	7.1	PASS
Radiated emission	7.2	PASS
20 db Bandwidth	7.2	PASS
Radiated emission of the carrier	7.2	PASS

6.1 Operating voltages/frequencies used for testing

Section	Test	Operating conditions
7.1	Conducted emission measurement (intentional radiator)	24 VDC (120 V; 60 Hz) 24 VDC (240 V; 50 Hz)
7.2	Radiated emission measurement (intentional radiator)	24 VDC
7.2	20 db Bandwidth	24 VDC
7.2	Radiated emission of the carrier	24 VDC

7 EMISSION TESTS

7.1 Conducted emission measurement (intentional radiator)

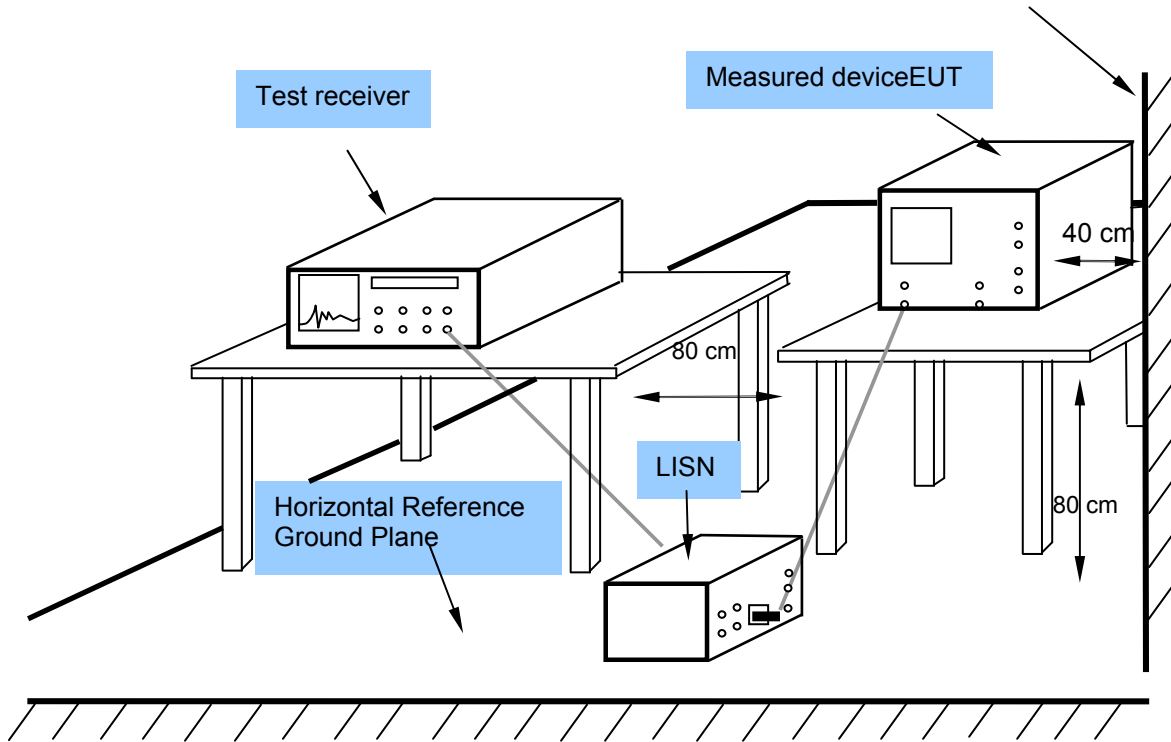
7.1.1 Test instruments

Description	Model No.	SIQ No.	Last calibration	Calibrated until	Calibration period	Used
Rohde-Schwarz, RFI receiver	ESU26	100428	2016-02	2018-02	24 months	X
Rohde & Schwarz, Artificial main network	ESH2-Z5	100406	2015-05	2017-05	24 months	X

7.1.2 Test procedure

- The EUT is placed on a non-conductive 0.8 meters high table, 0.4 meters from the vertical conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). LISN provide 50 Ohm / 50 μ H + 5 Ohm of coupling impedance for the measuring instrument.
- Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.
- AC power lines of EUT are checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz is searched using PEAK, QUASI-PEAK and AVERAGE function of the receiver. Bandwidth is set to 9 kHz.
- If applicable functions are changed (data transfer speed, clock speed,...) it should be noted in the test report.

7.1.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.4 Test results

NOTE: margin set at measurement is 15 dB. All measurements bellow the level of 15 dB margin are not reported.



C20161291

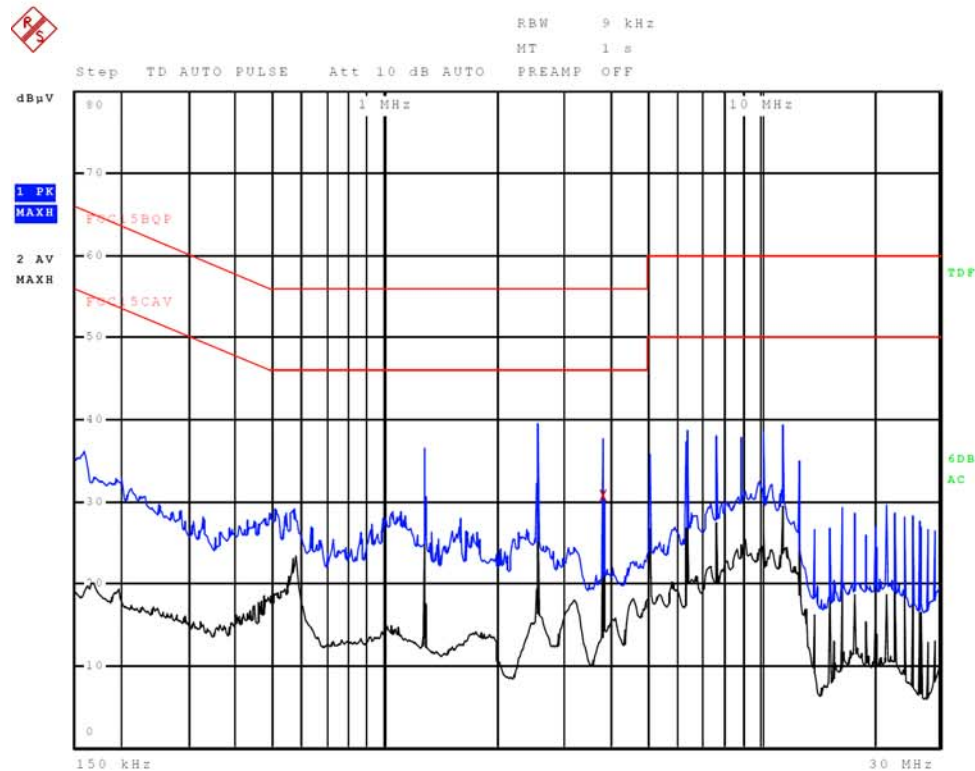
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Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
 PHASE

Time Domain Scan (1 Range)

Scan Start: 150 kHz
 Scan Stop: 30 MHz
 Detector: Trace 1: MAX PEAK Trace 2: Average
 Transducer: ENV216

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 12:31

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
PHASE

Final Measurement

Meas Time: 1 s
Margin: 15 dB
Peaks: 1

Trace	Frequency	Level (dBμV)	Detector	Delta Limit/dB
2	3.819750000 MHz	30.65	CISPR Averag	-15.35

**C20161291**

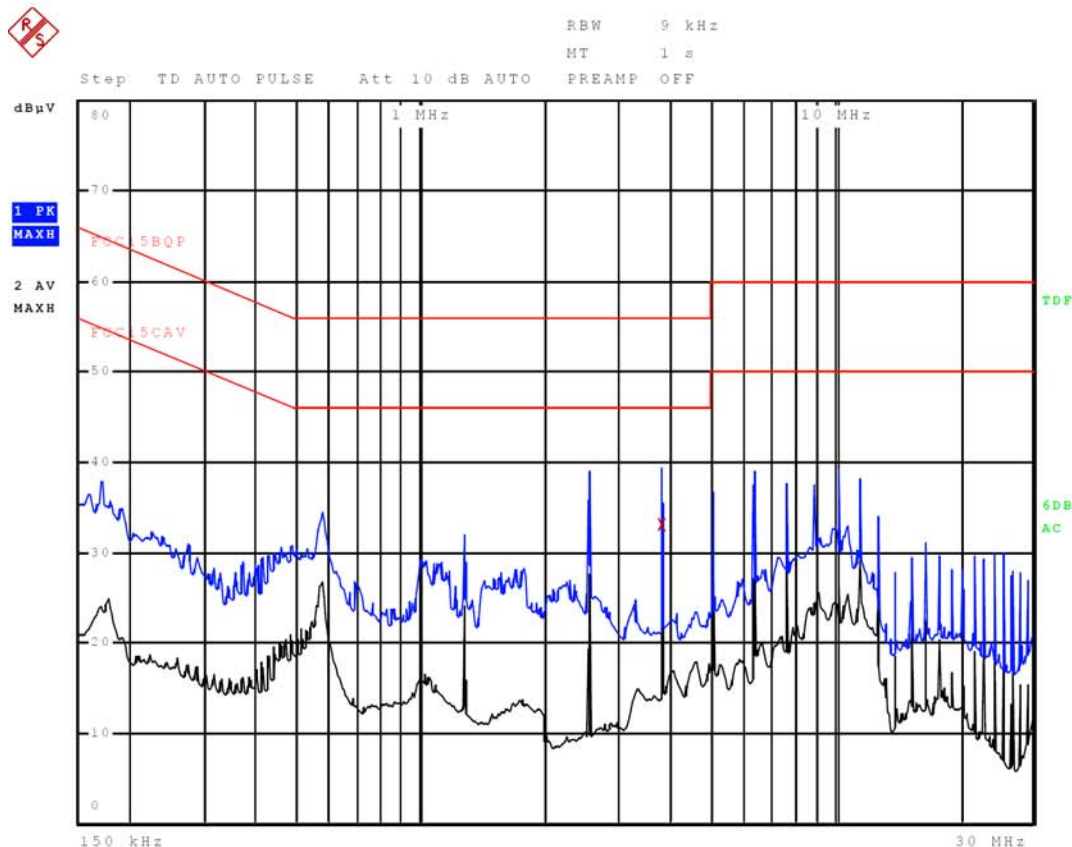
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Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
 NEUTRAL

Time Domain Scan (1 Range)

Scan Start: 150 kHz
 Scan Stop: 30 MHz
 Detector: Trace 1: MAX PEAK Trace 2: Average
 Transducer: ENV216

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 12:30

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
NEUTRAL

Final Measurement

Meas Time: 1 s
Margin: 15 dB
Peaks: 1

Trace	Frequency	Level (dB μ V)	Detector	Delta Limit/dB
2	3.822000000 MHz	32.98	CISPR Averag	-13.02

**C20161291**

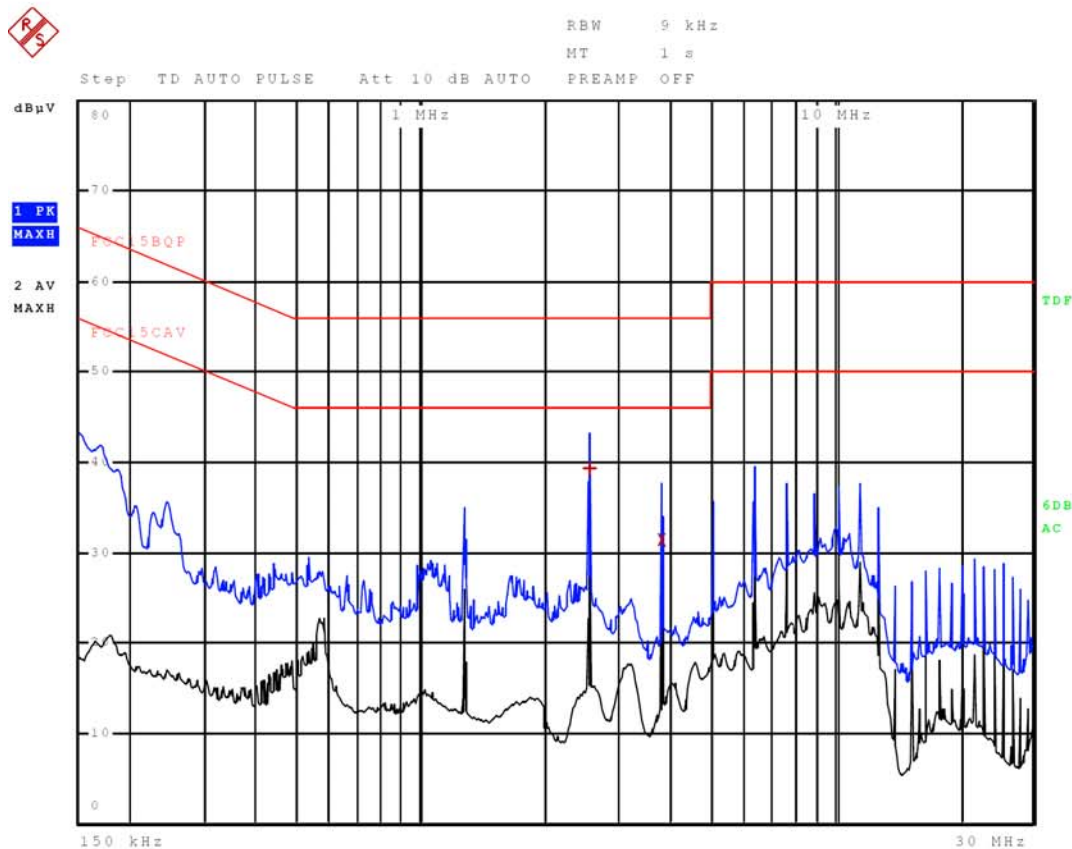
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Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
 PHASE

Time Domain Scan (1 Range)

Scan Start: 150 kHz
 Scan Stop: 30 MHz
 Detector: Trace 1: MAX PEAK Trace 2: Average
 Transducer: ENV216

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 12:35

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
PHASE

Final Measurement

Meas Time: 1 s
Margin: 15 dB
Peaks: 2

Trace	Frequency	Level (dBμV)	Detector	Delta Limit/dB
2	3.822000000 MHz	31.33	CISPR Averag	-14.67
1	2.548500000 MHz	39.19	Quasi Peak	-16.81

**C20161291**

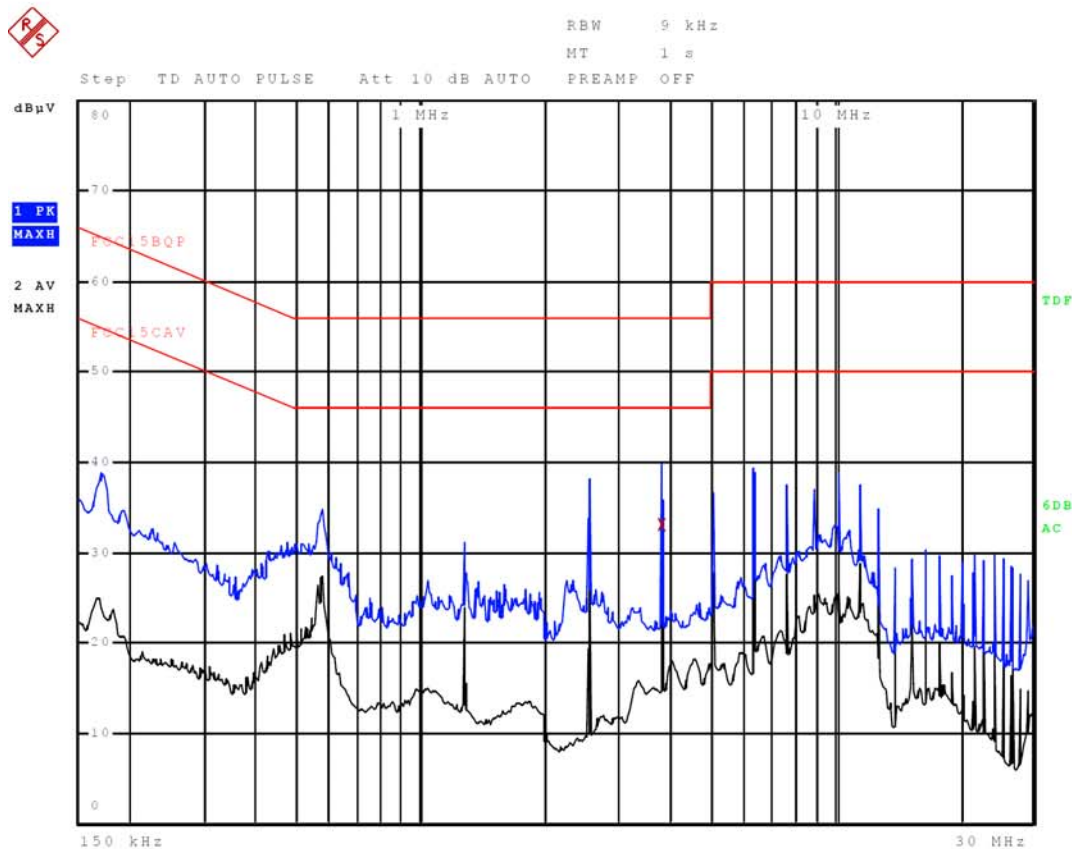
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Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
 NEUTRAL

Time Domain Scan (1 Range)

Scan Start: 150 kHz
 Scan Stop: 30 MHz
 Detector: Trace 1: MAX PEAK Trace 2: Average
 Transducer: ENV216

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 12:36

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1, Uin: 120 V, 60 Hz
Operator Andrej Skof
Test Spec
NEUTRAL

Final Measurement

Meas Time: 1 s
Margin: 15 dB
Peaks: 1

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
2	3.819750000 MHz	32.99	CISPR Averag	-13.01

**C20161291**

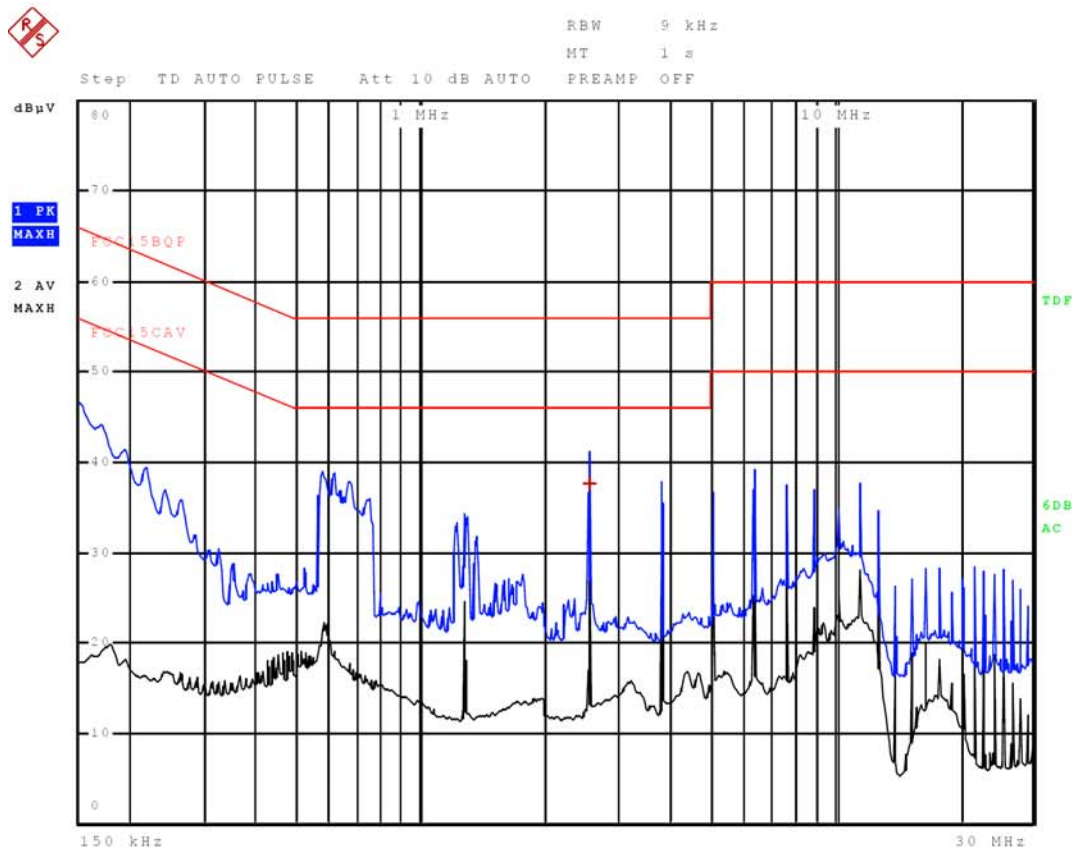
08.Jun 16 12:29

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 240 V, 50 Hz
Operator Andrej Skof
Test Spec
 PHASE

Time Domain Scan (1 Range)

Scan Start: 150 kHz
 Scan Stop: 30 MHz
 Detector: Trace 1: MAX PEAK Trace 2: Average
 Transducer: ENV216

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamplifier	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 12:29

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 240 V, 50 Hz
Operator Andrej Skof
Test Spec
PHASE

Final Measurement

Meas Time: 1 s
Margin: 15 dB
Peaks: 1

Trace	Frequency	Level (dB μ V)	Detector	Delta Limit/dB
1	2.548500000 MHz	37.53	Quasi Peak	-18.47

**C20161291**

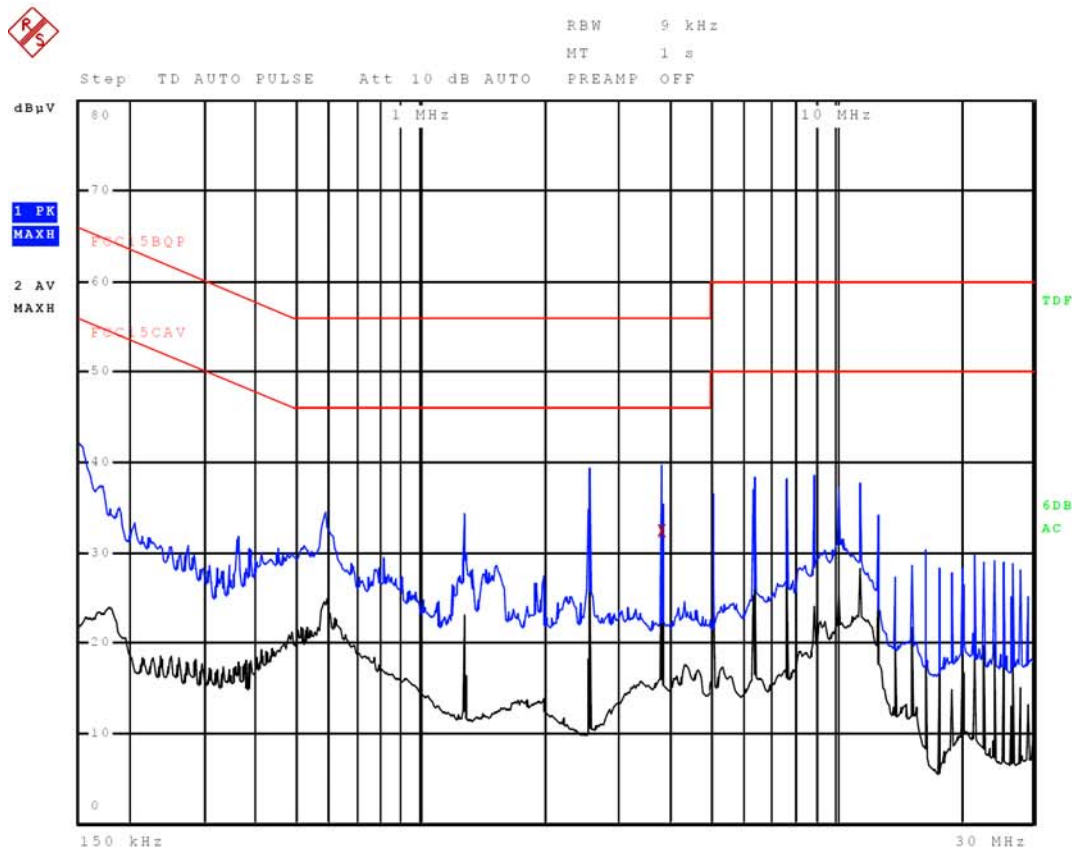
08.Jun 16 12:30

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 240 V, 50 Hz
Operator Andrej Skof
Test Spec
 NEUTRAL

Time Domain Scan (1 Range)

Scan Start: 150 kHz
 Scan Stop: 30 MHz
 Detector: Trace 1: MAX PEAK Trace 2: Average
 Transducer: ENV216

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 12:30

Meas Type CONDUCTED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0, Uin: 240 V, 50 Hz
Operator Andrej Skof
Test Spec
NEUTRAL

Final Measurement

Meas Time: 1 s
Margin: 15 dB
Peaks: 1

Trace	Frequency	Level (dBµV)	Detector	Delta Limit/dB
2	3.822000000 MHz	32.30	CISPR Averag	-13.70

7.2 Radiated emission measurement (intentional radiator)

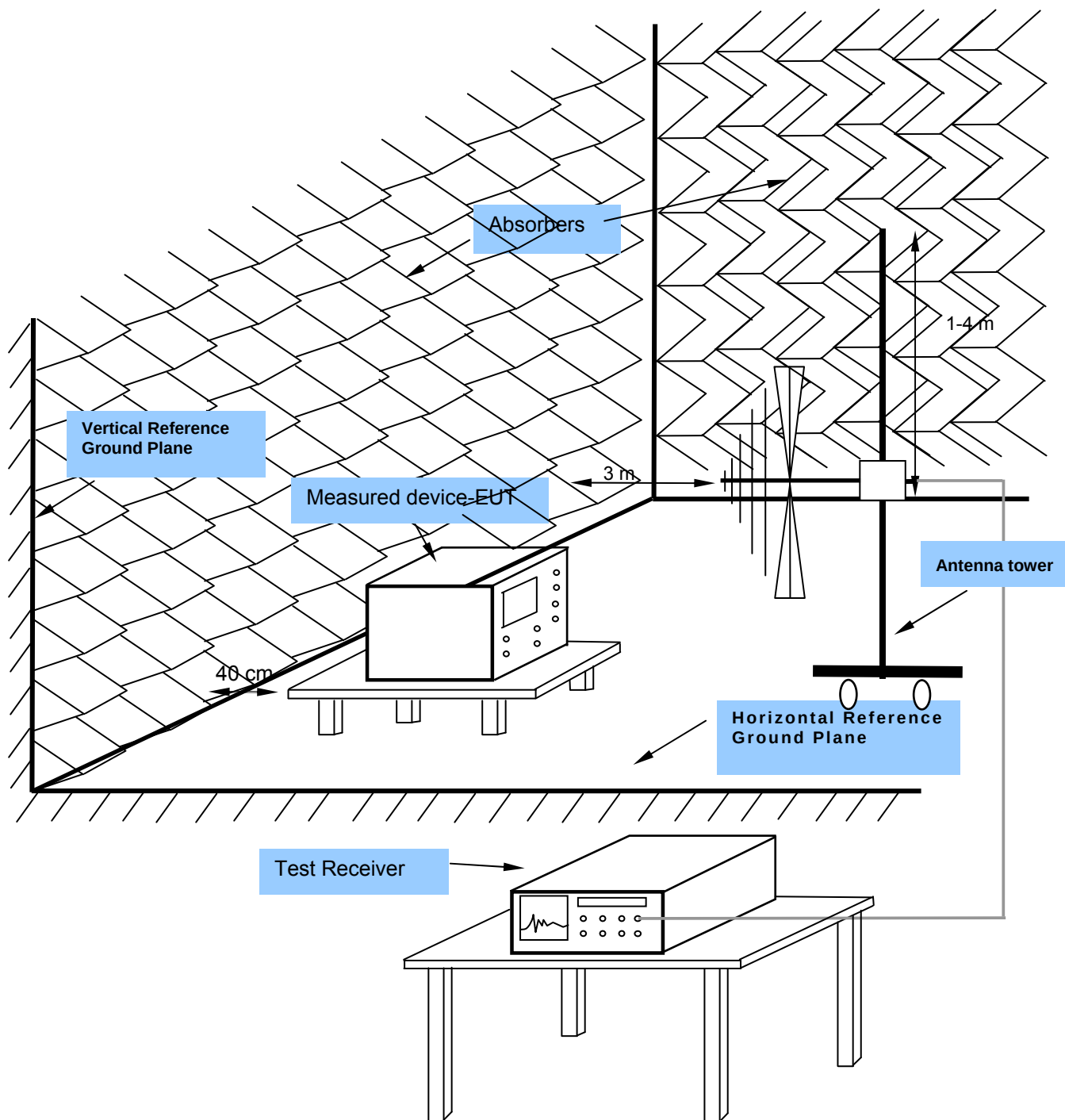
7.2.1 Test instruments

Description & Manufacturer	Model No.	SIQ No.	Last calibration	Calibrated until	Calibration period	Used
ETS, Anechoic chamber	3m	103949	2014-11	2016-11	24 months	X
Rohde-Schwarz, RFI receiver	ESU8	105187	2015-11	2017-11	24 months	
Rohde-Schwarz, RFI receiver	ESU26	100428	2016-02	2018-02	24 months	X
R&S, Antenna	HFH2-Z2	/	2015-09	2017-09	24 months	X
EMCO, Antenna	3142B	104351	2015-09	2017-09	24 months	X
EMCO, Antenna	3115	103002	2015-09	2017-09	24 months	X
Heinrich Deisel, Turn table	DS 420.00	103337	NA	NA	NA	X
Antenna tower	/	/	NA	NA	NA	X
Controller for turn table and antenna tower	/	/	NA	NA	NA	X

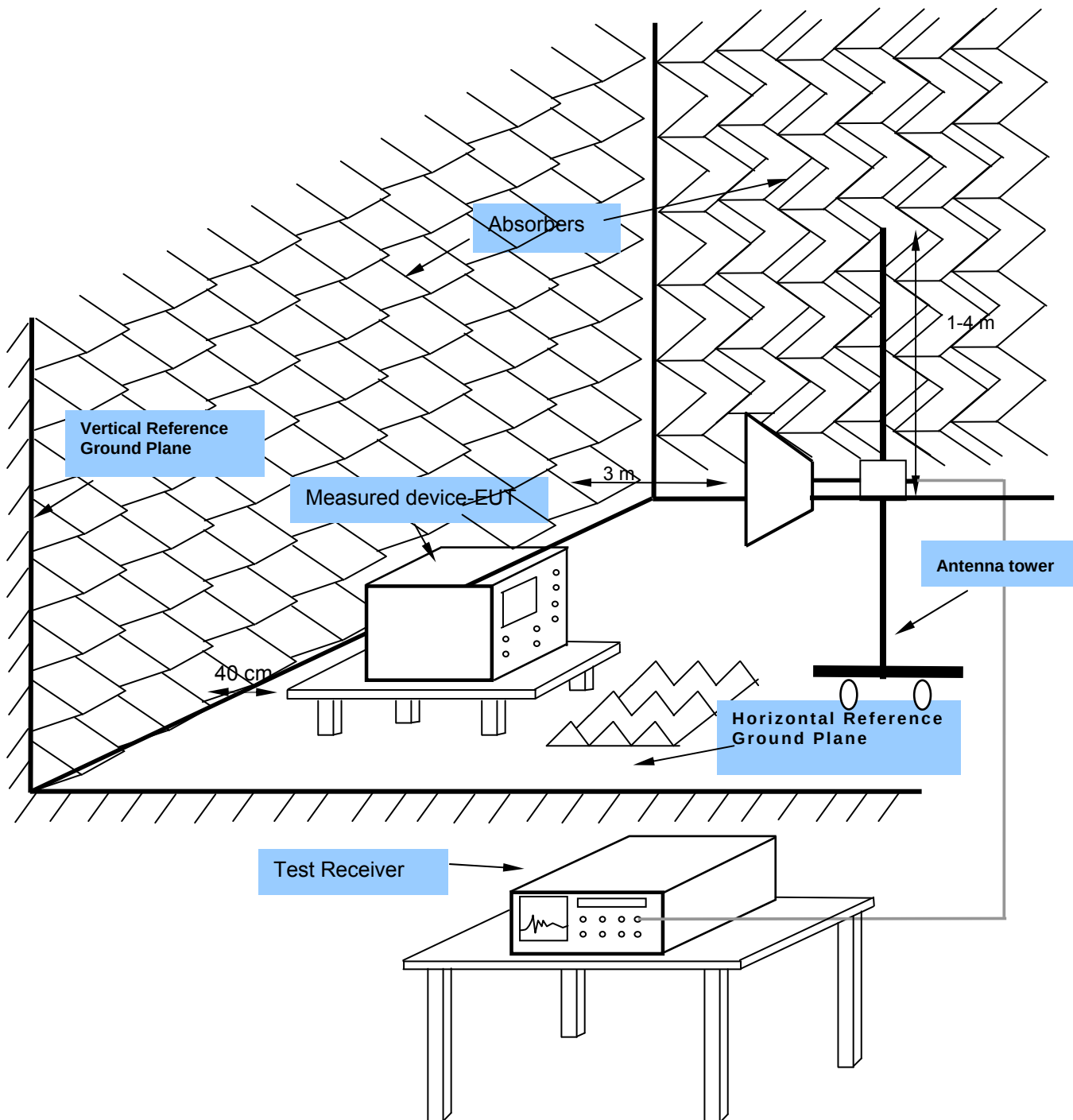
7.2.2 Test procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground in an Anechoic Chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of variable-height antenna tower.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to PEAK and QUAS-PEAK Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The highest points would be re-tested one by one using the quasi-peak method.
7. 20 dB Occupied Bandwidth: The occupied bandwidth was measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a 20 dB. The spectrum analyzer center frequency was set to the nominal EUT channel center frequency. The test-receiver system was set to PEAK Detect Function with Maximum Hold Mode. Placed were two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker was 20 dB below the reference value. The occupied bandwidth is the frequency difference between the two markers. If EUT has detachable antenna the measurement shall be performed at the antenna connector. If radiated measurements were performed the same test setup was used as with the radiated emission measurements for the appropriate frequency range.

7.2.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.2.4 Test result (15.209)

NOTE: margin set at measurement is 10, 20 and 40 dB (depending on the measurement). All measurements bellow the level of margin are not reported.


C20161291

08.Jun 16 12:02

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

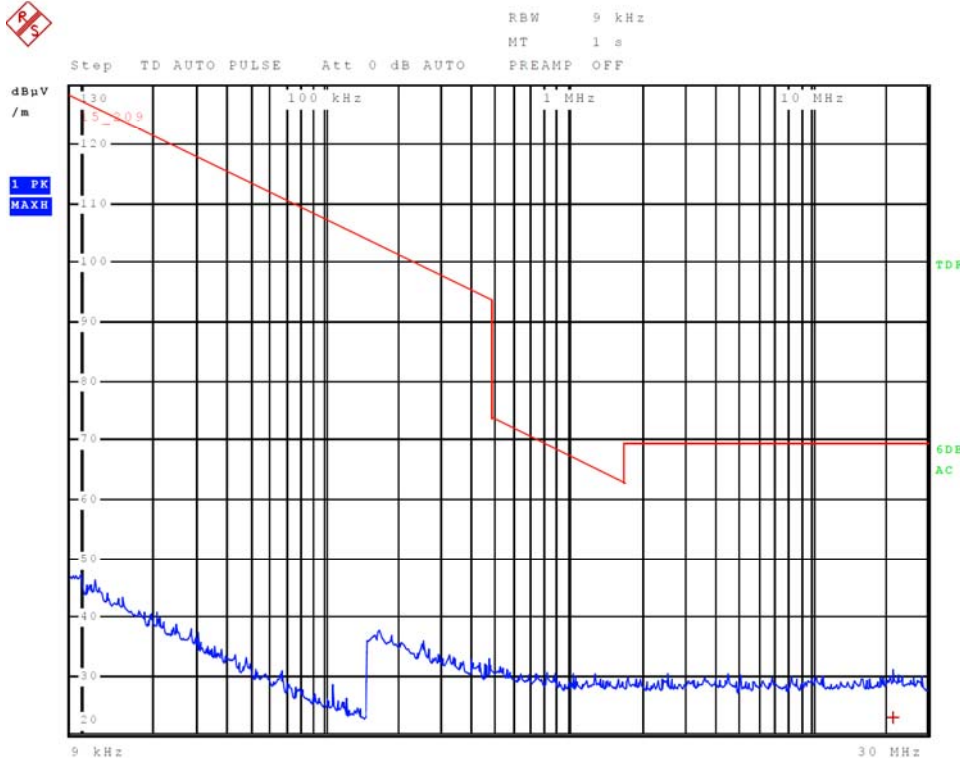
Test Spec

Antenna: 0 deg, Sample: 0 deg

Time Domain Scan (2 Ranges)

Scan Start: 9 kHz
Scan Stop: 30 MHz
Detector: Trace 1: MAX PEAK
Transducer: HFH2-Z2V

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
9.000000 kHz	149.950000 kHz	50.00 Hz	200.00 Hz	300 ms	Auto	0 dB	INPUT2
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



**C20161291**

08.Jun 16 12:02

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec

Antenna: 0 deg, Sample: 0 deg

Final Measurement

Meas Time: 1 s
Margin: 40 dB
Peaks: 1

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	21.570000000 MHz	22.99	Quasi Peak	-46.51

**ROHDE & SCHWARZ****C20161291**

08.Jun 16 11:56

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec

Antenna: 0 deg, Sample: 0 deg

Time Domain Scan (2 Ranges)

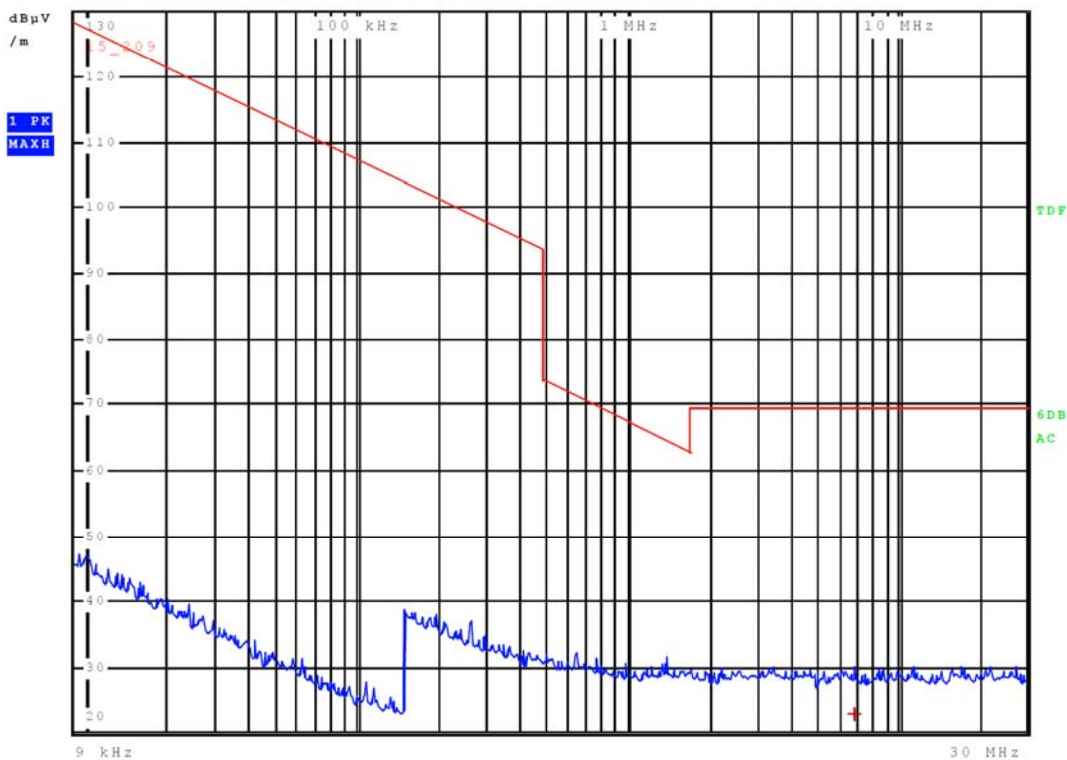
Scan Start: 9 kHz
Scan Stop: 30 MHz
Detector: Trace 1: MAX PEAK
Transducer: HFH2-Z2V

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
9.000000 kHz	149.950000 kHz	50.00 Hz	200.00 Hz	300 ms	Auto	0 dB	INPUT2
150.000000 kHz	30.000000 MHz	2.25 kHz	9.00 kHz	30 ms	Auto	0 dB	INPUT2



RBW 9 kHz
MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP OFF



**C20161291**

08.Jun 16 11:56

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec

Antenna: 0 deg, Sample: 0 deg

Final Measurement

Meas Time: 1 s
Margin: 40 dB
Peaks: 1

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	6.940500000 MHz	22.97	Quasi Peak	-46.53

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof
Test Spec
 VERTICAL 100 cm, 0 deg

Time Domain Scan (1 Range)

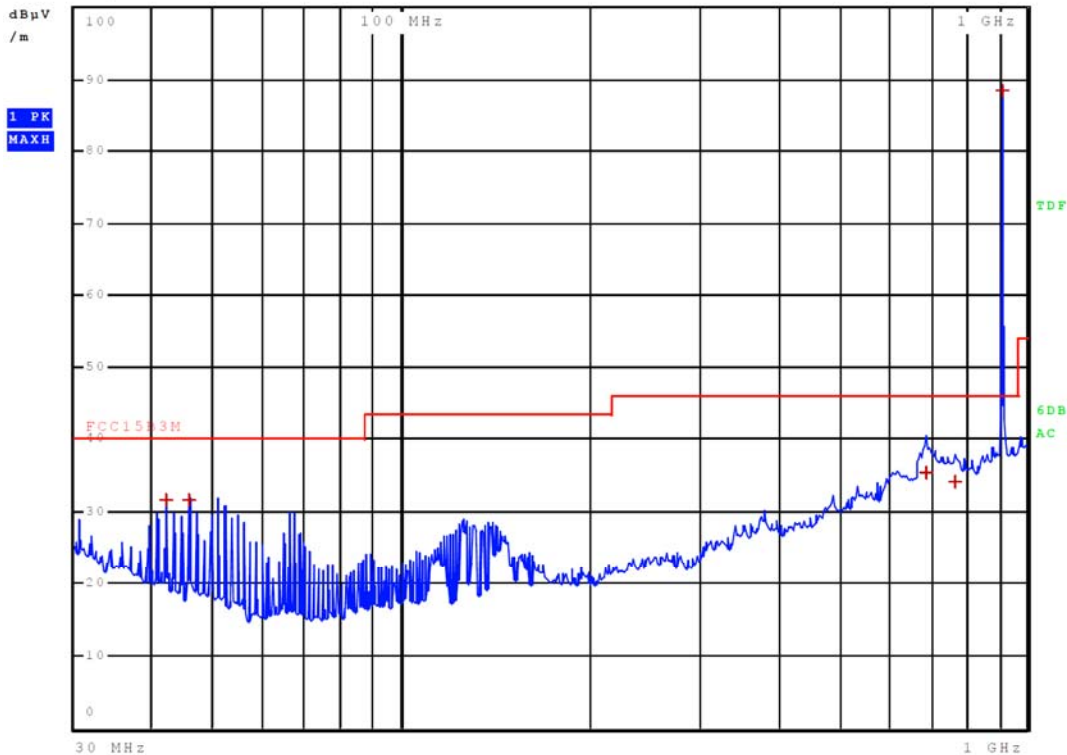
Scan Start: 30 MHz
Scan Stop: 1 GHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
30.000000 MHz	1.000000 GHz	30.00 kHz	120.00 kHz	1 ms	Auto	0 dB	INPUT2



RBW 120 kHz
 MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP OFF



**C20161291**

08.Jun 16 10:07

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec
 VERTICAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 10 dB
Subranges: 5

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	915.960000000 MHz	88.38	Quasi Peak	42.38
1	41.970000000 MHz	31.59	Quasi Peak	-8.41
1	45.810000000 MHz	31.58	Quasi Peak	-8.42
1	688.470000000 MHz	35.32	Quasi Peak	-10.68
1	766.830000000 MHz	34.09	Quasi Peak	-11.91



ROHDE & SCHWARZ

C20161291

08.Jun 16 10:09

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec
HORIZONTAL 100 cm, 0 deg

Time Domain Scan (1 Range)

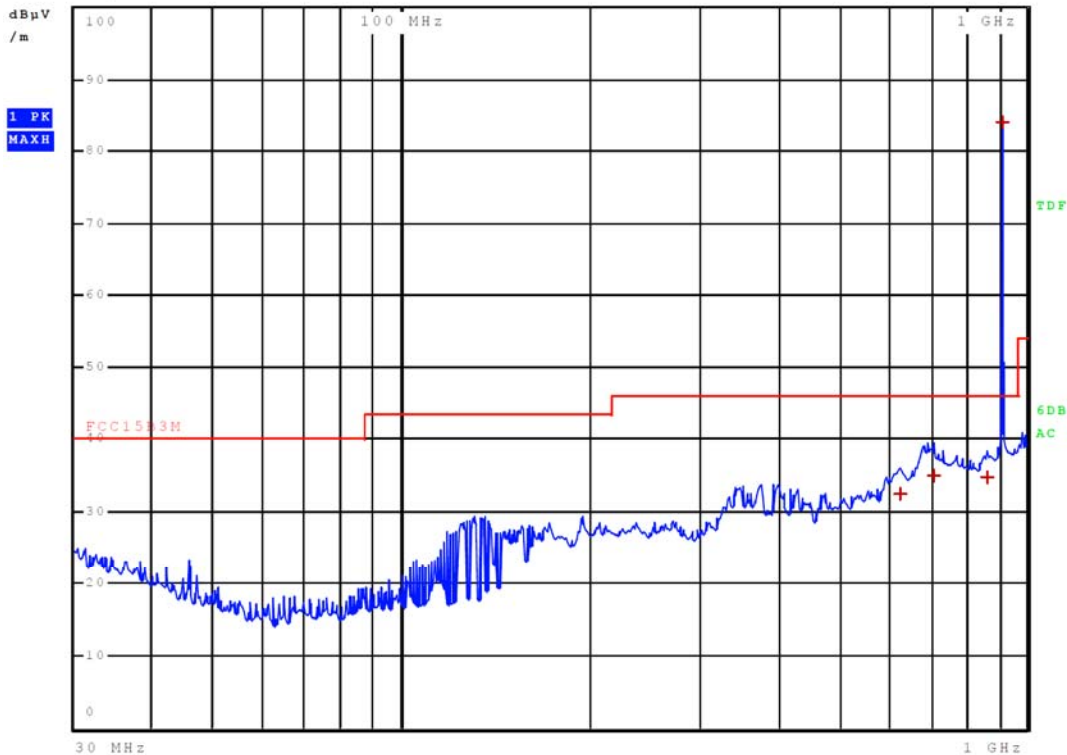
Scan Start: 30 MHz
Scan Stop: 1 GHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
30.000000 MHz	1.000000 GHz	30.00 kHz	120.00 kHz	1 ms	Auto	0 dB	INPUT2



RBW 120 kHz
MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP OFF



**C20161291**

08.Jun 16 10:09

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec
 HORIZONTAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 10 dB
Subranges: 4

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	915.960000000 MHz	83.86	Quasi Peak	37.86
1	708.540000000 MHz	35.03	Quasi Peak	-10.97
1	862.170000000 MHz	34.75	Quasi Peak	-11.25
1	628.290000000 MHz	32.42	Quasi Peak	-13.58

**C20161291**

08.Jun 16 10:25

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
VERTICAL 100 cm, 0 deg

Time Domain Scan (1 Range)

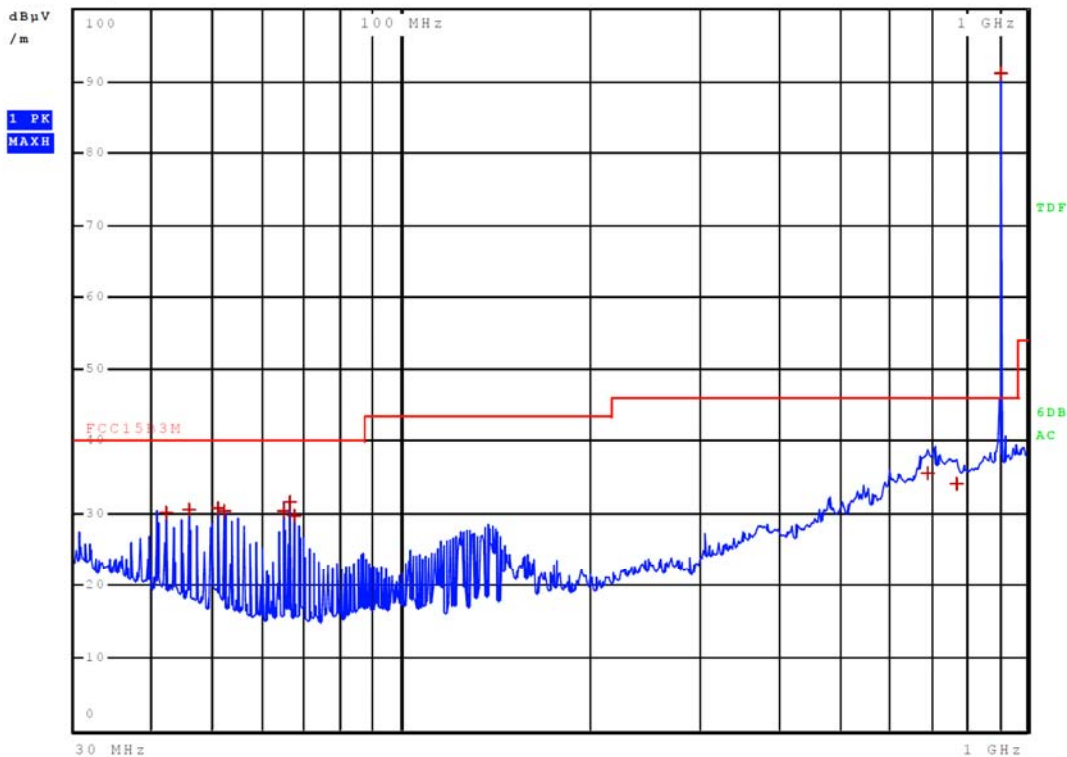
Scan Start: 30 MHz
Scan Stop: 1 GHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
30.000000 MHz	1.000000 GHz	30.00 kHz	120.00 kHz	1 ms	Auto	0 dB	INPUT2



RBW 120 kHz
MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP OFF



**C20161291**

08.Jun 16 10:25

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec
 VERTICAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 10 dB
Peaks: 10

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	908.370000000 MHz	91.00	Quasi Peak	45.00
1	66.120000000 MHz	31.54	Quasi Peak	-8.46
1	50.850000000 MHz	30.83	Quasi Peak	-9.17
1	45.780000000 MHz	30.54	Quasi Peak	-9.46
1	64.860000000 MHz	30.40	Quasi Peak	-9.60
1	52.110000000 MHz	30.29	Quasi Peak	-9.71
1	41.970000000 MHz	30.21	Quasi Peak	-9.79
1	67.380000000 MHz	29.63	Quasi Peak	-10.37
1	694.350000000 MHz	35.55	Quasi Peak	-10.45
1	770.970000000 MHz	34.11	Quasi Peak	-11.89

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
 HORIZONTAL 100 cm, 0 deg

Time Domain Scan (1 Range)

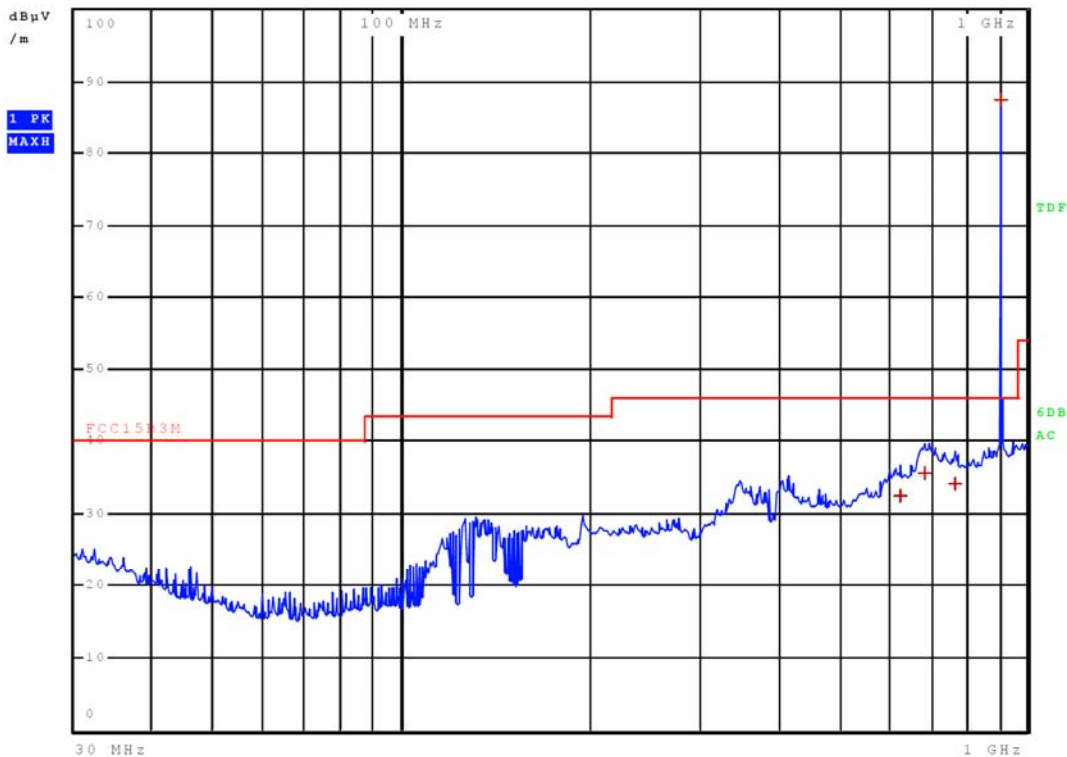
Scan Start: 30 MHz
Scan Stop: 1 GHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
30.000000 MHz	1.000000 GHz	30.00 kHz	120.00 kHz	1 ms	Auto	0 dB	INPUT2



RBW 120 kHz
 MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP OFF



**C20161291**

08.Jun 16 10:11

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec
 HORIZONTAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 10 dB
Subranges: 4

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	908.370000000 MHz	87.20	Quasi Peak	41.20
1	686.070000000 MHz	35.53	Quasi Peak	-10.47
1	767.790000000 MHz	34.13	Quasi Peak	-11.87
1	626.790000000 MHz	32.38	Quasi Peak	-13.62

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
 VERTICAL 100 cm, 15 deg

Time Domain Scan (1 Range)

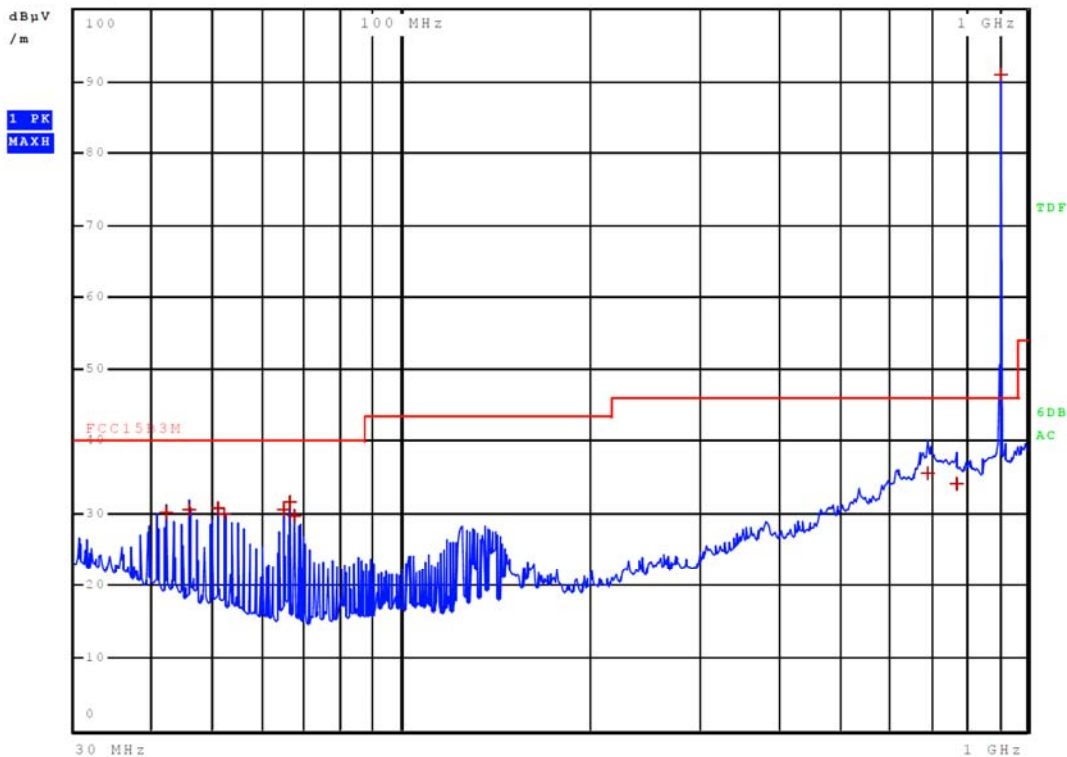
Scan Start: 30 MHz
Scan Stop: 1 GHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
30.000000 MHz	1.000000 GHz	30.00 kHz	120.00 kHz	1 ms	Auto	0 dB	INPUT2



RBW 120 kHz
 MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP OFF



**C20161291**

08.Jun 16 10:23

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec
 VERTICAL 100 cm, 15 deg

Final Measurement

Meas Time: 1 s
Margin: 10 dB
Peaks: 10

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	908.370000000 MHz	90.81	Quasi Peak	44.81
1	66.120000000 MHz	31.66	Quasi Peak	-8.34
1	50.850000000 MHz	30.76	Quasi Peak	-9.24
1	45.780000000 MHz	30.62	Quasi Peak	-9.38
1	64.860000000 MHz	30.60	Quasi Peak	-9.40
1	41.970000000 MHz	30.13	Quasi Peak	-9.87
1	52.110000000 MHz	30.02	Quasi Peak	-9.98
1	67.380000000 MHz	29.69	Quasi Peak	-10.31
1	694.350000000 MHz	35.53	Quasi Peak	-10.47
1	770.970000000 MHz	34.13	Quasi Peak	-11.87


C20161291
Meas Type RADIATED EMISSION

Equipment under Test Z-Wave

Manufacturer GOAP d.o.o.

OP Condition CH0

Operator Andrej Skof

Test Spec

VERTICAL 100 cm, 0 deg

Time Domain Scan (1 Range)
Scan Start: 1 GHz

Scan Stop: 10 GHz

Detector: Trace 1: MAX PEAK Trace 2: Average

Transducer: RE-18GHz

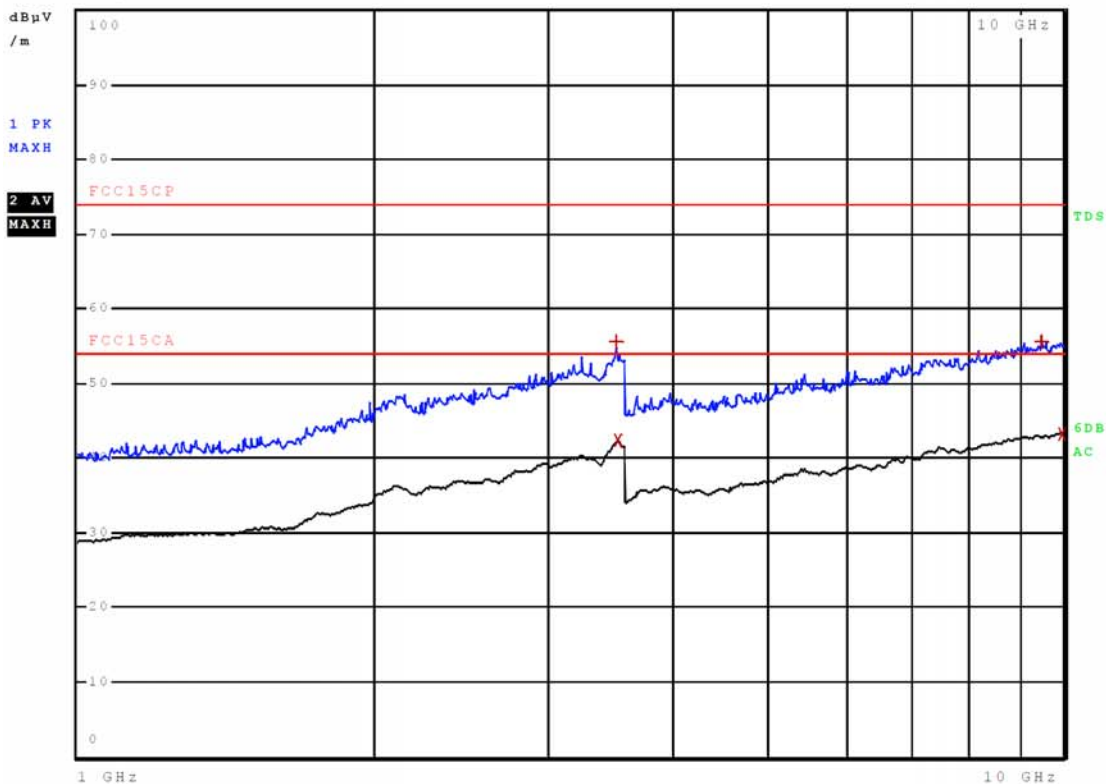
Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamplifier	Input
1.000000 GHz	10.000000 GHz	250.00 kHz	1.00 MHz	1 ms	Auto	35 dB	INPUT1



RBW 1 MHz

MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP ON



**C20161291**

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof
Test Spec
 VERTICAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 4

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
2	9.955000000 GHz	43.27	CISPR Averag	-10.73
2	3.534500000 GHz	42.29	CISPR Averag	-11.71
1	9.494750000 GHz	55.57	Max Peak	-18.43
1	3.524750000 GHz	55.55	Max Peak	-18.45



C20161291

Meas Type RADIATED EMISSION

Equipment under Test Z-Wave

Manufacturer GOAP d.o.o.

OP Condition CH0

Operator Andrej Skof

Test Spec

HORIZONTAL 100 cm, 0 deg

Time Domain Scan (1 Range)

Scan Start: 1 GHz

Scan Stop: 10 GHz

Detector: Trace 1: MAX PEAK Trace 2: Average

Transducer: RE-18GHz

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
1.000000 GHz	10.000000 GHz	250.00 kHz	1.00 MHz	1 ms	Auto	35 dB	INPUT1



RBW 1 MHz

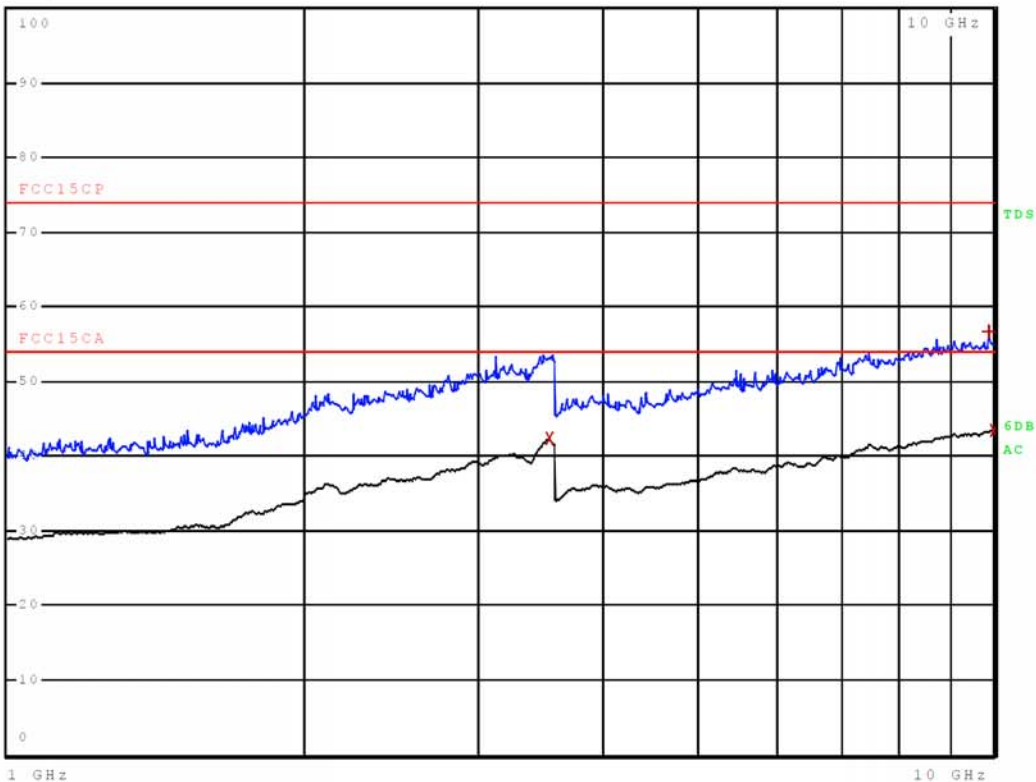
MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP ON

dBμV /m

1 PK MAXH

2 AV MAXH



**C20161291**

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec

HORIZONTAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 3

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
2	9.984000000 GHz	43.30	CISPR Averag	-10.70
2	3.545500000 GHz	42.30	CISPR Averag	-11.70
1	9.888000000 GHz	56.59	Max Peak	-17.41



C20161291

Meas Type RADIATED EMISSION

Equipment under Test Z-Wave

Manufacturer GOAP d.o.o.

OP Condition CH1

Operator Andrej Skof

Test Spec

VERTICAL 100 cm, 0 deg

Time Domain Scan (1 Range)

Scan Start: 1 GHz

Scan Stop: 10 GHz

Detector: Trace 1: MAX PEAK Trace 2: Average

Transducer: RE-18GHz

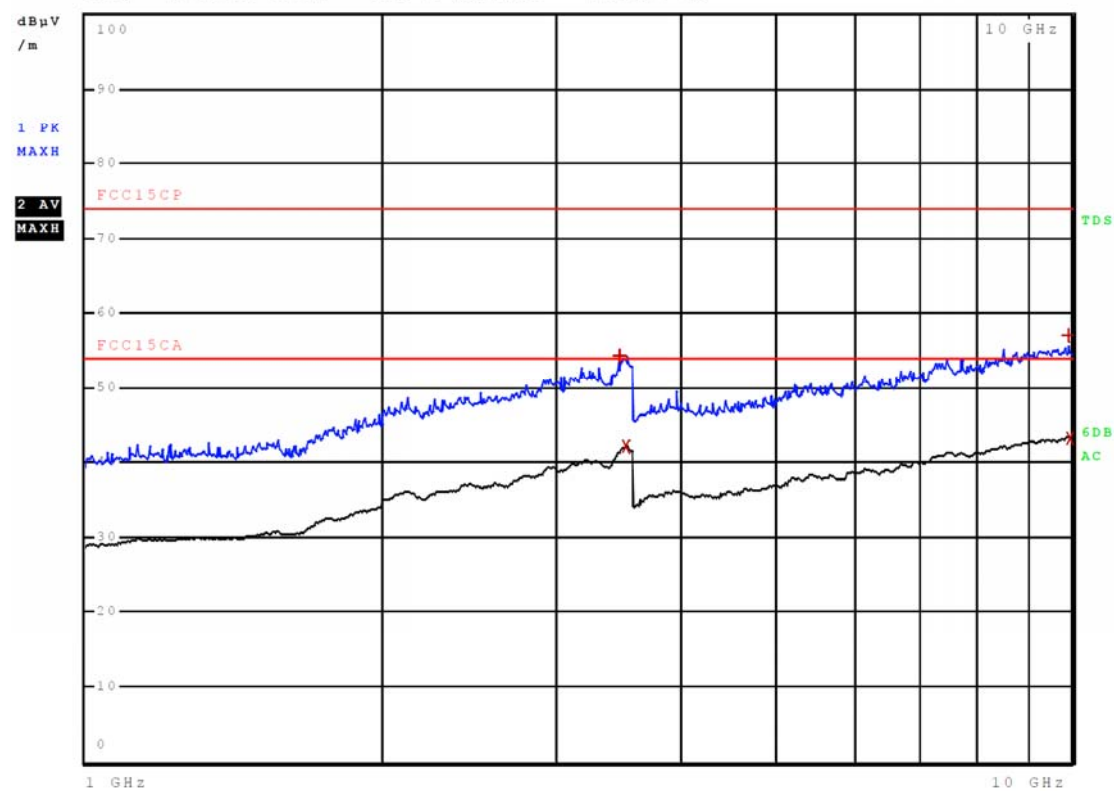
Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
1.000000 GHz	10.000000 GHz	250.00 kHz	1.00 MHz	1 ms	Auto	35 dB	INPUT1



RBW 1 MHz

MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP ON



**C20161291**

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
 VERTICAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 4

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
2	9.977000000 GHz	43.24	CISPR Averag	-10.76
2	3.537750000 GHz	42.20	CISPR Averag	-11.80
1	9.909750000 GHz	57.07	Max Peak	-16.93
1	3.482250000 GHz	54.29	Max Peak	-19.71



C20161291

Meas Type RADIATED EMISSION

Equipment under Test Z-Wave

Manufacturer GOAP d.o.o.

OP Condition CH1

Operator Andrej Skof

Test Spec

HORIZONTAL 100 cm, 0 deg

Time Domain Scan (1 Range)

Scan Start: 1 GHz

Scan Stop: 10 GHz

Detector: Trace 1: MAX PEAK Trace 2: Average

Transducer: RE-18GHz

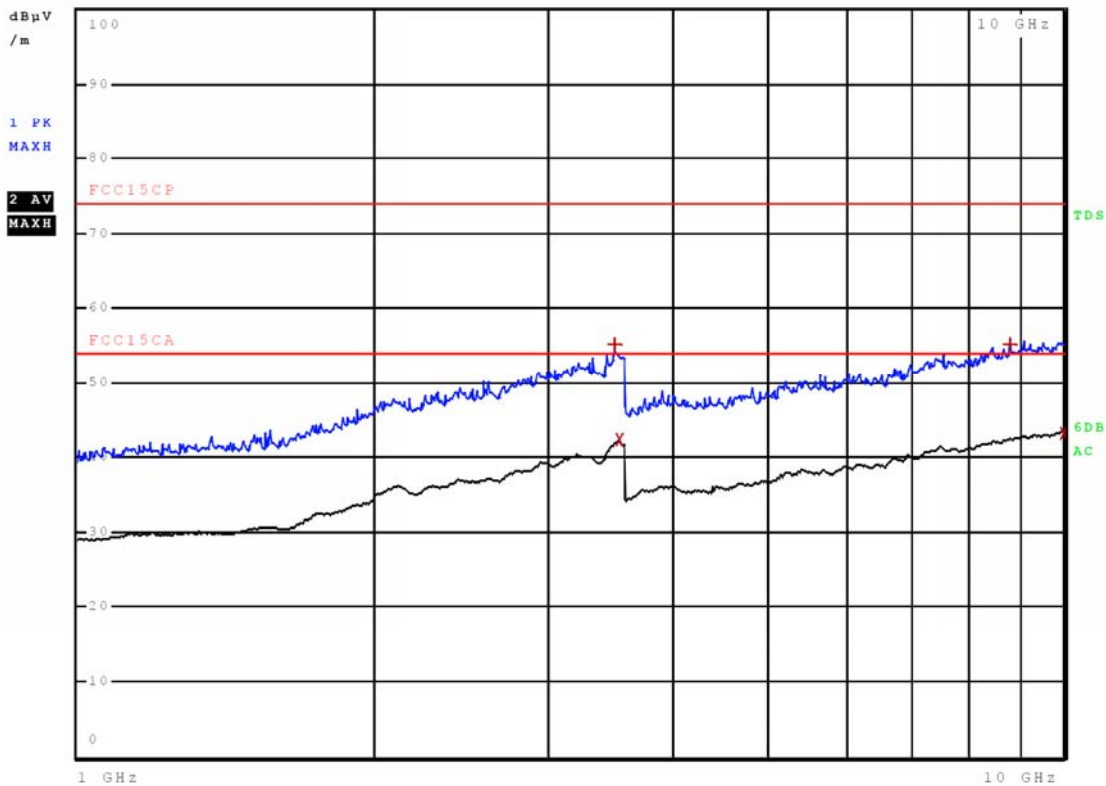
Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
1.000000 GHz	10.000000 GHz	250.00 kHz	1.00 MHz	1 ms	Auto	35 dB	INPUT1



RBW 1 MHz

MT 1 s

Step TD AUTO PULSE Att 0 dB AUTO PREAMP ON



**C20161291**

Meas Type RADIATED EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
 HORIZONTAL 100 cm, 0 deg

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 4

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
2	9.989750000 GHz	43.27	CISPR Averag	-10.73
2	3.543250000 GHz	42.24	CISPR Averag	-11.76
1	3.502250000 GHz	55.16	Max Peak	-18.84
1	8.820000000 GHz	55.05	Max Peak	-18.95

7.2.5 Test result (15.215)

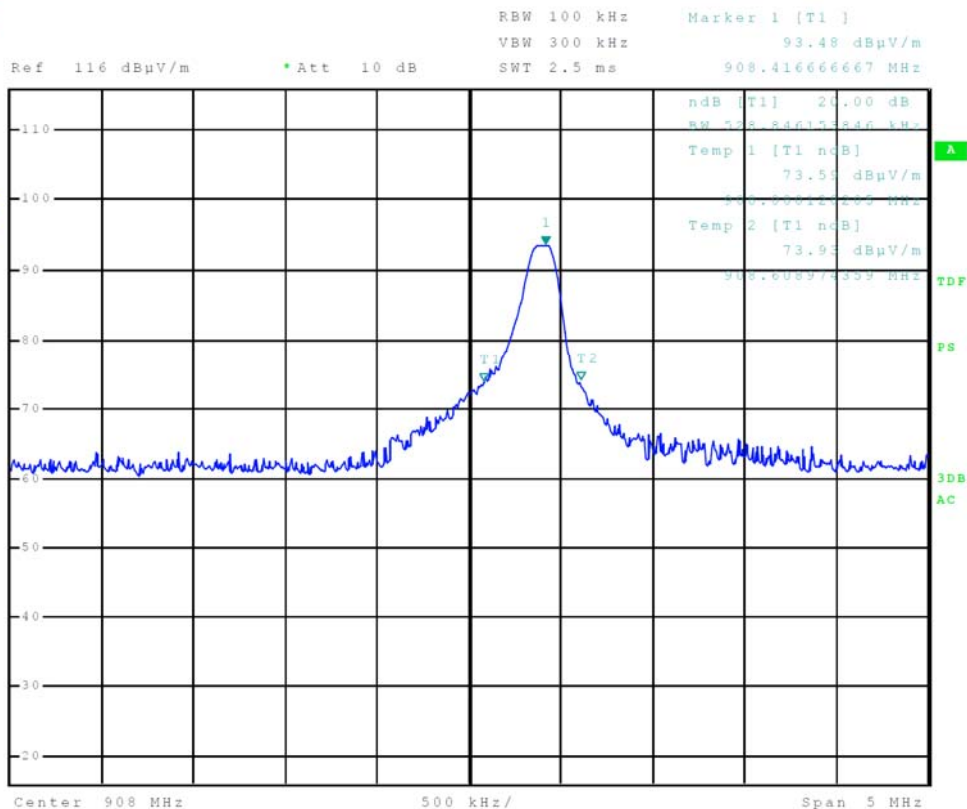

ROHDE & SCHWARZ
C20161291

08.Jun 16 10:39

Meas Type BANDWIDTH OF THE EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
 VERTICAL 100 cm, 300 deg

Sweep Settings Screen A

Center Frequency	908.000000 MHz	Ref Level	116.000 dBμV/m
Frequency Offset	0.000000 Hz	Ref Level Offset	0.000 dB
Span	5.000000 MHz	Ref Position	100.000 %
Start Frequency	905.500000 MHz	Level Range	100.000 dB
Stop Frequency	910.500000 MHz	RF Att	10.000 dB
RBW	100.000000 kHz	X-Axis	LIN
VBW	300.000000 kHz	Y-Axis	LOG
Sweep Time	2.50 ms		



**C20161291**

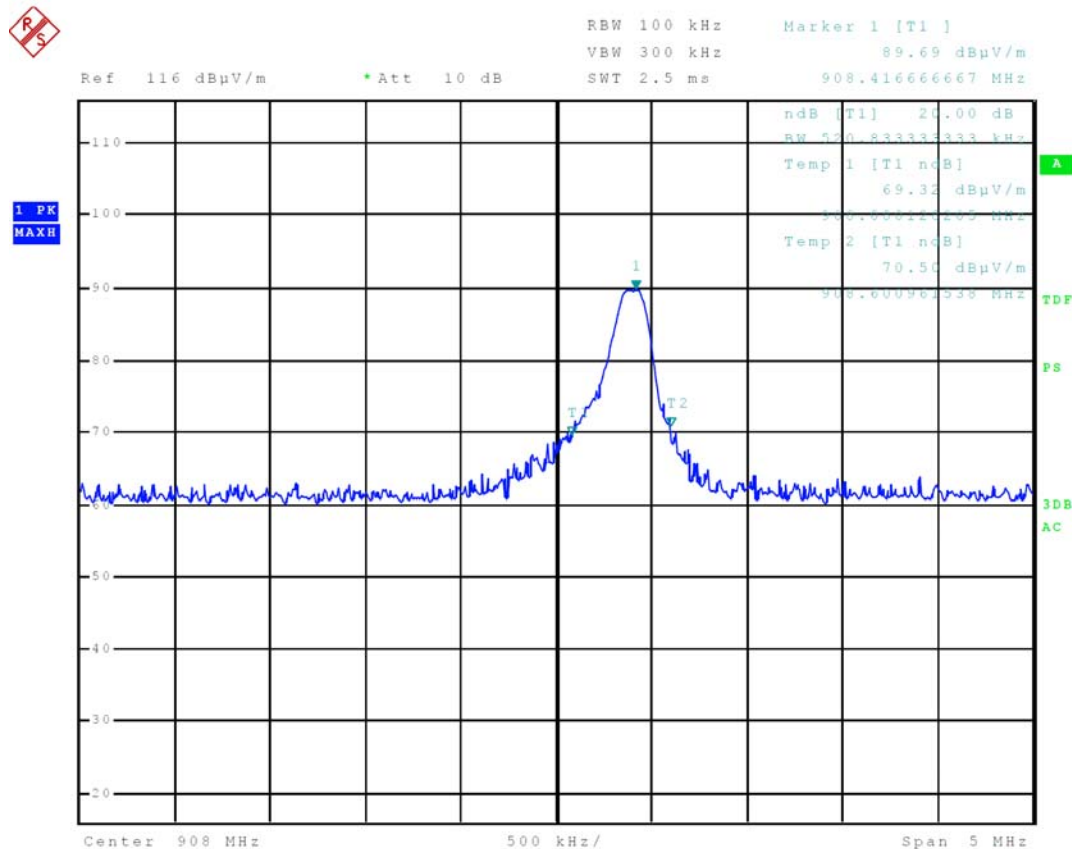
08.Jun 16 10:42

Meas Type BANDWIDTH OF THE EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec
 HORIZONTAL 167 cm, 245 deg

Sweep Settings Screen A

Center Frequency	908.000000 MHz	Ref Level	116.000 dBμV/m
Frequency Offset	0.000000 Hz	Ref Level Offset	0.000 dB
Span	5.000000 MHz	Ref Position	100.000 %
Start Frequency	905.500000 MHz	Level Range	100.000 dB
Stop Frequency	910.500000 MHz	RF Att	10.000 dB
RBW	100.000000 kHz		
VBW	300.000000 kHz	X-Axis	LIN
Sweep Time	2.50 ms	Y-Axis	LOG



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 10:49

Meas Type BANDWIDTH OF THE EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
VERTICAL 100 cm, 300 deg

Sweep Settings Screen A

Center Frequency	916.000000 MHz	Ref Level	116.000 dBμV/m
Frequency Offset	0.000000 Hz	Ref Level Offset	0.000 dB
Span	5.000000 MHz	Ref Position	100.000 %
Start Frequency	913.500000 MHz	Level Range	100.000 dB
Stop Frequency	918.500000 MHz	RF Att	10.000 dB
RBW	100.000000 kHz	X-Axis	LIN
VBW	300.000000 kHz	Y-Axis	LOG
Sweep Time	2.50 ms		

**MARKER 1**

915.9839744 MHz

Ref 116 dBμV/m * Att 10 dB

RBW 100 kHz

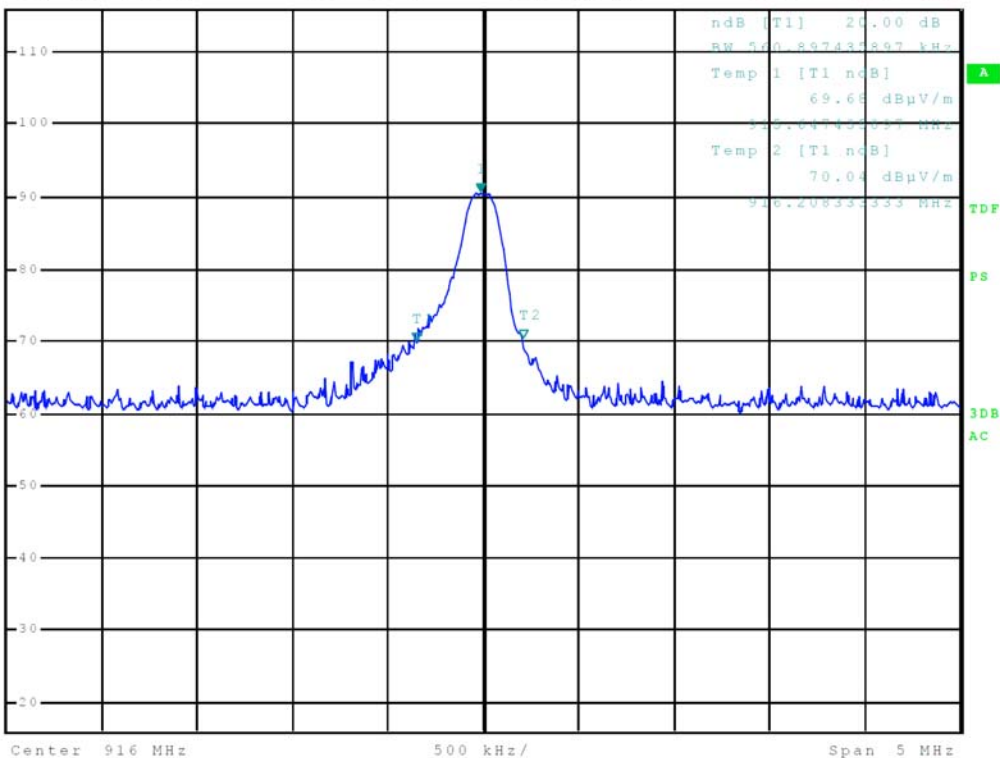
Marker 1 [T1]

VBW 300 kHz

90.38 dBμV/m

SWT 2.5 ms

915.983974359 MHz

1 PK
MAXH

**C20161291**

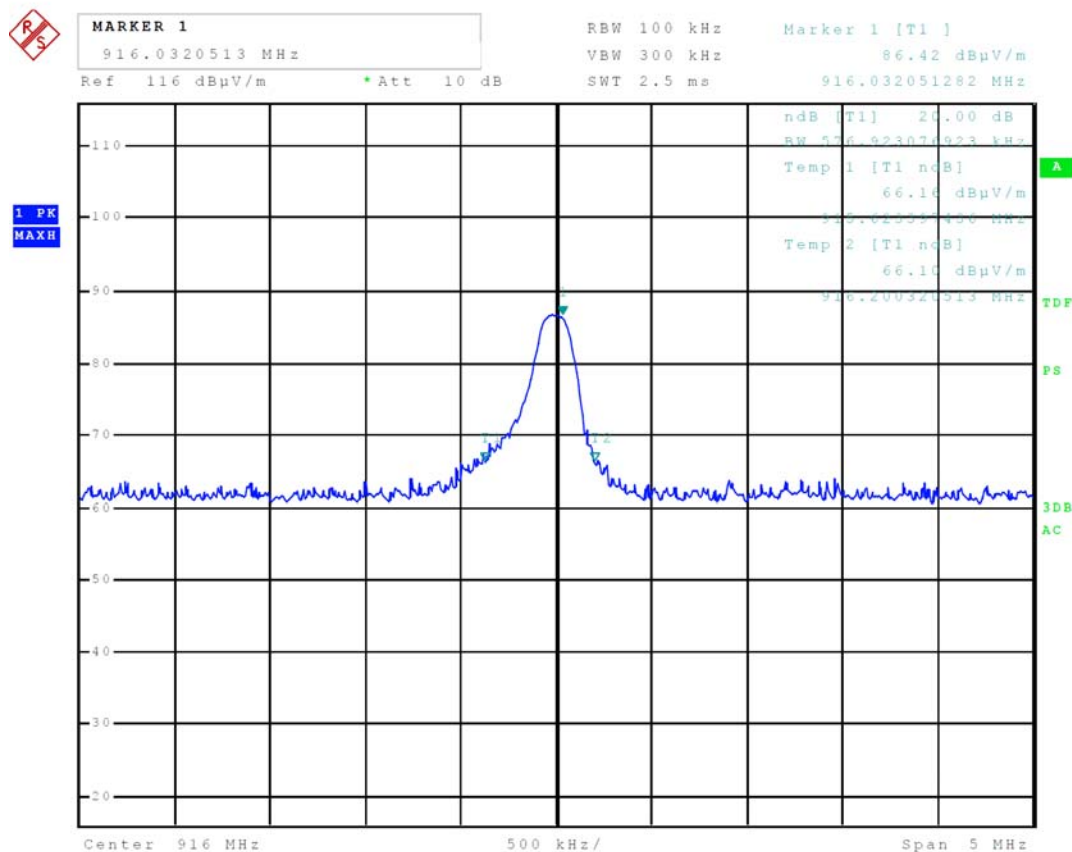
08.Jun 16 10:47

Meas Type BANDWIDTH OF THE EMISSION
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec
 HORIZONTAL 167 cm, 245 deg

Sweep Settings Screen A

Center Frequency	916.000000 MHz	Ref Level	116.000 dBμV/m
Frequency Offset	0.000000 Hz	Ref Level Offset	0.000 dB
Span	5.000000 MHz	Ref Position	100.000 %
Start Frequency	913.500000 MHz	Level Range	100.000 dB
Stop Frequency	918.500000 MHz	RF Att	10.000 dB
RBW	100.000000 kHz		
VBW	300.000000 kHz	X-Axis	LIN
Sweep Time	2.50 ms	Y-Axis	LOG



**Tabulated results – Occupied Bandwidth:**

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Frequency at 20 dB BW closest to Band Edge (MHz)	Delta to Band Edge (MHz)
1 (Lo)	908,42	0,528	908,08	6,08
0 (Hi)	916,03	0,577	916,20	11,80

Note: Presented are worst case results for each channel.

7.2.6 Test result (15.249)


ROHDE & SCHWARZ
C20161291

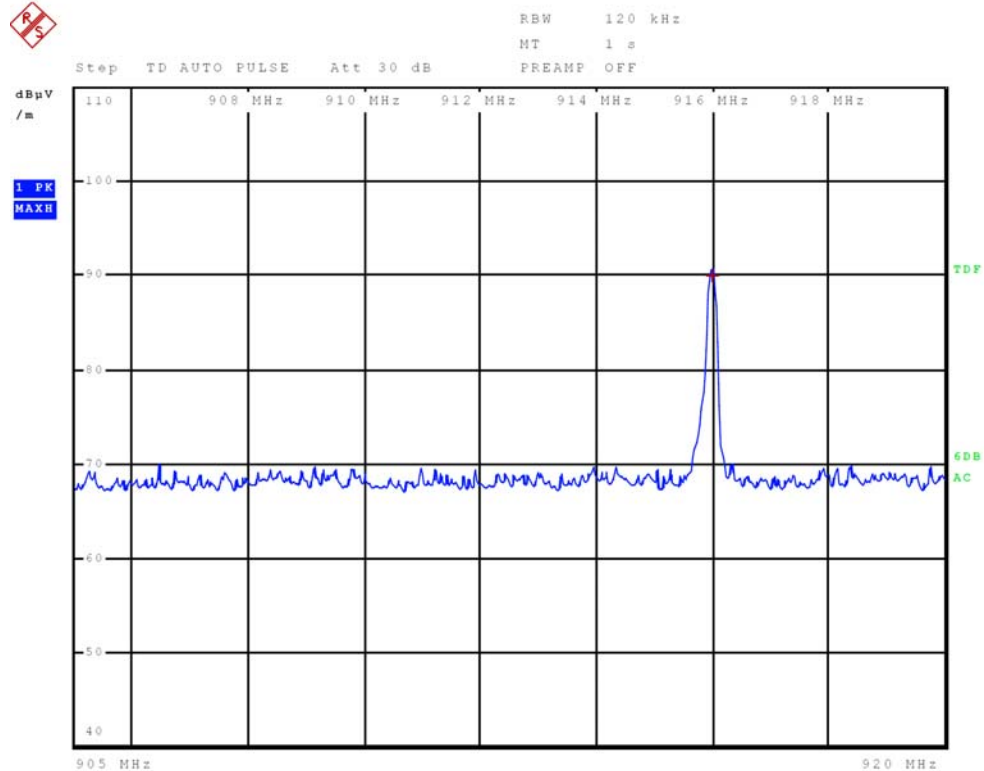
08.Jun 16 10:01

Meas Type EMISSION OF THE CARRIER
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof
Test Spec
 VERTICAL 100 cm, 300 deg

Time Domain Scan (1 Range)

Scan Start: 905 MHz
Scan Stop: 920 MHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
905.000000 MHz	920.000000 MHz	30.00 kHz	120.00 kHz	1 ms	30 dB	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 10:01

Meas Type EMISSION OF THE CARRIER
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec
VERTICAL 100 cm, 300 deg

Final Measurement

Meas Time: 1 s
Margin: 6 dB
Peaks: 1

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	915.980000000 MHz	89.94	Quasi Peak	

**C20161291**

08.Jun 16 10:03

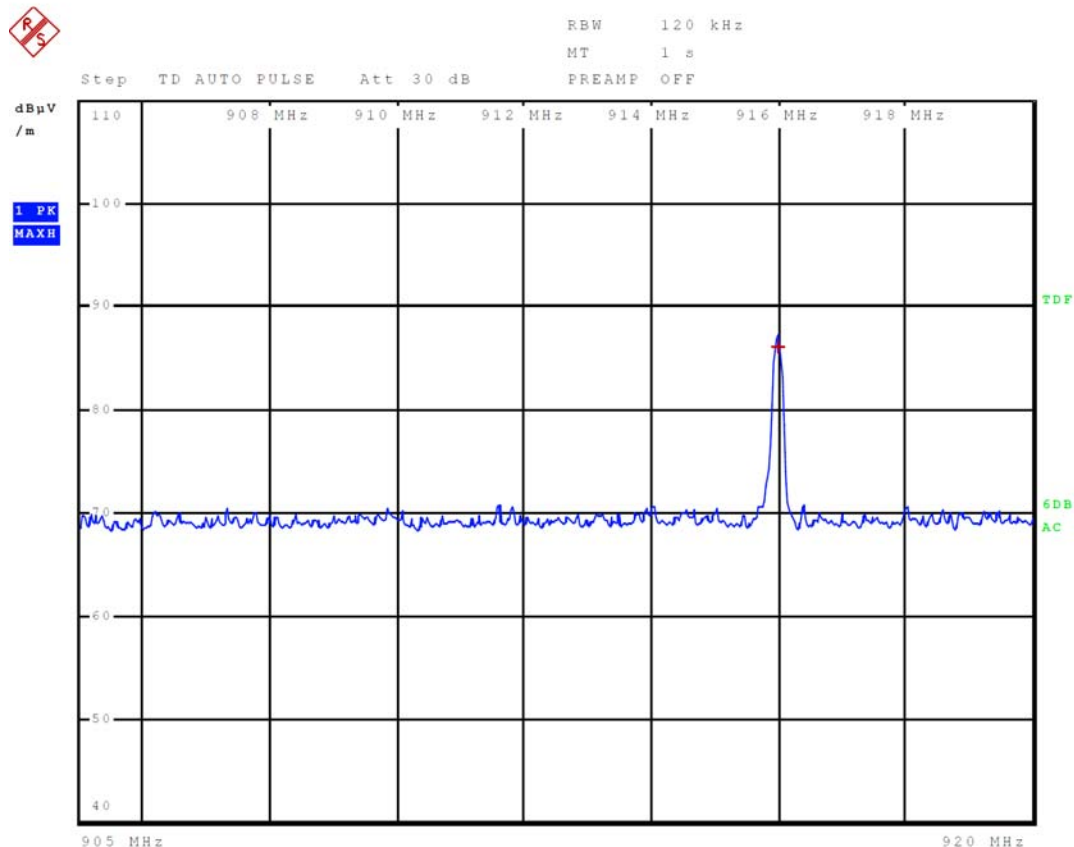
Meas Type EMISSION OF THE CARRIER
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec
 HORIZONTAL 167 cm, 245 deg

Time Domain Scan (1 Range)

Scan Start: 905 MHz
Scan Stop: 920 MHz
Detector: Trace 1: MAX PEAK
Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
905.000000 MHz	920.000000 MHz	30.00 kHz	120.00 kHz	1 ms	30 dB	0 dB	INPUT2



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 10:03

Meas Type EMISSION OF THE CARRIER
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH0
Operator Andrej Skof

Test Spec
HORIZONTAL 167 cm, 245 deg

Final Measurement

Meas Time: 1 s
Margin: 6 dB
Peaks: 1

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	915.980000000 MHz	86.09	Quasi Peak	

**C20161291**

08.Jun 16 09:49

Meas Type EMISSION OF THE CARRIER
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof

Test Spec
 VERTICAL 100 cm, 300 deg

Time Domain Scan (1 Range)

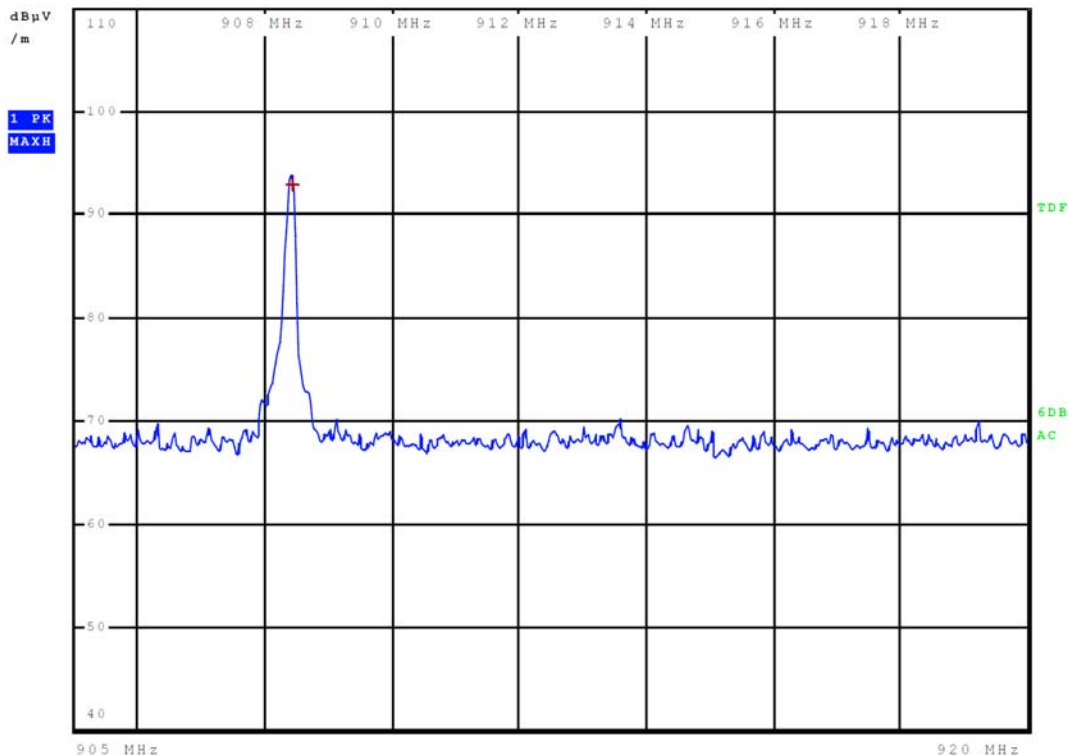
Scan Start: 905 MHz
 Scan Stop: 920 MHz
 Detector: Trace 1: MAX PEAK
 Transducer: 3142B3m

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
905.000000 MHz	920.000000 MHz	30.00 kHz	120.00 kHz	1 ms	30 dB	0 dB	INPUT2



RBW 120 kHz
 MT 1 s
 PREAMP OFF

Step TD AUTO PULSE Att 30 dB



**ROHDE & SCHWARZ****C20161291**

08.Jun 16 09:49

Meas Type EMISSION OF THE CARRIER
Equipment under Test Z-Wave
Manufacturer GOAP d.o.o.
OP Condition CH1
Operator Andrej Skof
Test Spec
VERTICAL 100 cm, 300 deg

Final Measurement

Meas Time: 1 s
Margin: 6 dB
Peaks: 1

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	908.420000000 MHz	92.91	Quasi Peak	

**Tabulated results – Emission of the Carrier**

Channel	Frequency (MHz)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Delta to Limit (dB)
1	908,37	89,13	94,00	-4,87
0	915,97	86,09	94,00	-7,91

Note: Presented are worst case results for each channel.