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Report Reference ID:	149852-1TRFWL

Test specification:	Title 47 - Telecommunication Chapter I - Federal Communications Commission Subchapter A - General Part 15 - Radio Frequency Devices Subpart C - Intentional Radiators – **§15.249 - Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz and 24.0–24.25 GHz**

Applicant:	META System S.p.A. Via Majakovskij 10/b/c/d/e Reggio Emilia, I-42124; Italy
Apparatus:	Microwave sensor for volumetric protection
FCC ID:	P3O001692
Model:	MUW II

Testing laboratory:	Nemko Spa Via del Carroccio, 4 I 20853 Biassono (Italy) Telephone: +039 039 2201201 Facsimile: +39 039 220 1221

	Name and title	**Date**
Tested by:	Daniele Guarnone Wireless/EMC Specialist	2011-05-11
Reviewed by:	Gabriele Curioni, Wireless/EMC Specialist	2011-05-11

Table of contents

Section 1: Report summary

1.1 Test specification

Specifications	**FCC Part 15 Subpart C, 15.249** **Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz and 24.0–24.25 GHz**

1.2 Statement of compliance

Compliance	In the configuration tested the EUT was found compliant Yes ☒ No ☐ This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko Canada Inc. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15; Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003.

1.3 Exclusions

Exclusions	None

1.4 Registration number

Test site FCC ID number	**P3O001692**

1.5 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued
R1TRF	XXX

1.6 Limits of responsibility

The date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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Section 2: Summary of test results

2.1 FCC Part 15 Subpart C – Intentional Radiators, test results

General requirements for FCC Part 15

Part	Test description	Verdict
§15.31(e)	Variation of power source	Pass
§15.31(m)	Number of operating frequencies	Pass
§15.203	Antenna requirement	Pass
§15.207(a)	Conducted limits	N/A
§15.215(c)	20 dB bandwidth	Pass

Specific requirements for FCC Part 15 Subpart C, 15.249

Part	Test description	Verdict
§15.249(a)	Radiated emissions not in restricted bands	Pass
§15.249(b)	Fixed Point-to-Point operation in the 24.0–24.25 GHz band	N/A
§15.249(d)	Spurious emissions (except harmonics)	Pass

Notes: None

Section 3: Equipment under test (EUT) and application details

3.1 Applicant details

Applicant complete business name	Name:	META System S.p.A Via Majakovskij 10/b/c/d/e I-421124, Reggio Emilia, Italy
	Federal Registration Number (FRN):	0006537807
	Grantee code	P3O
Mailing address	Address: City: Province/State: Post code: Country:	info@metasystem.it Reggio Emilia Reggio Emilia -- Italy

3.2 Modular equipment

a) Single modular approval	Single modular approval Yes ☐ No ☒
b) Limited single modular approval	Limited single modular approval Yes ☐ No ☒

3.3 Product details

FCC ID	Grantee code:	**P3O**
	Product code:	**001692**
Equipment class	DSC – Part 15 Remote Control/Security Device Transmitter	
Description of product as it is marketed	Microwave sensor for volumetric protection	
	Model name/number:	MUW II
	Serial number:	--

3.4 Application purpose

Type of application	☒ Original certification ☐ Change in identification of presently authorized equipment Original FCC ID: Grant date: ☐ Class II permissive change or modification of presently authorized equipment

3.5 Composite/related equipment

a) Composite equipment	The EUT is a composite device subject to an additional equipment authorization Yes ☐ No ☒
b) Related equipment	The EUT is part of a system that operates with, or is marketed with, another device that requires an equipment authorization Yes ☐ No ☒
c) Related FCC ID	If either of the above is “yes”: ☐ has been granted under the FCC ID(s) listed below: ☐ is in the process of being filled under the FCC ID(s) listed below: ☐ is pending with the FCC ID(s) listed below: ☐ has a mix of pending and granted statues under the FCC ID(s) listed below: i FCC ID: ii FCC ID:

3.6 Sample information

Receipt date:	2010-07-22
Nemko sample ID number:	152185

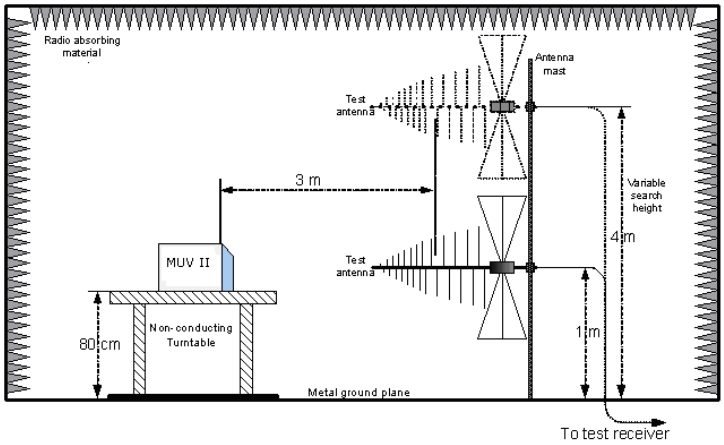
3.7 EUT technical specifications

Operating band:	5725 - 5875 MHz
Operating frequency:	5784 MHz
Modulation type:	pulsed
Occupied bandwidth:	143.787MHz
Channel spacing:	150 MHz
Emission designator:	144MP0N
Antenna type:	Integral
Power source:	12 VDC

3.8 Operation of the EUT during testing

Details:	Transmitting at maximum power

3.9 EUT setup diagram



Section 4: Engineering considerations

4.1 Modifications incorporated in the EUT

Modifications	Modifications performed to the EUT during this assessment None ☒ Yes ☐, performed by Client ☐ or Nemko ☐ Details:

4.2 Deviations from laboratory tests procedures

Deviations	Deviations from laboratory test procedures None ☒ Yes ☐ - details are listed below:

4.3 Technical judgment

Judgment	None

Section 5: Test conditions

5.1 Power source and ambient temperatures

Normal temperature, humidity and air pressure test conditions	Temperature: 15–30 ℃ Relative humidity: 20–75 % Air pressure: 86–106 kPa When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.
Power supply range:	The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6: Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the Nemko Spa Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Section 7: Test equipment

7.1 Test equipment list

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next cal.
Emi Test Receiver 20 Hz ÷ 5 GHz	R&S	ESBI	828038/003	08/2011
Spectrum Analizer 9 KHz ÷ 40 GHz	R&S	FSEK	848255/005	09/2011
Trilog Broad Band Antenna 25 MHz÷2 GHz	Schwarzbeck	VULB 9168	VULB 9168-242	08/2013
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	08/2013
Shielded room	Siemens	10m control room	1947	08/2013
Broadband preamplifier	Schwarzbeck	BBV 9718	9718-137	05/2011
Bilog antenna 1 ÷18 GHz	Schwarzbeck	STLP 9148-123	123	09/2011
Double Ridged Waveguide Horn	RF SPIN	DRH40	061106a40	08/2013
Wide band Amplifier 18 GHz ÷ 40 GHz	MITEQ	AMF-5F-18004000-37-8P	128061	08/2011

Note: N/A = Not applicable, NCR = No cal required, COU = Cal on use

Section 8: Testing data

8.1 Clause 15.31(e) Variation of power source

§ 15.31 Measurement standards.

(e) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. For battery-operated equipment, the equipment tests shall be performed using a new battery.

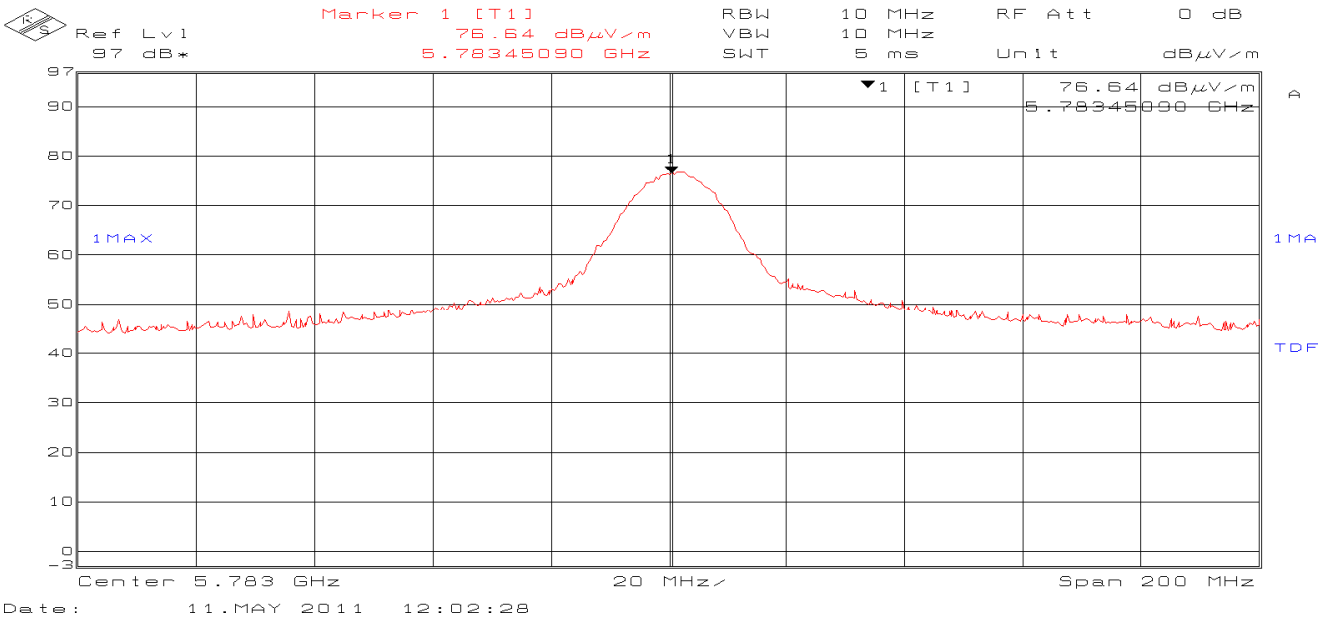
Special notes

None

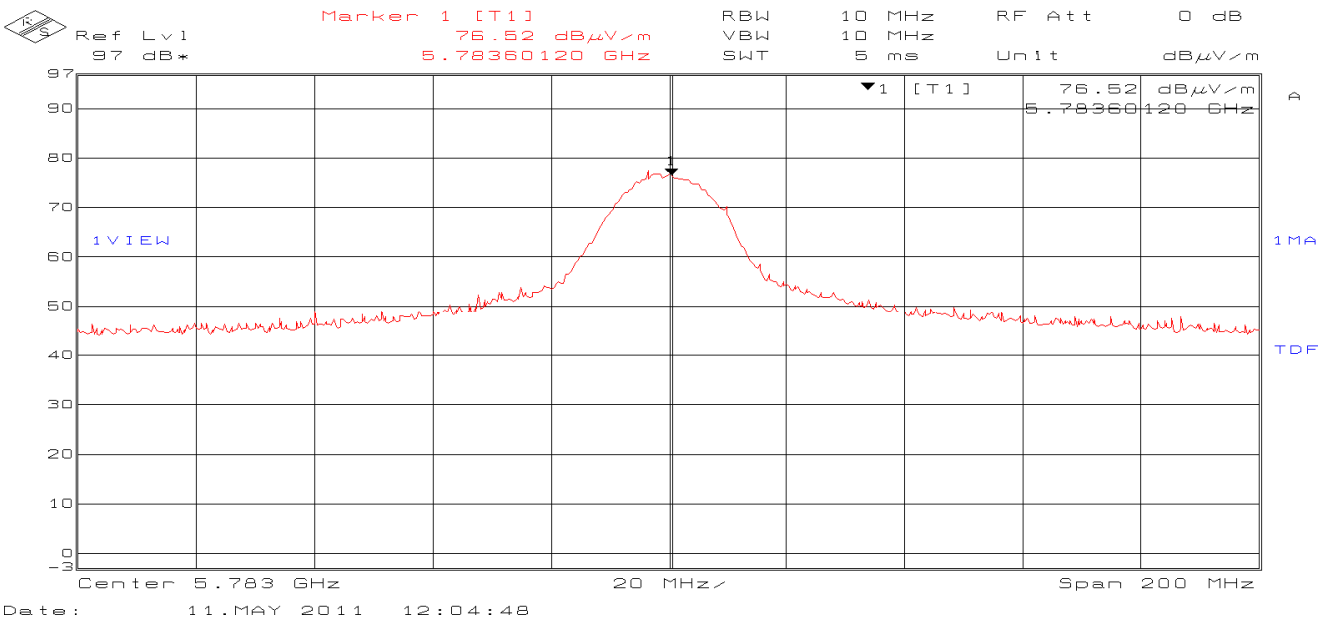
Test data

– Transmit output power was measured while supply voltage was varied from 10.2 VAC to 13.8 Vdc (85 % to 115 % of the nominal rated supply voltage). No change in transmit output power was observed.

13.8 Vdc



10.2 Vdc



8.2 Clause 15.31(m) Number of operating frequencies

§ 15.31 Measurement standards.

(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz and less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Special notes

None

Test data

The frequency band is 5725 - 5875 MHz and number of operating frequencies is 1

Low frequency / channel	--
Mid frequency / channel	--
High frequency / channel	--

8.3 Clause 15.203 Antenna requirement

§ 15.203 Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

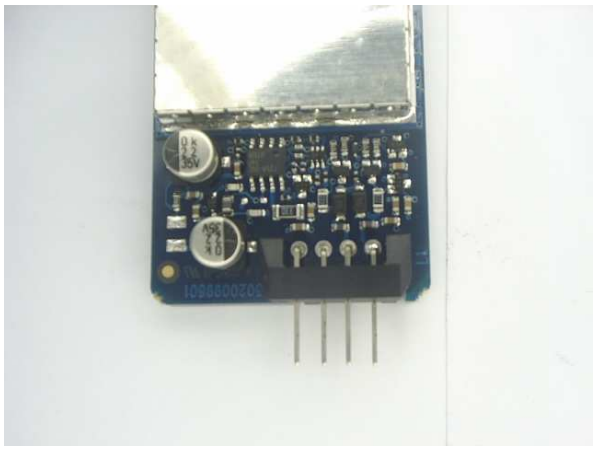
Special notes

None

Test data

The EUT uses a non-detachable antenna to the intentional radiator.

Detailed photo of printed circuit antenna



8.4 Clause 15.207(a) Conducted limits

§ 15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50
*-Decreases with the logarithm of the frequency.		

Special notes

N/A

Test data

N/A

The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance.

A preview measurement was generated with the receiver in continuous scan mode Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver/Spectrum analyzer settings:	
0.15 MHz to 30 MHz	
Preview measurements	**Final measurement**
Receiver: 9 kHz RBW, Peak and Average detector, max hold	Receiver: 9 kHz RBW, Quasi-peak and Average detector
Measurement time 100 ms	

Test data, continued

Tabular results

Frequency (MHz)	Q-Peak result (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Conductor	Correction (dB)	Margin (dB)	Limit (dBµV)
--	--	--	--	--	--	-	--	--

Frequency (MHz)	Average result (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Conductor	Correction (dB)	Margin (dB)	Limit (dBµV)
--	--	--	--	--	--	--	--	--

Notes

Correction factor includes cable loss, LISN, and attenuator.
Result measurement is a summation of the raw measurement value and the correction factor.

8.5 Clause 15.215(c) Emission bandwidth

§ 15.215 Additional provisions to the general radiated emission limitations

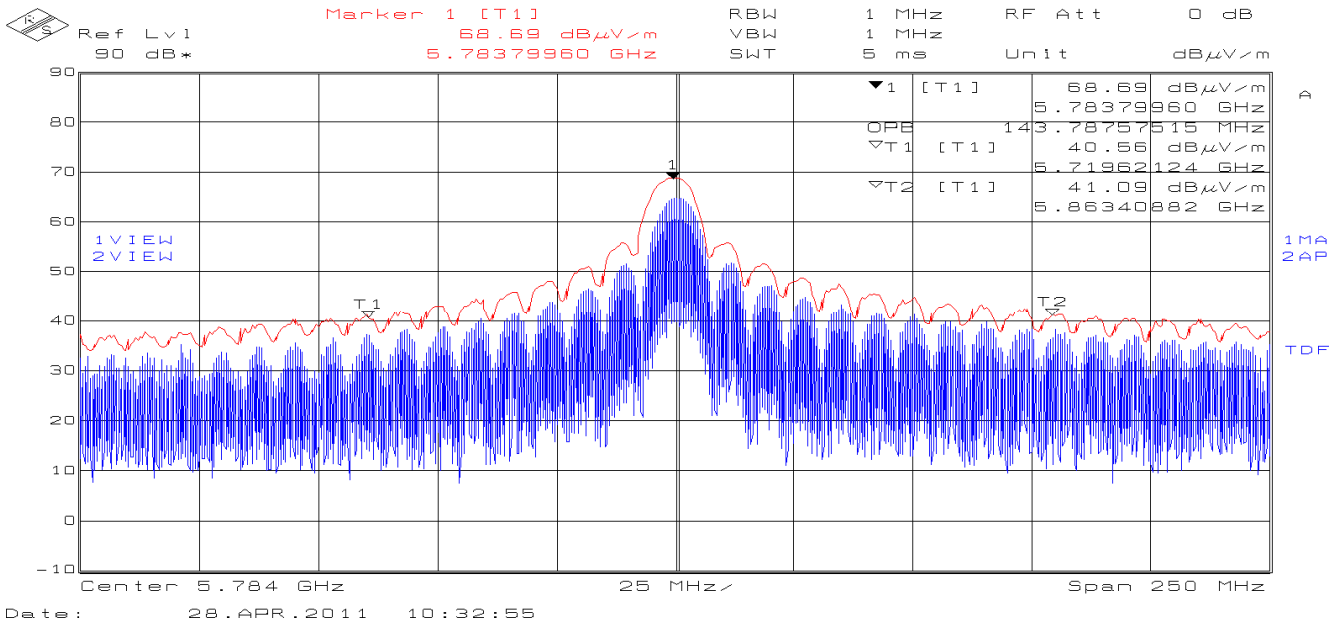
(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80 % of the permitted band in order to minimize the possibility of out-of-band operation.

Special notes

The test was performed using peak detector of the spectrum analyzer with RBW no narrower than 1 % of the emission bandwidth.

Test data

Measured results



99 percent emission bandwidth (MHz)	Limit (MHz)	Margin (MHz)
143.78757515	150	6.212425

Notes:
26/t = 200E6 Hz
½ main lobe width 1/t = 200E6/26 = 7.69 MHz

8.6 Clause 15.249(a) Field strength of radiated emissions not in restricted bands

§ 15.249 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental		Field strength of spurious emissions	
	(mV/m)	(dBµV/m)	(µV/m)	(dBµV/m)
902–928	50	94	500	54
2400–2483.5	50	94	500	54
5725–5875	50	94	500	54
24.0–24.25	250	108	2500	68

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of **this section are based on average limits**. **However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.** For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter (128 dBµV/m) at 3 meters along the antenna azimuth.

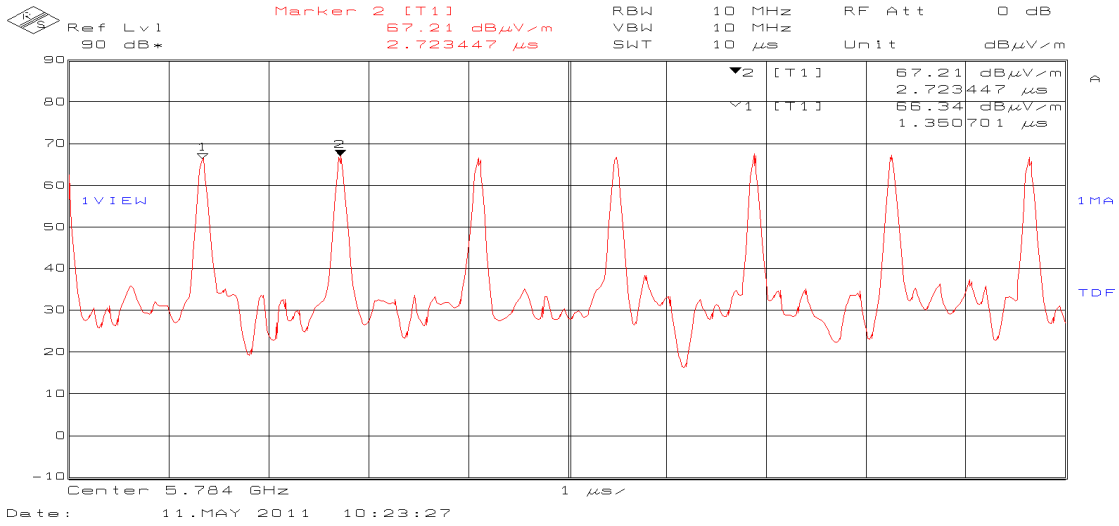
Special notes

- The spectrum was searched from 30 MHz to the 10th harmonic.
- The EUT was measured on three orthogonal axis.
- All measurements were performed at a distance of 3 m.
- All measurements were performed:
  - within 30–1000 MHz range: using a quasi-peak detector with 120 kHz/300 kHz RBW/VBW,
  - above 1 GHz: using peak detector with 10 MHz/10 MHz RBW/VBW for peak results
  - RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal

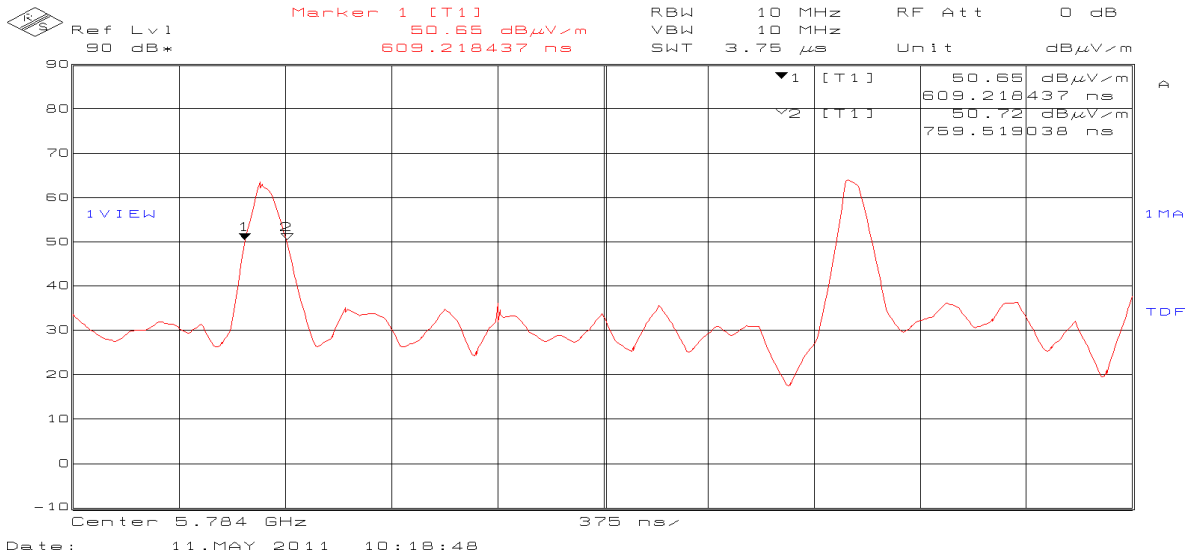
The average value is total peak – duty cycle

Test data

Duty cycle/average factor calculations



Pulse ripetition = 0.001373 mS



Pulse width= 0.00015 mS

$$Duty\,cycle\,/\,average\,factor = 20\times\log_{10}\left(\frac{Tx_{100\,ms}}{100\,ms}\right)$$ =**--19 dB**

Test data, continued

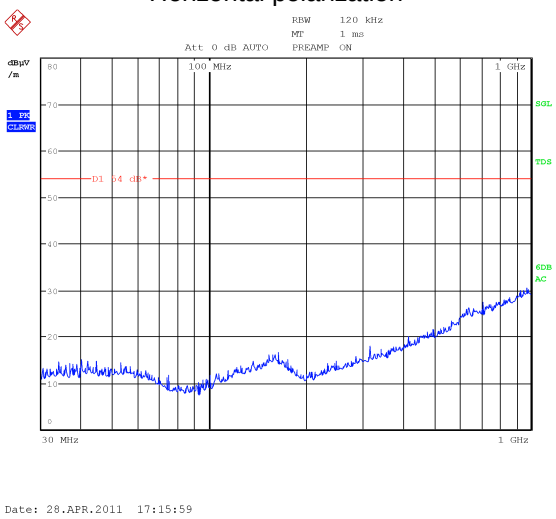
Test facility	Measuring distance (m)	Antenna height variation (m)	Turn table position (°)
10 m Semi anechoic chamber	3	1–4	0–360

Results

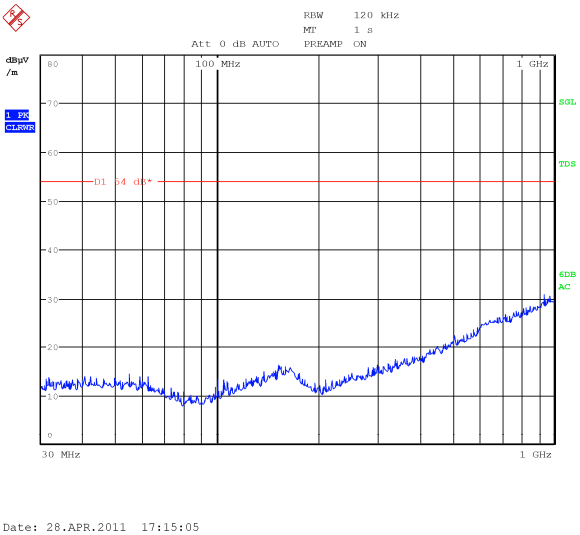
Refer to spectral plots and tables of this section.

Spectral plots

Horizontal polarization



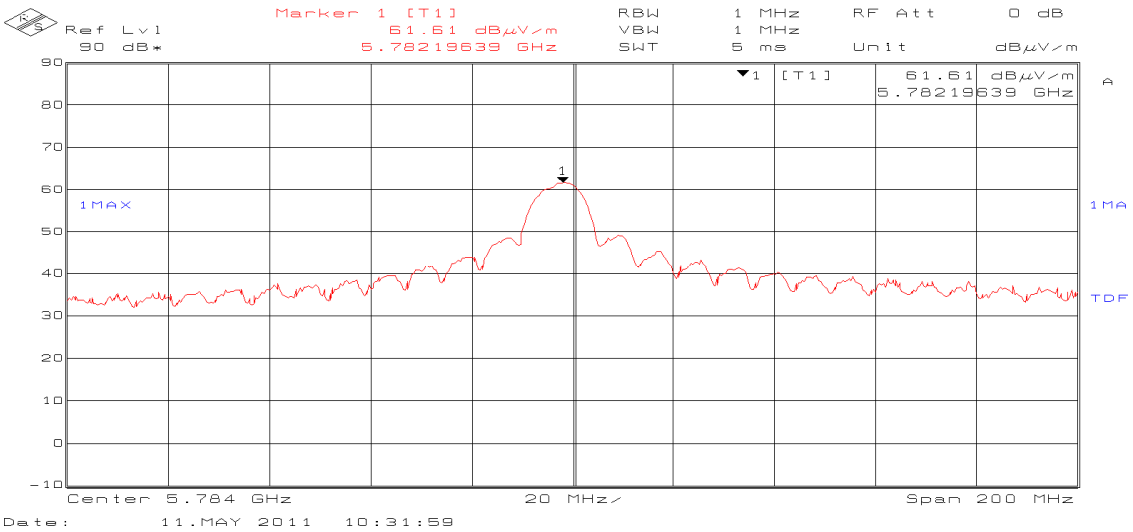
Vertical polarization



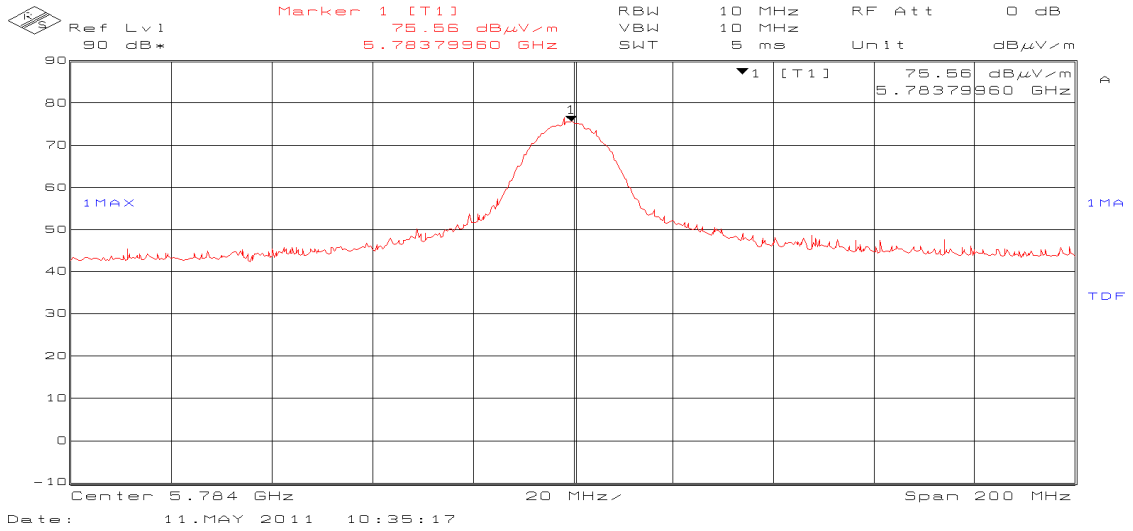
Nemko Spa Via del Carroccio, 4 I 20853 Biassono (Italy)	**Section 8:** Testing data	**Product:** MUW II	
	Test name: Clause 15.215(c) Emission bandwidth		
	Test date: 2011-05-11	**Test engineer:** Daniele Guarnone	
	Verdict: Pass	**Supply input:** linear dc power supply	
	Temperature: 23℃	**Air pressure:** 1019 mbar	**Relative humidity:**57 %
	Specification: FCC Part 15 Subpart C		

Spectral plots

Horizontal polarization: fundamental



RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal.



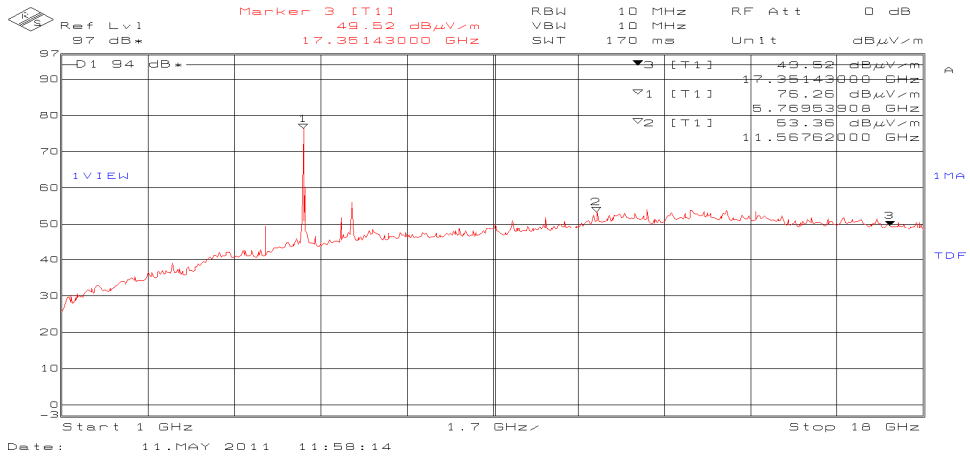
Test facility	Measuring distance (m)	Antenna height variation (m)	Turn table position (°)
10 m Semi anechoic chamber	3	1–4	0–360

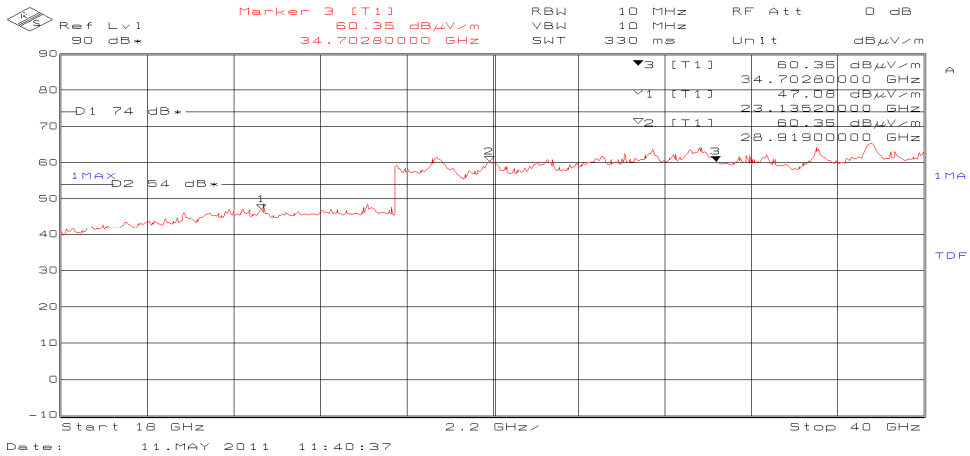
Results

Refer to spectral plots and tables of this section.

Spectral plots

Horizontal polarization





Test data, continued

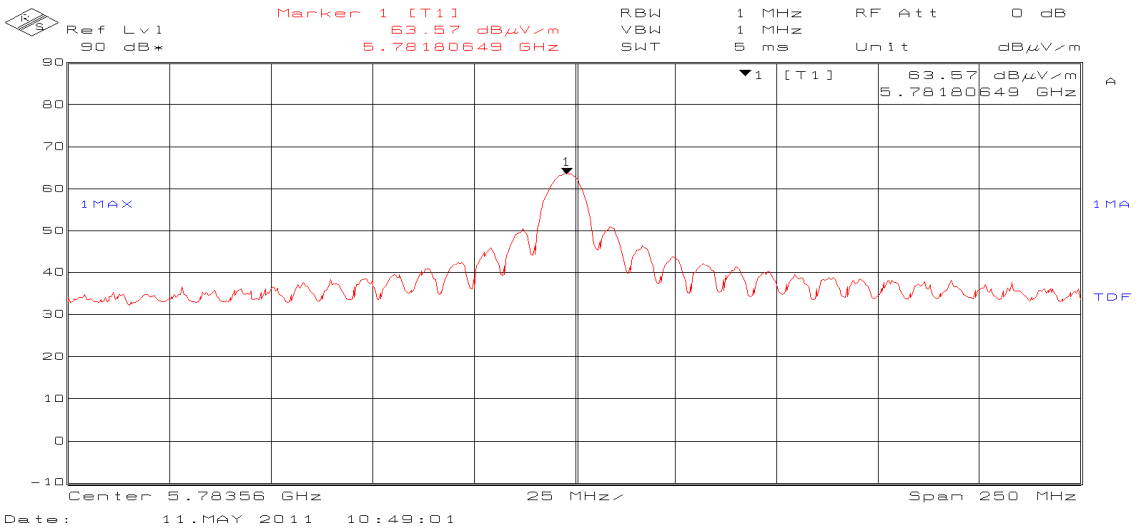
Test facility	Measuring distance (m)	Antenna height variation (m)	Turn table position (°)
10 m Semi anechoic chamber	3	1–4	0–360

Results

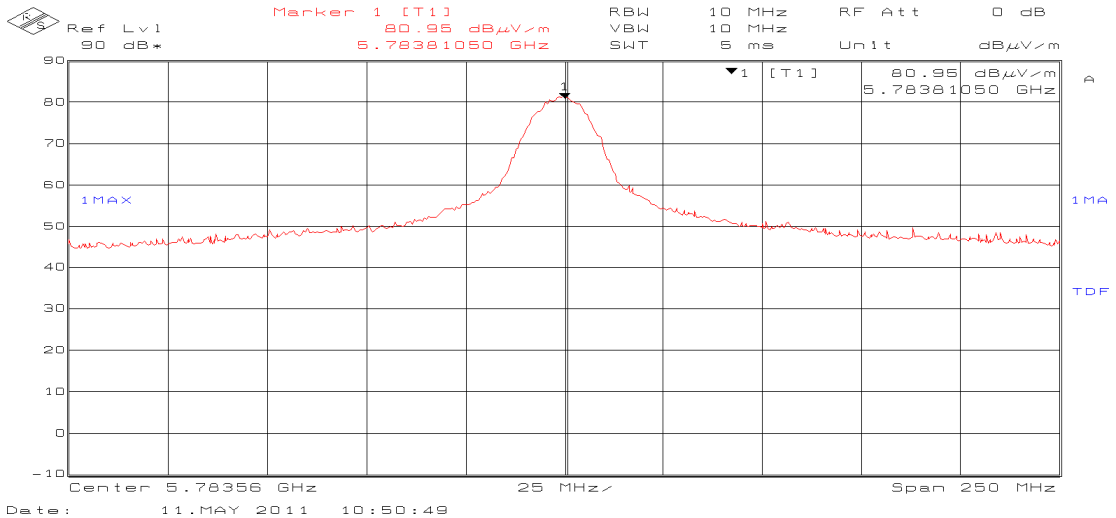
Refer to spectral plots and tables of this section.

Spectral plots

Vertical polarization: fundamental



RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal.



Test data, continued

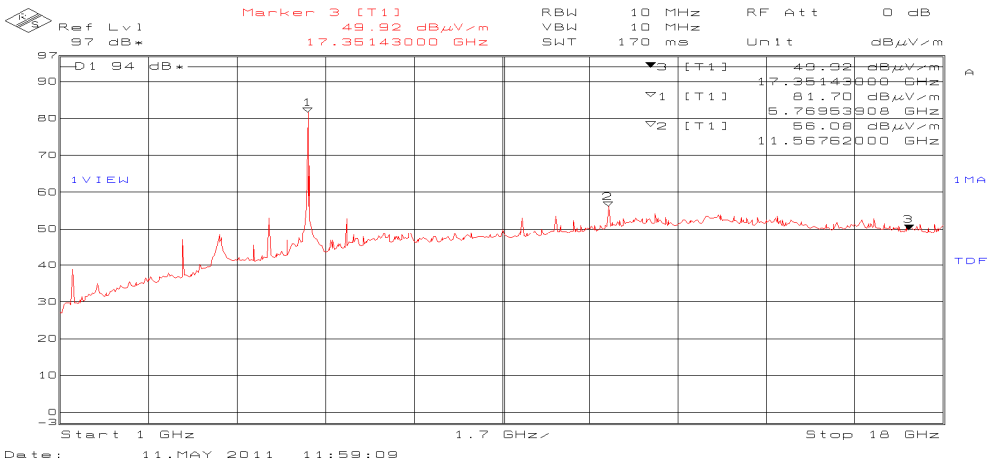
Test facility	Measuring distance (m)	Antenna height variation (m)	Turn table position (°)
10 m Semi anechoic chamber	3	1–4	0–360

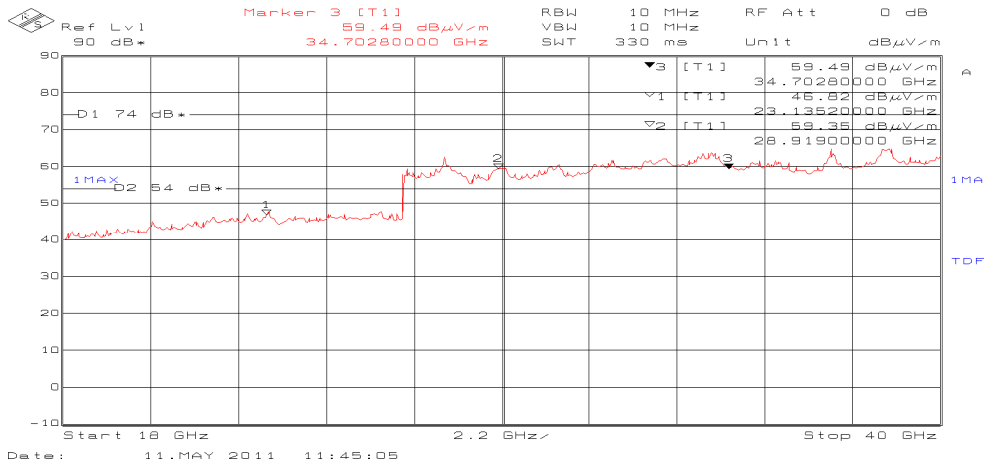
Results

Refer to spectral plots and tables of this section.

Spectral plots

Vertical polarization





Test facility	Measuring distance (m)	Antenna height variation (m)	Turn table position (°)
10 m Semi anechoic chamber	3	1–4	0–360

Results

The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators) for determination of compliance. Limits have been adjusted to reflect 3 m requirements.

A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver/Spectrum analyzer settings:	
30 MHz to 1 GHz	
Preview measurements	**Final measurement**
Receiver: 120 kHz RBW, Peak detector, max hold	Receiver: 120 kHz RBW, Quasi-peak detector
1 GHz to 40 GHz	
Preview measurements	**Final measurement**
Spectrum analyzer: 10 MHz RBW, Peak detector, max hold	Receiver: 1 MHz RBW, Peak detector
Measurement time 100ms	

- RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal
- The average value is total peak – duty cycle.

Test data, continued

Frequency (MHz)	Polarization. V/H	Field strength peak (dBµV/m) (RBW=10MHz)	Limit peak (dBµV/m)	Margin (dB)
Fundamental				
5783.8	H	76.3	114	-37.7
5783.8	V	81.7	114	-32.3
Harmonics				
11567.2	V	56.1	74	-17.9
17351.43	V	49.9	74	-24.1
23135.2	V	46.8	74	-27.2
28919	V	59.3	74	-14.7
34702.8	V	59.5	74	-14.5
11567.2	H	53.4	74	-20.6
17351.43	H	49.5	74	-24.5
23135.2	H	47.1	74	-26.9
28919	H	60.4	74	-13.6
34702.8	H	60.4	74	-13.6

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

Frequency (MHz)	Polarization. V/H	Field strength Average =Total peak- duty cycle (dBµV/m)	Limit Average (dBµV/m)	Margin (dB)
Fundamental				
5783.8	H	57.3	94	-36.7
5783.8	V	62.7	94	-31.3
Harmonics				
11567.2	V	37.1	54	-16.9
17351.43	V	30.9	54	-23.1
23135.2	V	27.8	54	-26.2
28919	V	40.3	54	-13.7
34702.8	V	40.5	54	-13.5
11567.2	H	34.4	54	-19.6
17351.43	H	30.5	54	-23.5
23135.2	H	28.1	54	-25.9
28919	H	41.4	54	-12.6
34702.8	H	41.4	54	-12.6

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

8.7 Clause 15.249(b) Fixed Point-to-Point operation in the 24.0–24.25 GHz band

§ 15.249 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.

(b) Fixed, point-to-point operation as referred to in this paragraph shall be limited to systems employing a fixed transmitter transmitting to a fixed remote location. Point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information are not allowed. Fixed, point-to-point operation is permitted in the 24.05–24.25 GHz band subject to the following conditions:

(1) The field strength of emissions in this band shall not exceed 2500 millivolts/meter.

(2) The frequency tolerance of the carrier signal shall be maintained within ±0.001 % of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery-operated equipment, the equipment tests shall be performed using a new battery.

(3) Antenna gain must be at least 33 dBi. Alternatively, the main lobe beamwidth must not exceed 3.5 degrees. The beamwidth limit shall apply to both the azimuth and elevation planes. At antenna gains over 33 dBi or beamwidths narrower than 3.5 degrees, power must be reduced to ensure that the field strength does not exceed 2500 millivolts/meter.

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter (128 dBµV/m) at 3 meters along the antenna azimuth.

Special notes

- The spectrum was searched from 30 MHz to the 10th harmonic.
- The EUT was measured on three orthogonal axis.
- All measurements were performed at a distance of 3 m.
- All measurements were performed:
  - below 30 MHz: using a quasi-peak detector with 9 kHz/30 kHz RBW/VBW,
  - within 30–1000 MHz range: using a quasi-peak detector with 120 kHz/300 kHz RBW/VBW,
  - within 30–1000 MHz range: using a peak detector with 100 kHz/300 kHz RBW/VBW,
  - above 1 GHz: using peak detector with 1 MHz/3 MHz RBW/VBW for peak results
    - and using peak detector with 1 MHz/10 Hz RBW/VBW for average results
    - or using average detector with 1 MHz/3 MHz RBW/VBW for average results
    - or using a duty cycle/average factor for average results calculations.

Test data

N/A

8.8 Clause 15.249(d) Spurious emissions (except for harmonics)

§ 15.249 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Special notes

§15.209 – Radiated emission limits

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009–0.490	2400/F	67.6−20log(F)	300
0.490–1.705	24000/F	87.6−20log(F)	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes:
- F = fundamental frequency in kHz
- In the emission table above, the tighter limit applies at the band edges.
- For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

- The spectrum was searched from 30 MHz to the 10th harmonic.
- The EUT was measured on three orthogonal axis.
- All measurements were performed at a distance of 3 m.
- All measurements were performed:
  - above 1 GHz: using peak detector with 10MHz/10MHz RBW/VBW for peak results
  - RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal
  - The average value is total peak – duty cycle.
  -

Test data

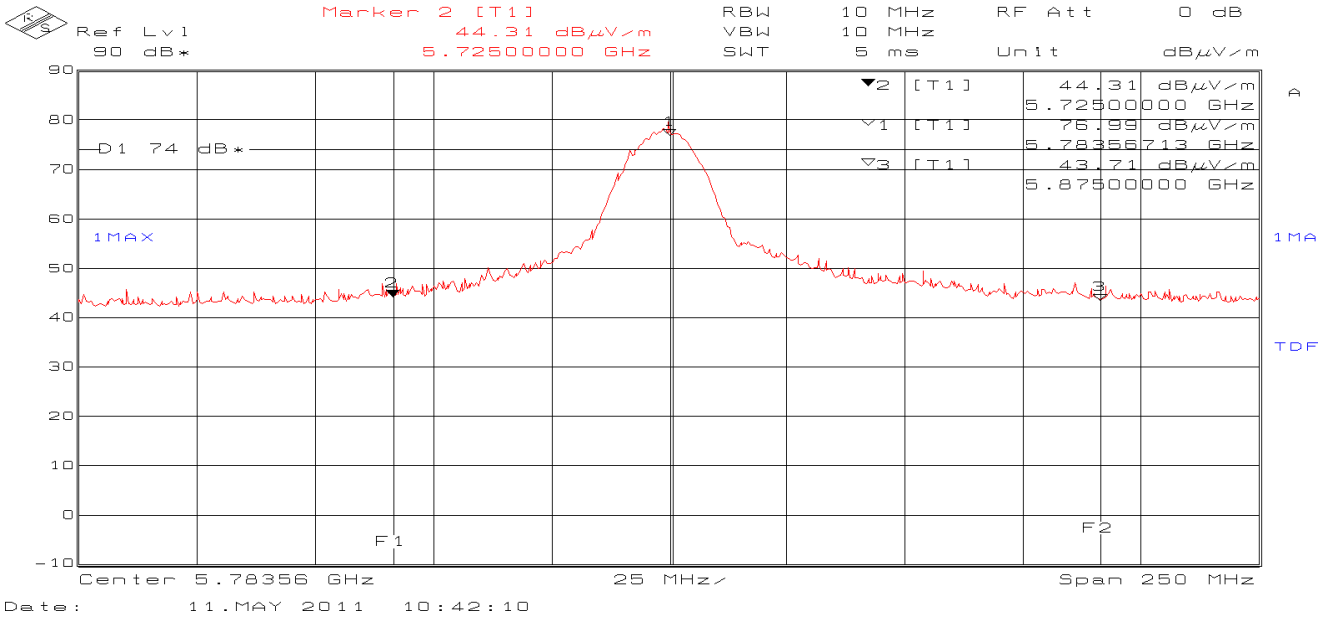
Duty cycle/average factor calculations

§15.35(c) When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Duty cycle/average factor calculations:

$$Duty\,cycle\,/\,average\;factor = 20\times\log_{10}\left(\frac{Tx_{100\,ms}}{100\,ms}\right)$$ =19 dB

horizontal



RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal.

Test data

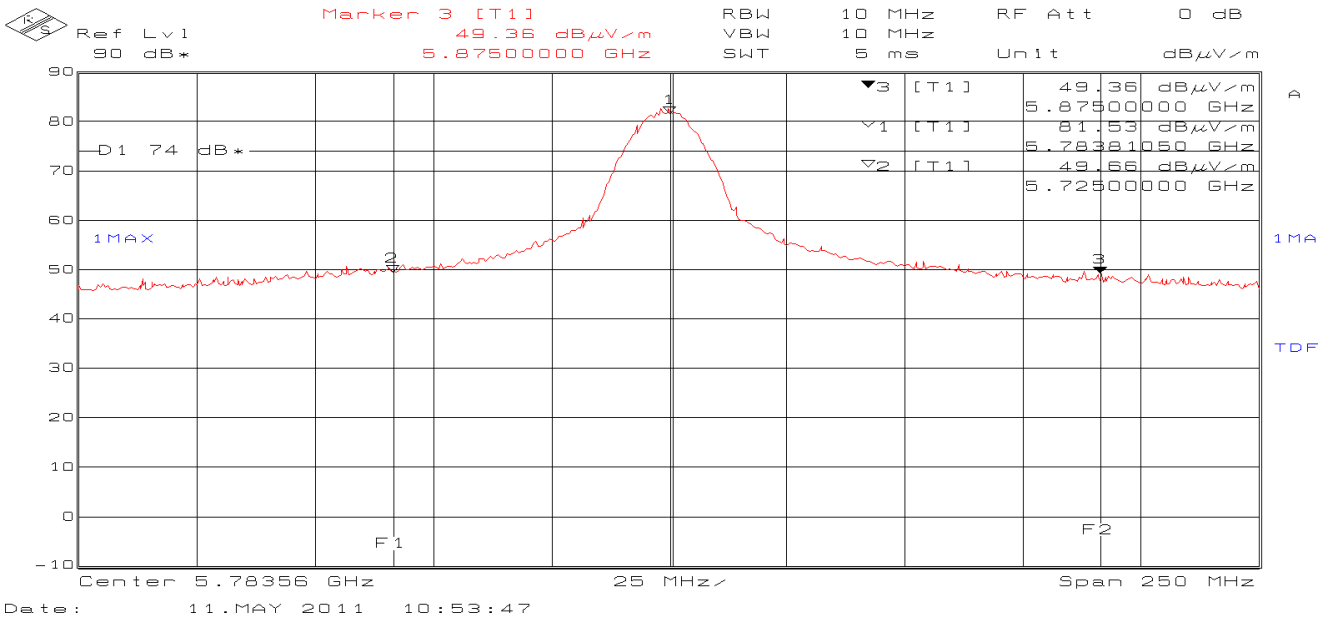
Duty cycle/average factor calculations

§15.35(c) When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Duty cycle/average factor calculations:

$$Duty\,cycle\,/\,average\,factor = 20\times\log_{10}\left(\frac{Tx_{100\,ms}}{100\,ms}\right)$$ =19 dB

vertical



RBW of 1 MHz is less than the main lobe width. Therefore these measurements must be made using "Pulsed RF Agilent 150-2" test method with the spectrum analyzer configured for pulse spectrum. When the bandwidth (RBW) equals 1/2 of the main lobe width the displayed amplitude is practically the peak amplitude of the signal.

Test data, continued

Frequency (MHz)	Polarization. V/H	Field strength Total peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5725	V	49.7	74	-24.3
5875	V	49.4	74	-24.6
5725	H	44.3	74	-29.7
5875	H	43.7	74	-30.3

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

Test data, continued

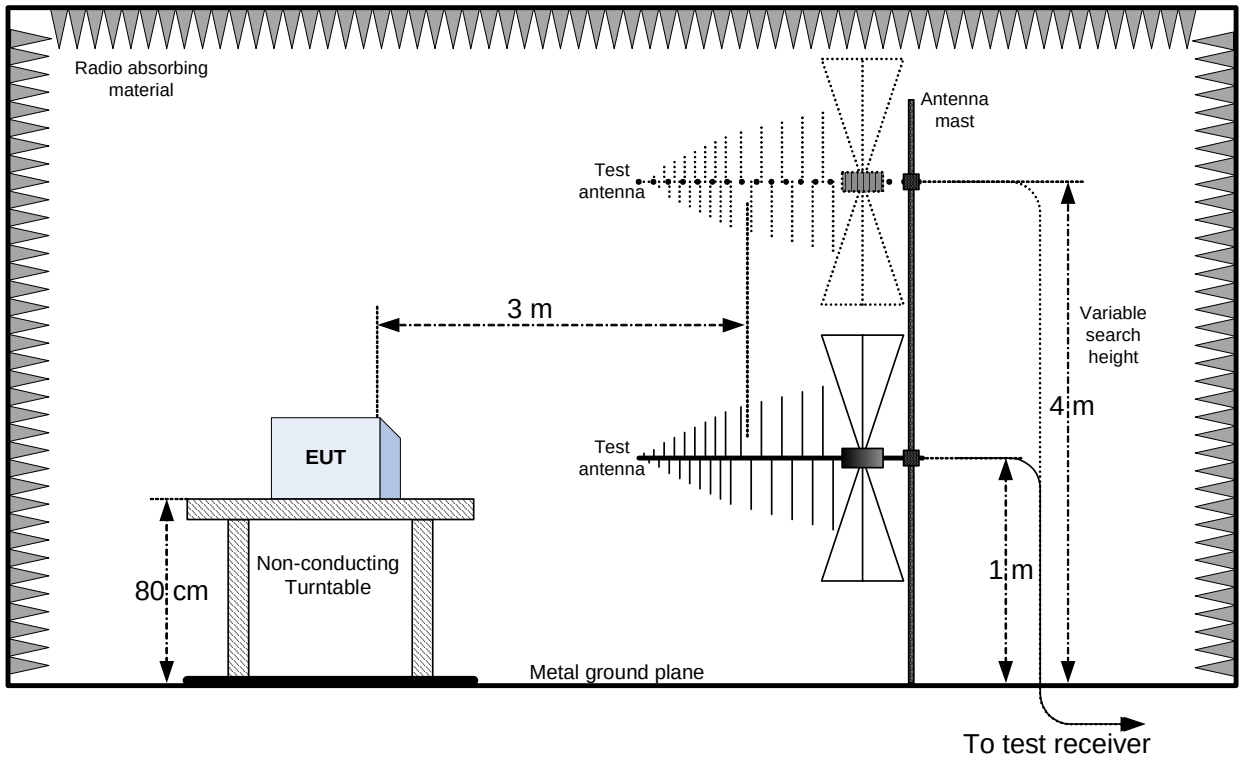
Frequency (MHz)	Polarization. V/H	Field strength Avearge (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5725	V	30.7	54	-23.3
5875	V	30.4	54	-23.6
5725	H	25.3	54	-28.7
5875	H	24.7	54	-29.3

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

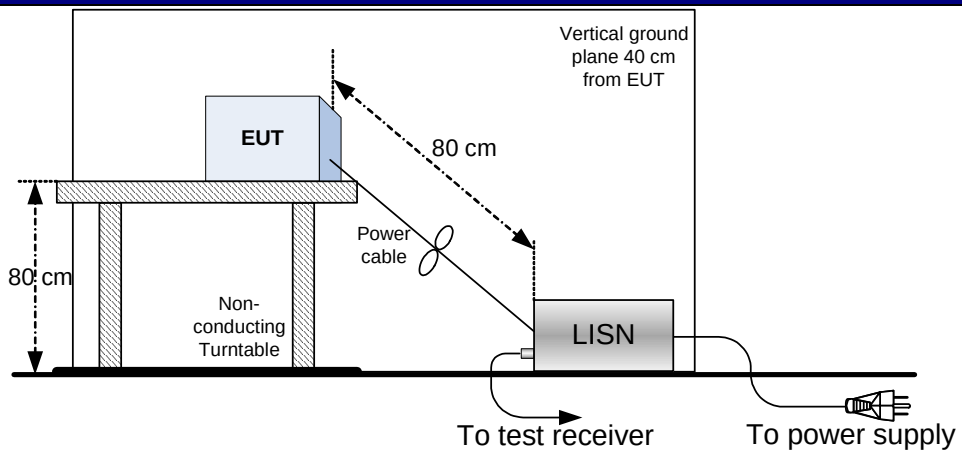
Avearge= Total peak- duty cycle

Section 9: Block diagrams of test set-ups

Radiated emissions set-up

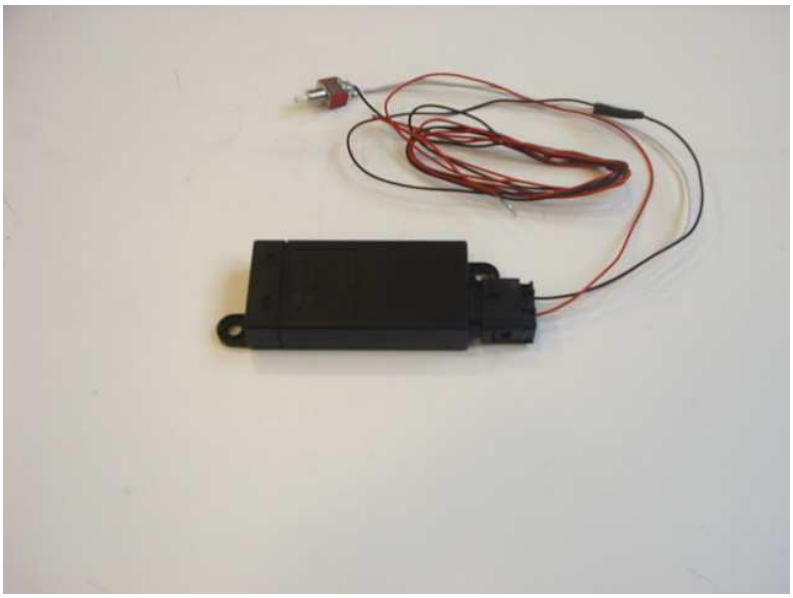


Conducted emissions set-up



Section 10: EUT photos

EUT



EUT