IMQ S.p.A. con socio unico
Via Quintiliano, 43
20138 MILANO - I

TELECOMMUNICATIONS & TELEMATICS FOR TRANSPORTS LABORATORY

TEST REPORT
No. ARSM00048/1

performed in accordance with

FCC Rules: Code of Federal Regulations (CFR) no. 47
Part 15 Subpart C Section 15.249

PRODUCT	HANDHELD TRANSMITTER
MODEL(s) TESTED	H912 (basic) H904; H902; HT98; HT94 (derived)
FCC ID	O2W-TXH
TRADE MARK(s)	QUICK

APPLICANT	QUICK S.p.A. – Via Piangipane, 120/A – 48124 PIANGIPANE (RA) - ITALY

Tested by	Roberto Radice	Roberto Radice
Approved by	Giorgio Belussi *[Laboratory head]*	

Revision Sheet

Release No.	Date	Revision Description
Rev. 0	2012-08-06	First edition
Rev. 1	2012-11-21	Added derived models measure and external/internal photos

1. GENERAL DATA

SAMPLE		
Samples received on	**2012-06-29**	**(item sent and sampling by applicant)**
IMQ reference samples	**BEM**	**64749**
Samples tested No.	5 (basic model: all tests; derived models: only radiated emission test)	
Object under analysis recognition	**Not carried out** Except where stated, characteristics of products were taken from client description and were not verified by the laboratory	
TEST LOCATION		
Testing dates	2012-07-03 ÷ 2012-11-20	
Testing laboratory.	IMQ S.p.A. - Via Quintiliano, 43 – I-20138 Milano	
ENVIRONMENTAL CONDITIONING		
Parameter	***Measured***	
Ambient Temperature	25 ÷ 35 °C	
Relative Humidity	50 ÷ 60 %	
Atmospheric Pressure	900 ÷ 1000 mbar	

2. REFERENCE DOCUMENT

DOCUMENT		DATE	TITLE
☒	47 CFR Part 15	2008	Radio Frequency Device
☒	ANSI C63.4	2009	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
☒	ANSI C63.10	2009	American National Standard for Testing Unlicensed Wireless Devices

3. UNIT UNDER TEST (EUT) DETAILS

GENERAL DATA

MODEL (basic)	Description
H912	Handheld transmitter with n°12 keys
VARIANTS (derived)	**Description**
H904	Handheld transmitter with n°4 keys
H902	Handheld transmitter with n°2 keys
HT98	Thruster Handheld transmitter with n°8 keys
HT94	Thruster Handheld transmitter with n°4 keys

FCC ID	O2W-TXH

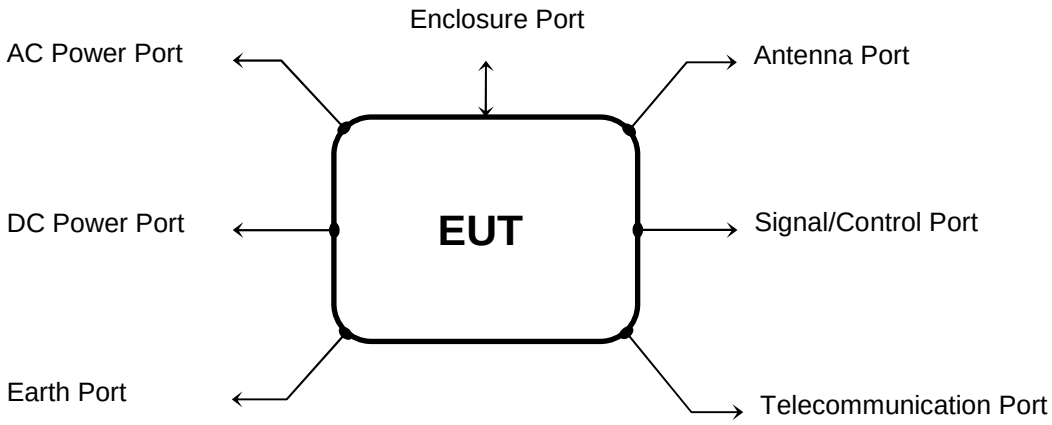
Manufacturer	QUICK S.p.A. – Via Piangipane, 120/A – 48124 PIANGIPANE (RA) - ITALY

Type of equipment	HANDHELD TRANSMITTER
Operating frequency:	913,70 MHz
Maximum RF radiated power:	93,6dBµV/m
Modulation:	FSK
Channel Spacing:	/
Antenna:	Integral (on PCB)
RX sensitivity:	/
Main SW identification	/
Main HW Board identification	
Peripherals included (for system application)	/
Interfaces :	/
Integrated interfaces :	/
AC adapter:	/
Data cable	/
Telecom cable	/
Power supply type :	Internal 3AAA alkaline battery

AC power input cable :	/
DC power input cable :	/

4. TEST CONFGURATION OF UNIT UNDER TEST

EUT PORTS



Port	Description	Max length
Enclosure	Plastic surface, closed by 6 metallic screws	119mm.
AC power	Port not present	/
DC power	Internal 3AAA alkaline battery	/
Earth	Port not present	/
Telecommunication	Port not present	/
Signal	Port not present	/
Control	Port not present	/
Antenna	Integral (on PCB)	/

STATE OF THE EUT DURING TESTS

Ref.	Mode	Description
#1	Operating	Continuous transmission

SUPPORT EQUIPMENT

Defined as equipment needed for correct operation or loading of the EUT, but not considered as tested:

Equipment	Manufacturer	Model
None		

ELECTROMAGNETICALLY RELEVANT COMPONENTS

Component	No.	Manufacturer	Model
/			

RFI SUPPRESSION DEVICES

Component	No.	Manufacturer	Model
/			

EMI PROTECTION DEVICES

Component	No.	Manufacturer	Model
/			

EUT TECHNICAL DOCUMENTATION

Document	Reference
TX H902-912 - Manual of installation and use	Rev 000a
TX HT94-HT98 - Manual of installation and use	Rev 000a

5. METHODS OF MEASUREMENT

All compliance measurements have been carried out using the procedures described in the standard ANSI C63.4-2009, ANSI C63.10-2009 and Section 15.31 of CFR47 Part 15 – Subpart A (General). Additional test requirements have been adopted according to the reference Section indicated in the § 6 of this test report.
FREQUENCY RANGE INVESTIGATED
Radiated emission tests: from 0,15 MHz to tenth harmonic of fundamental.

6. SUMMARY OF TEST RESULTS

POSSIBLE TEST CASE VERDICTS:	
Test object does meet the requirement	PASS
Test object does not meet the requirement	FAIL
Test case does not apply to the test object	N.A.
Test not performed	N.P.

CFR47 Part 15	TITLE	RESULT
§ 15.203	Antenna Requirements	PASS
§ 15.35 (c)	Pulse train measurement for pulsed operation	Measured
§ 15.207 (a)	Conducted Emission	N.A.1
§ 15.205 (a) (b) § 15.209 § 15.249 (a) (d)	Restricted band of operation Radiated Emissions Operation within band 902÷928MHz	PASS
§ 2.202 (a)	Occupied bandwidth	Measured
§ 15.215 (c)	Bandwidth of emission (20dB Bandwidth)	PASS
§ 1.1307 (b)(1)	RF exposure evaluation	PASS

Note 1	Port not present, battery operating device

7. TEST RESULTS

7.1 ANTENNA REQUIREMENTS

TEST 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 Sections 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 Section 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.

Antenna specifications	
N° of authorized antenna types	1
Antenna type	Integral antenna on PCB
Maximum total gain	< 6dB
External power amplifiers	Not present

TEST RESULT
The EUT meets the requirements of section 15.203 and 15.204

7.2 PULSE TRAIN MEASUREMENT FOR PULSED OPERATION

TEST REQUIREMENT

According to CFR 47 Part 15, section 15.35(c).

Guide ANSI C63.4

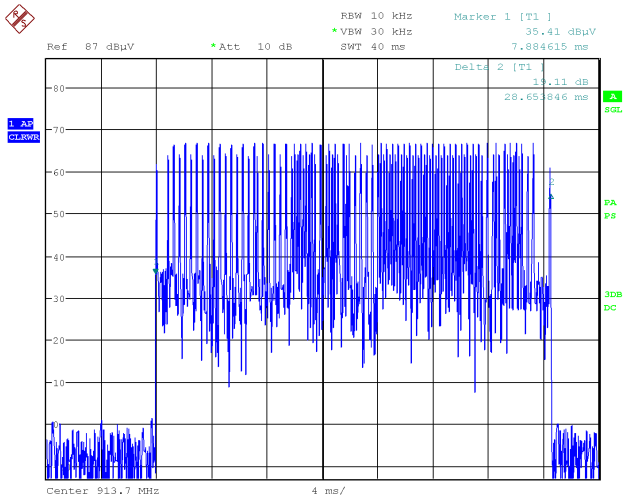
Devices transmitting pulsed emissions and subject to a limit requiring an average detector function for radiated emissions shall initially be measured with an instrument that uses a peak detector.

A radiated emission measured with a peak detector may then be corrected to a true average using the appropriate factor for emission duty cycle.

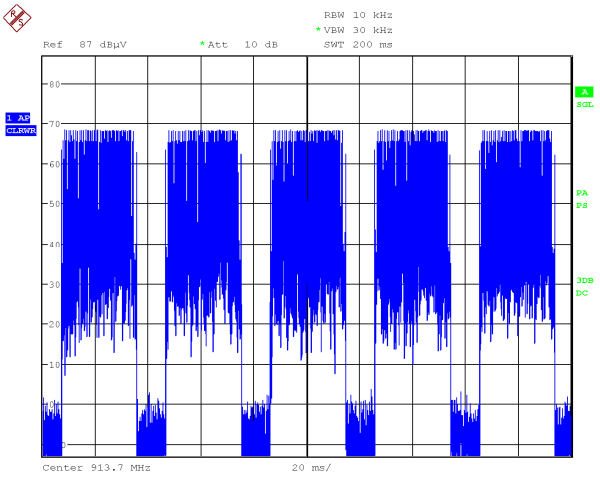
This correction factor relates the measured peak level to the average limit and is derived by averaging absolute field strength over one complete pulse train that is 0.1 s, or less, in length. If the pulse train is longer than 0.1 s, the average shall be determined from the average absolute field strength during the 0.1 s interval in which the field strength is at a maximum.

MEASUREMENTS RESULTS

Single pulse



Total pulse train



TEST RESULT

T single pulse: 28,65ms

T_{on}: 28,65 x 5 = 143,25 ms

Total period: 200 ms

Pulse train correction: 20*log (T_{on}/Total period) = –2.89 dB.

REMARKS

None

7.3 RADIATED DISTURBANCES

TEST REQUIREMENT	
Test setup	ANSI C63.4
Test facility	Semi-anechoic chamber
Test distance	3 meters
Frequency range	9 kHz to tenth harmonic of fundamental
IF bandwidth (below 30 MHz)	9 kHz
IF bandwidth (below 1,000 MHz)	120 kHz
IF bandwidth (above 1,000 MHz)	1 MHz
Deviation to test procedure	None
Limits	Sections 15.205, 15.209, 15.249
EUT operating condition	#1
Remark	(*) In accordance with part 15.31 (f) (2), where the measurement distance was specified to be 30 or 300 meters, a correction factor was applied in order to permit measurement to be performed at a separation distance. The applied formula for limits at 3 meter is: Extrapolation (dB) = 40log (300meter / 3meter) = +80db Extrapolation (dB) = 40log (30meter / 3meter) = +40db

TEST RESULT
The EUT meets the requirements of sections 15.205, 15.209 and 15.249.

LIMIT FOR FUNDAMENTAL		
Frequency (MHz)	**Quasi-Peak (dBµV/m)**	**Quasi-Peak Limit (µV/m)**
913,70	94	50.000

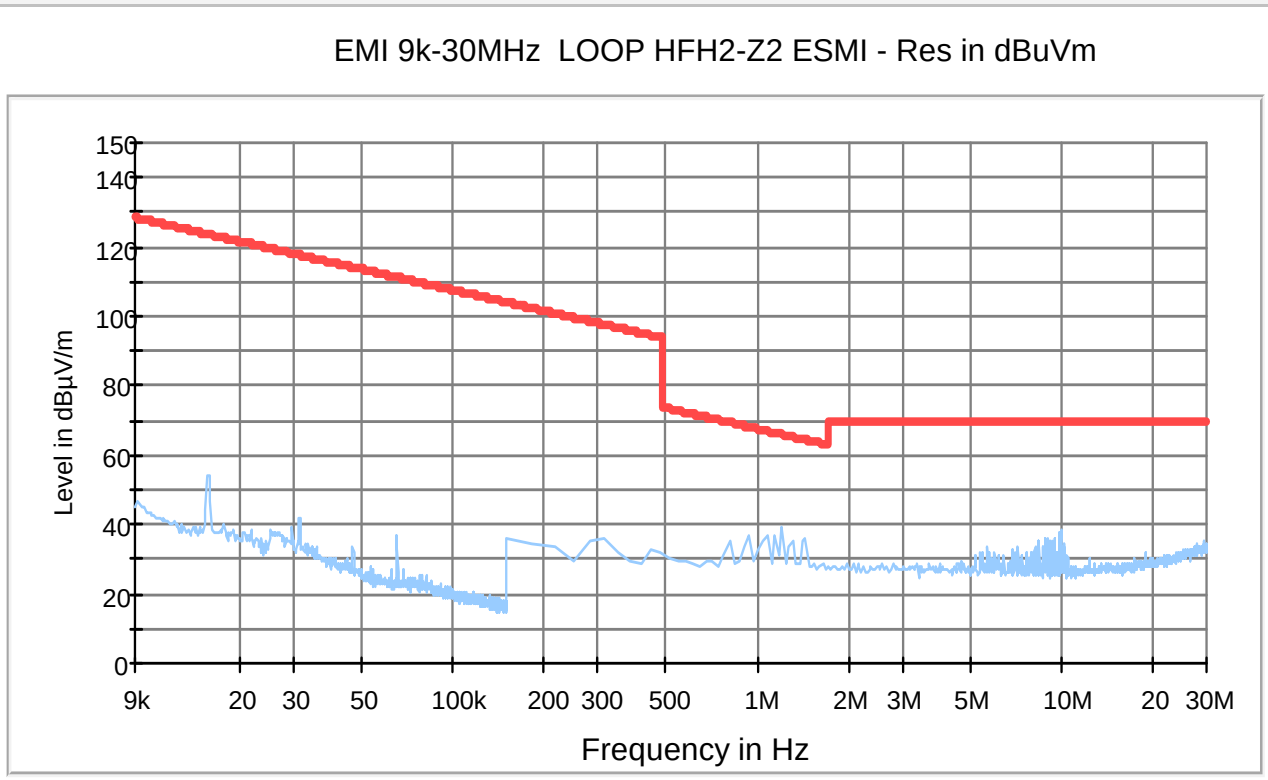
LIMITS FOR SPURIOUS		
Band of operations	**Peak (dBµV/m)**	**Average Limit (dBµV/m)**
Restricted bands (par. 15.205)	74	54
Other bands	According to 15.209 or fundamental –20dB (which is greater)	According to 15.209 or fundamental –20dB (which is greater)

TEST PROCEDURE

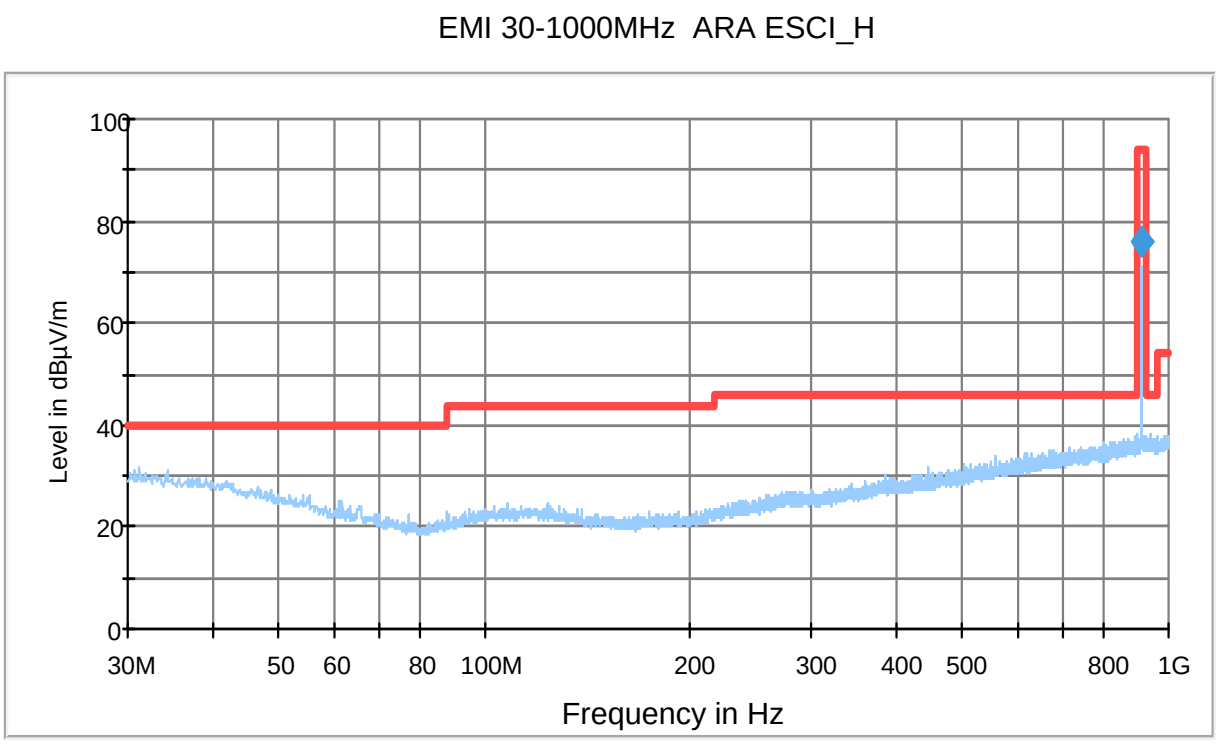
1) The EUT was placed on turntable which is 0.8 m above the ground plane
2) The turntable shall rotate from 0° to 360° degrees to determine the position of maxim um emission level.
3) The EUT is positioned 3 m away from the receiving antenna which varied from 1 to 4 m to find the highest emission.
4) The measurements were made with the detector set to PEAK and AVERAGE amplitude within a bandwidth of 100 kHz below 1000 MHz and 1 MHz above 1000 MHz.
5) The receiving antenna was positioned in both horizontal and vertical polarization.
6) The measurements with Quasi-Peak detector, below 1000 MHz are performed only for frequencies for which the Peak values are ≥ (Q.P. limit – 6 dB).

MEASUREMENTS RESULTS

Range: 9kHz ÷ 30MHz



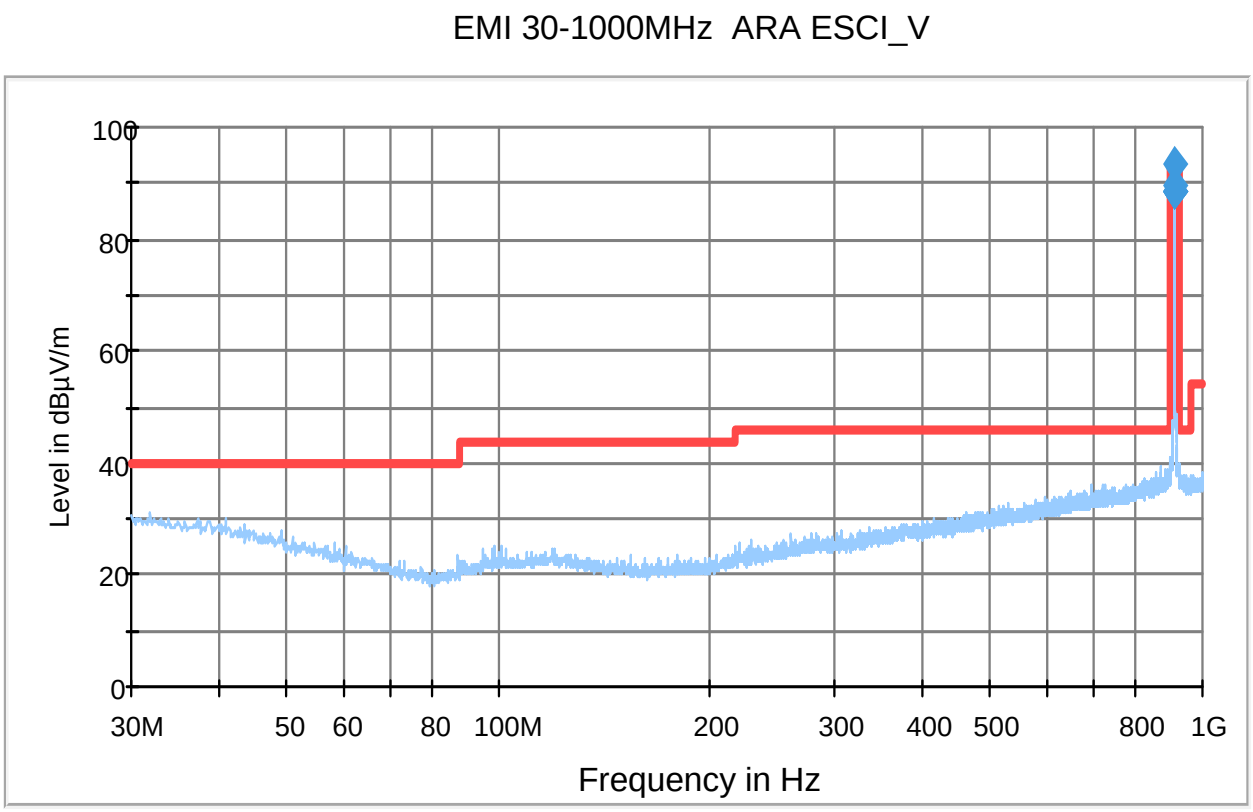
Range: 30 ÷ 1000 MHz Horizontal polarization - Model H912 (basic model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	75.8	1000.0	120.000	99.9	H	-44.0	24.5	18.20	94.00

Max fundamental frequency value in horizontal polarization: 75,8 dBµV/m

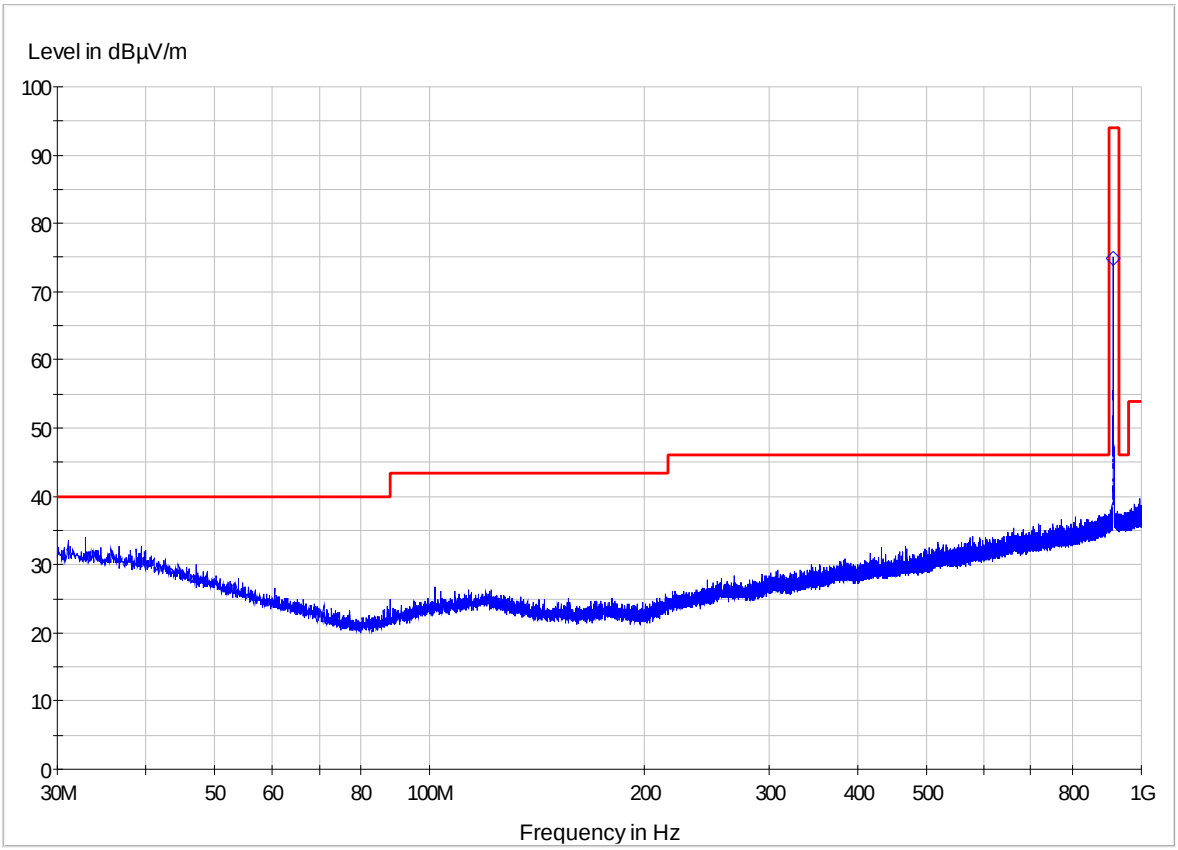
Range: 30 ÷ 1000 MHz Vertical polarization - Model H912 (basic model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.661250	88.7	1000.0	120.000	139.0	V	-75.0	24.5	5.30	94.00
913.667500	89.6	1000.0	120.000	131.0	V	-69.0	24.5	4.40	94.00
913.668750	88.8	1000.0	120.000	138.0	V	-75.0	24.5	5.20	94.00
913.670000	93.4	1000.0	120.000	119.0	V	-69.0	24.5	0.60	94.00
913.671250	88.4	1000.0	120.000	138.0	V	-70.0	24.5	5.60	94.00
913.672500	88.5	1000.0	120.000	139.0	V	-70.0	24.5	5.50	94.00

Max fundamental frequency value in vertical polarization: 93,4 dBµV/m

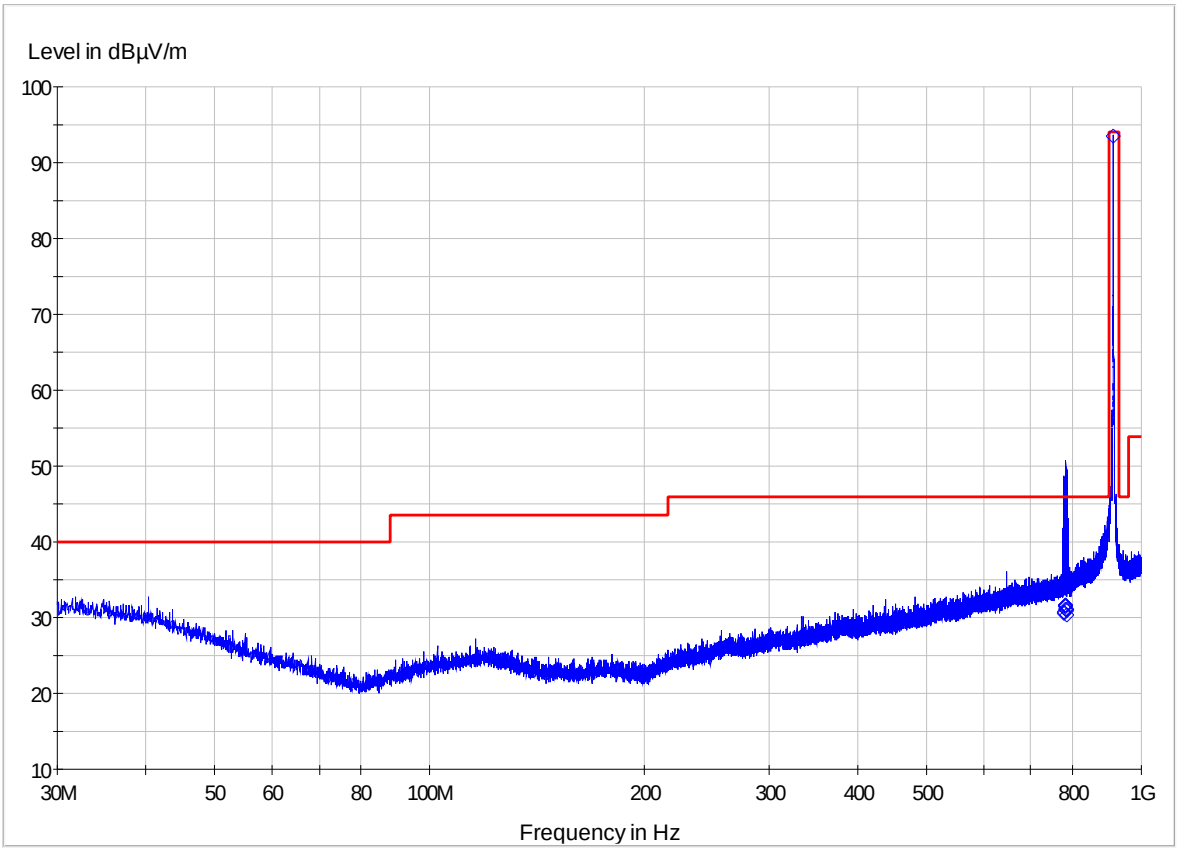
Range: 30 ÷ 1000 MHz Horizontal polarization - Model H904 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	75.0	1000.0	120.000	99.9	H	-40.0	24.5	19.00	94.00

Max fundamental frequency value in horizontal polarization: 75,0 dBµV/m

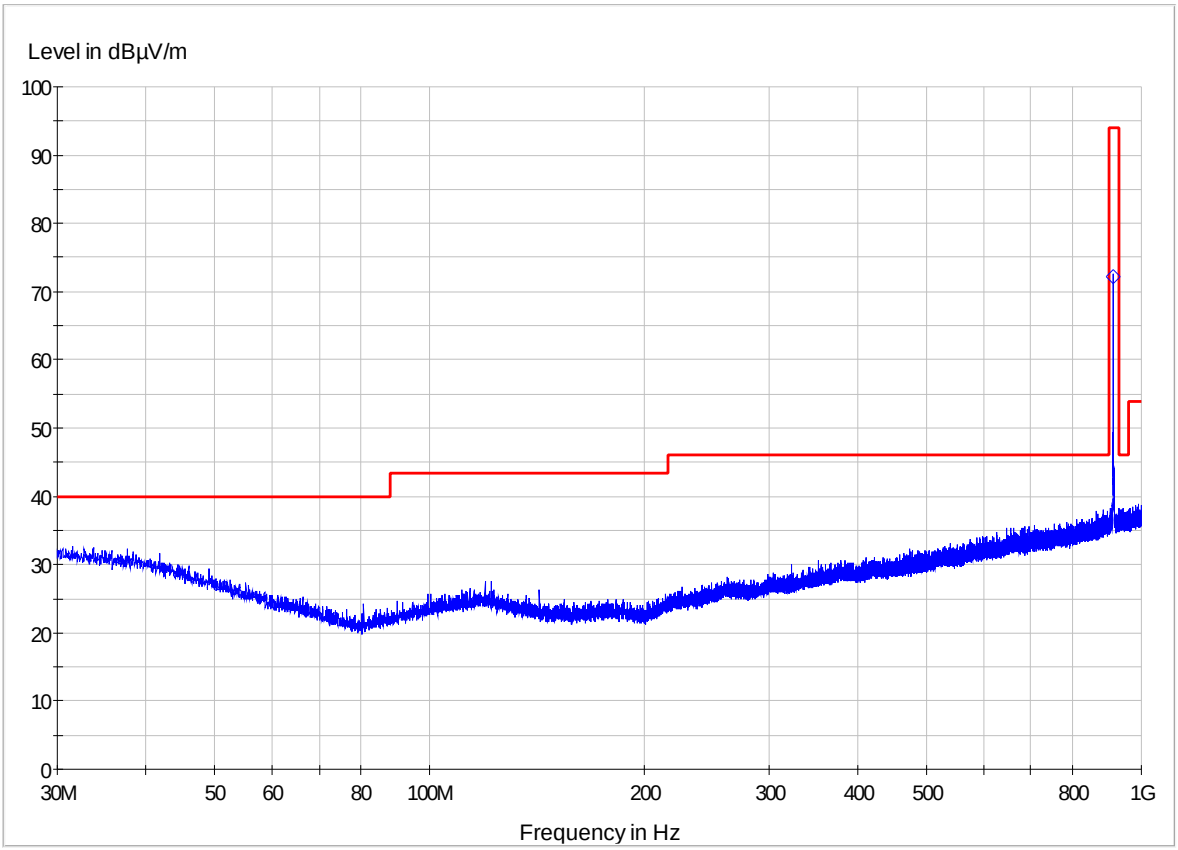
Range: 30 ÷ 1000 MHz Vertical polarization - Model H904 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
778.800000	30.5	1000.0	120.000	125.0	V	-53.0	23.2	15.50	46.00
779.920000	30.8	1000.0	120.000	125.0	V	-53.0	23.2	15.20	46.00
780.840000	31.1	1000.0	120.000	128.0	V	-53.0	23.2	14.90	46.00
781.600000	31.5	1000.0	120.000	125.0	V	-53.0	23.2	14.50	46.00
782.640000	31.7	1000.0	120.000	128.0	V	-53.0	23.2	14.30	46.00
783.680000	31.6	1000.0	120.000	128.0	V	-53.0	23.2	14.40	46.00
784.000000	31.6	1000.0	120.000	125.0	V	-53.0	23.2	14.40	46.00
784.960000	31.2	1000.0	120.000	125.0	V	-53.0	23.2	14.80	46.00
785.800000	30.8	1000.0	120.000	128.0	V	-53.0	23.2	15.20	46.00
787.440000	30.5	1000.0	120.000	128.0	V	-53.0	23.2	15.20	46.00
913.670000	93.6	1000.0	120.000	119.0	V	-53.0	24.5	0.40	94.00

Max fundamental frequency value in vertical polarization: 93,6 dBµV/m

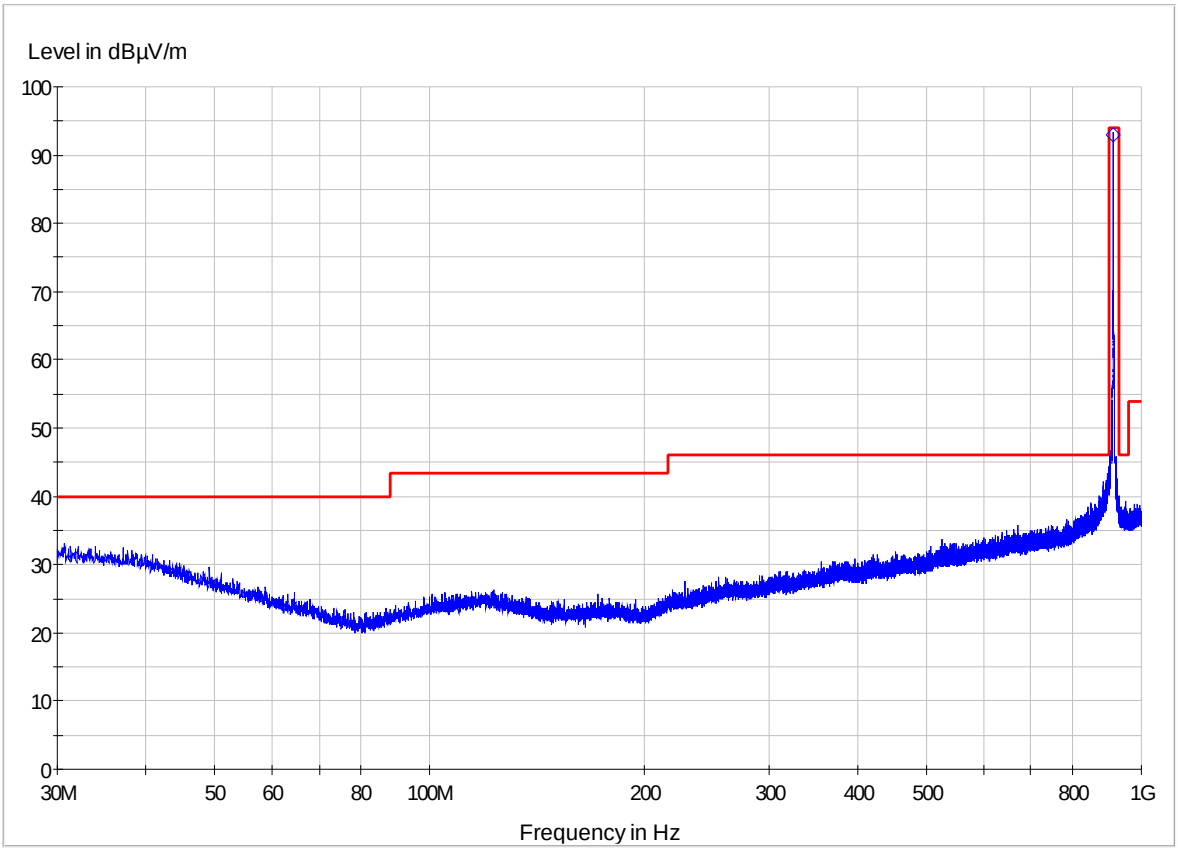
Range: 30 ÷ 1000 MHz Horizontal polarization - Model H902 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	72.2	1000.0	120.000	110.0	H	-35.0	24.5	21.80	94.00

Max fundamental frequency value in horizontal polarization: 72,2 dBµV/m

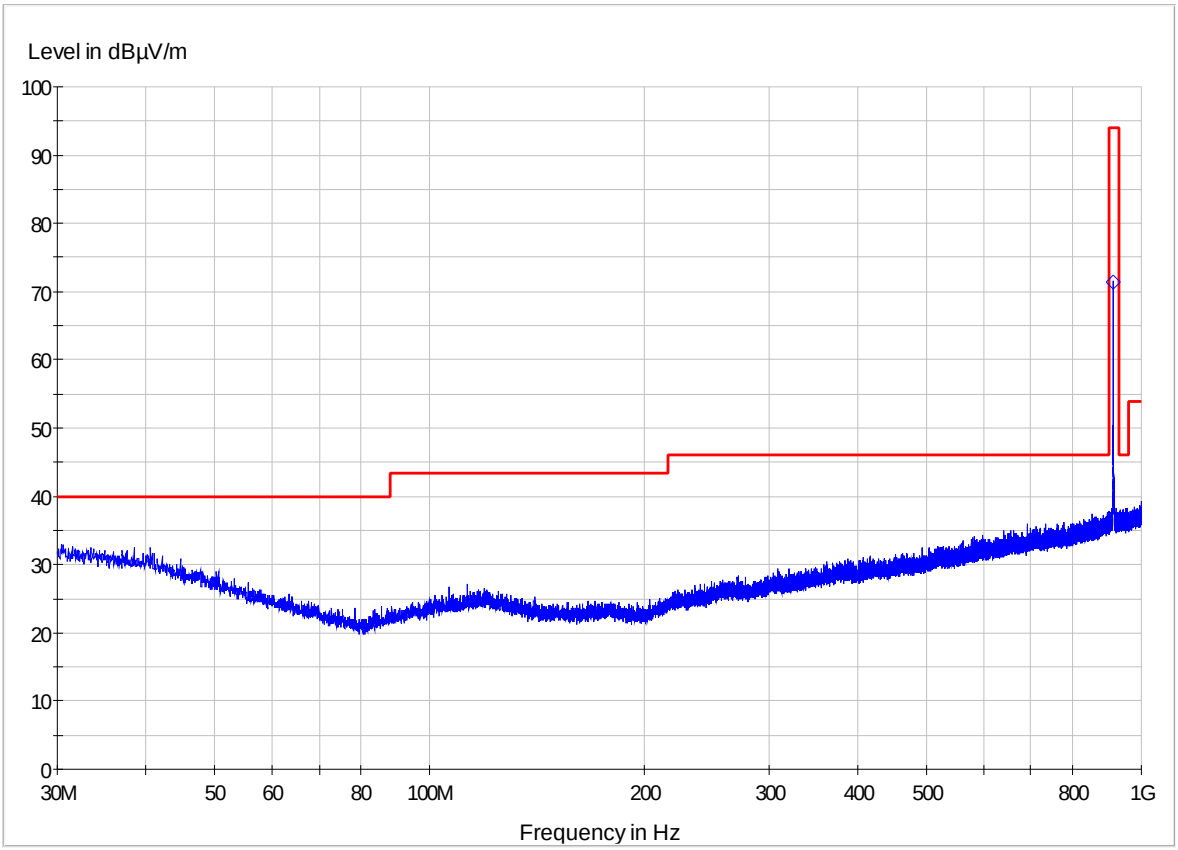
Range: 30 ÷ 1000 MHz Vertical polarization - Model H902 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	93.1	1000.0	120.000	120.0	V	-57.0	24.5	0.90	94.00

Max fundamental frequency value in vertical polarization: 93,1 dBµV/m

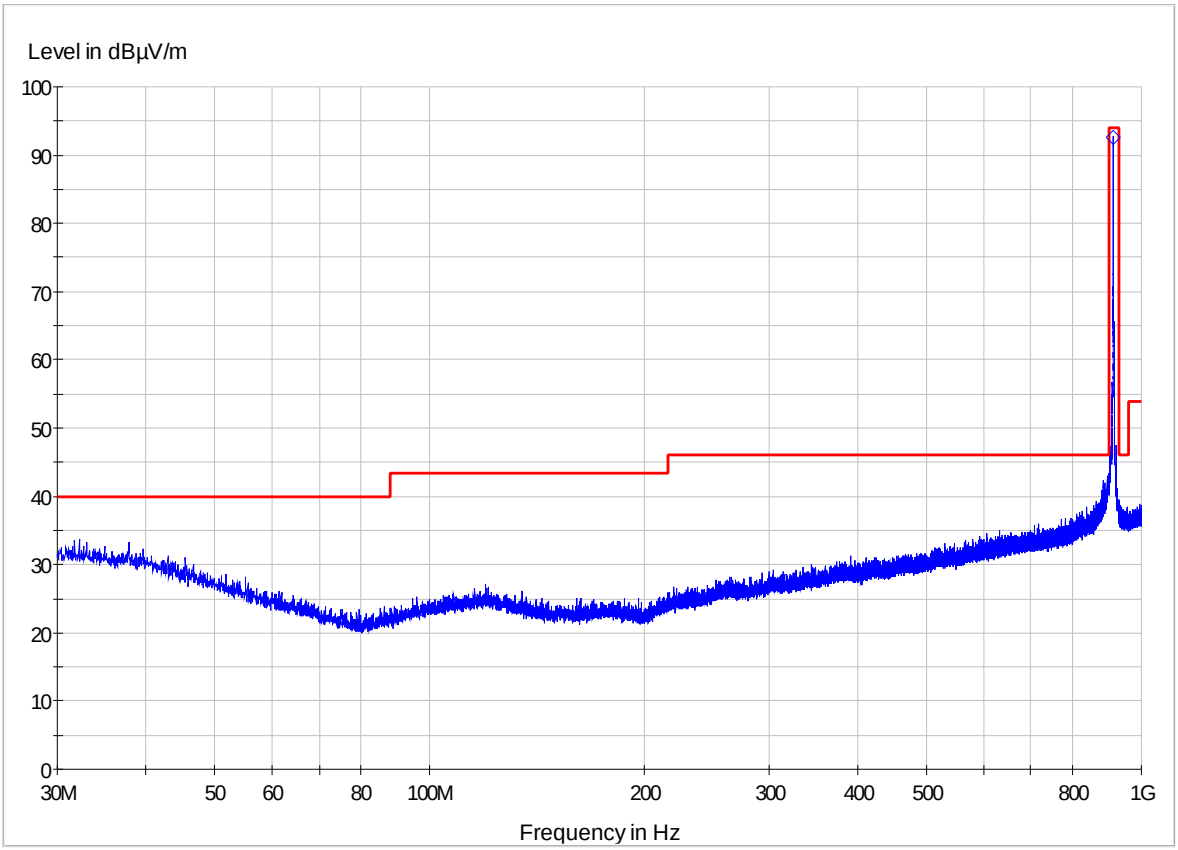
Range: 30 ÷ 1000 MHz Horizontal polarization - Model HT98 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	71.3	1000.0	120.000	110.0	H	-41.0	24.5	22.70	94.00

Max fundamental frequency value in horizontal polarization: 71,3 dBµV/m

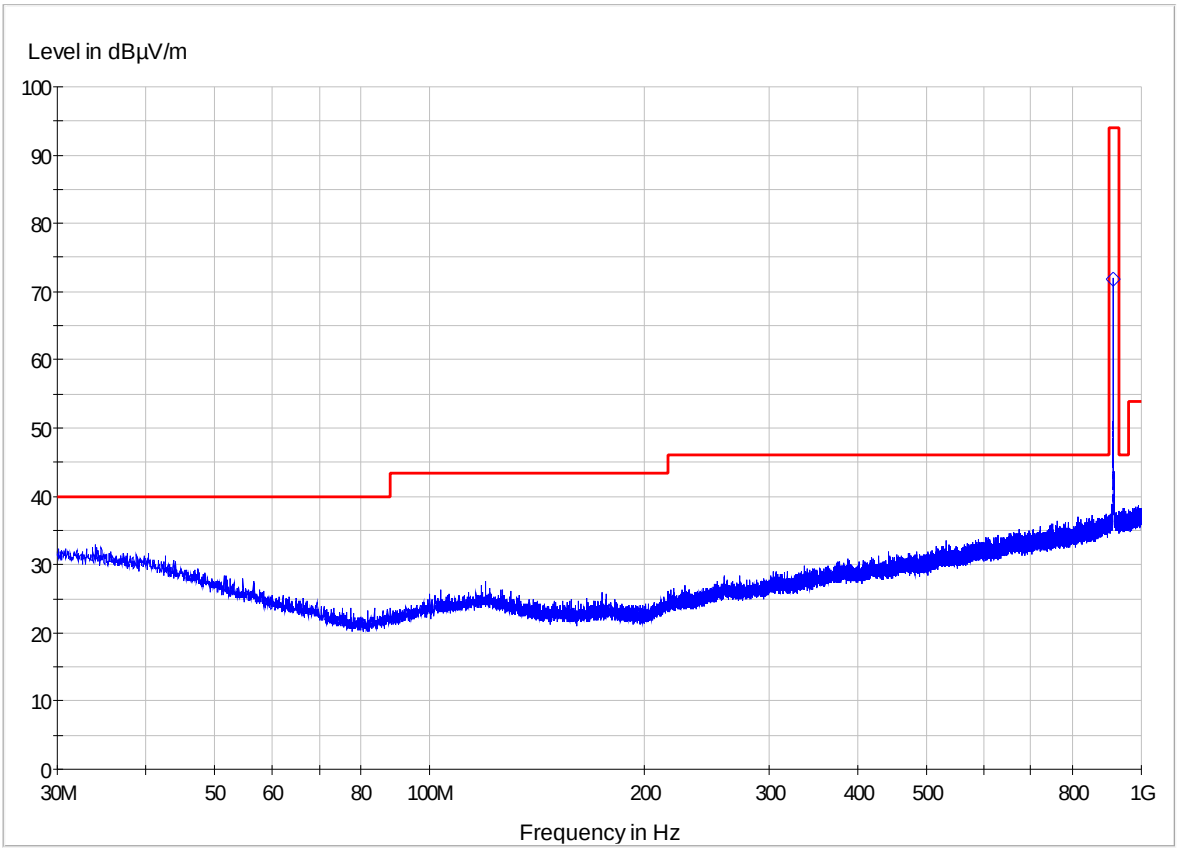
Range: 30 ÷ 1000 MHz Vertical polarization - Model HT98 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	92.7	1000.0	120.000	117.0	V	-51.0	24.5	1.30	94.00

Max fundamental frequency value in vertical polarization: 92,7 dBµV/m

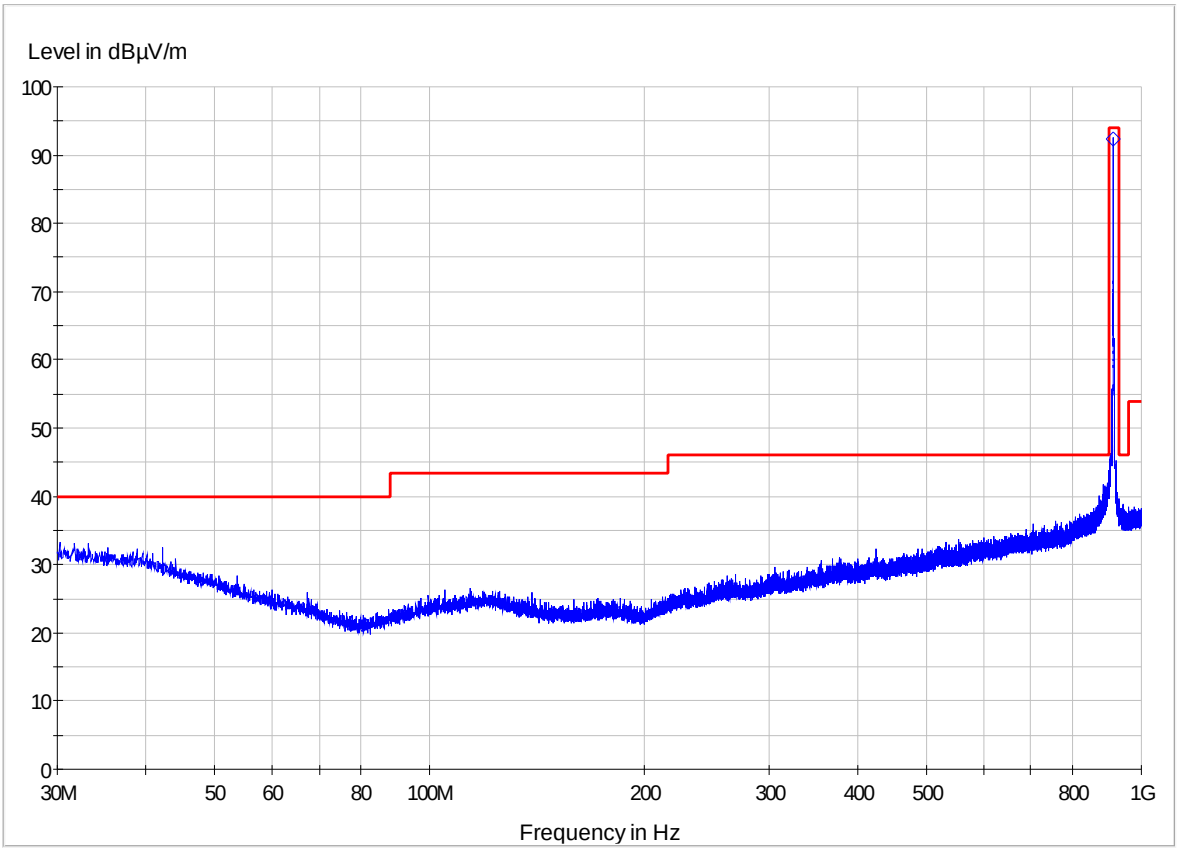
Range: 30 ÷ 1000 MHz Horizontal polarization - Model HT94 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	71.9	1000.0	120.000	112.0	H	-38.0	24.5	22.10	94.00

Max fundamental frequency value in horizontal polarization: 71,9 dBµV/m

Range: 30 ÷ 1000 MHz Vertical polarization - Model HT94 (derived model)



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
913.670000	92.4	1000.0	120.000	115.0	V	-53.0	24.5	1.60	94.00

Max fundamental frequency value in vertical polarization: 92,4 dBµV/m

Range: 1000 + 10000 MHz – Model H912 (basic model)

PEAK RESULT (RBW=1MHz; VBW=1MHz) – VERTICAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	54,13	25,30	3,53	-37,44	45,52	500	54,00	>8
2741,18	50,72	27,50	4,00	-37,47	44,75	500	54,00	>9
3654,88	46,19	28,70	4,91	-37,20	42,60	500	54,00	>11
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

PEAK RESULT (RBW=1MHz; VBW=1MHz) – HORIZONTAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	56,22	25,30	3,53	-37,44	47,61	500	54,00	>6
2741,18	48,43	27,50	4,00	-37,47	42,46	500	54,00	>11
3654,88	45,03	28,70	4,91	-37,20	41,44	500	54,00	>12
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

Range: 1000 + 10000 MHz – Model H904 (derived model)

PEAK RESULT (RBW=1MHz; VBW=1MHz) – VERTICAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	57,58	25,30	3,53	-37,44	48,97	500	54,00	>5
2741,18	51,05	27,50	4,00	-37,47	45,08	500	54,00	>8
3654,88	45,54	28,70	4,91	-37,20	41,95	500	54,00	>12
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

PEAK RESULT (RBW=1MHz; VBW=1MHz) – HORIZONTAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	58,45	25,30	3,53	-37,44	49,84	500	54,00	>4
2741,18	52,20	27,50	4,00	-37,47	46,23	500	54,00	>7
3654,88	45,69	28,70	4,91	-37,20	42,10	500	54,00	>11
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

Range: 1000 + 10000 MHz – Model H902 (derived model)

PEAK RESULT (RBW=1MHz; VBW=1MHz) – VERTICAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	56,98	25,30	3,53	-37,44	48,37	500	54,00	>5
2741,18	53,27	27,50	4,00	-37,47	47,30	500	54,00	>6
3654,88	46,44	28,70	4,91	-37,20	42,85	500	54,00	>11
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

PEAK RESULT (RBW=1MHz; VBW=1MHz) – HORIZONTAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	56,65	25,30	3,53	-37,44	48,04	500	54,00	>5
2741,18	51,20	27,50	4,00	-37,47	45,23	500	54,00	>8
3654,88	44,89	28,70	4,91	-37,20	41,30	500	54,00	>12
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

Range: 1000 + 10000 MHz – Model HT98 (derived model)

PEAK RESULT (RBW=1MHz; VBW=1MHz) – VERTICAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	54,63	25,30	3,53	-37,44	46,02	500	54,00	>7
2741,18	53,94	27,50	4,00	-37,47	47,97	500	54,00	>6
3654,88	47,35	28,70	4,91	-37,20	43,76	500	54,00	>10
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

PEAK RESULT (RBW=1MHz; VBW=1MHz) – HORIZONTAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	58,12	25,30	3,53	-37,44	49,51	500	54,00	>4
2741,18	53,99	27,50	4,00	-37,47	48,02	500	54,00	>5
3654,88	44,74	28,70	4,91	-37,20	41,15	500	54,00	>12
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

Range: 1000 + 10000 MHz – Model HT94 (derived model)

PEAK RESULT (RBW=1MHz; VBW=1MHz) – VERTICAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	53,73	25,30	3,53	-37,44	45,12	500	54,00	>8
2741,18	50,48	27,50	4,00	-37,47	44,51	500	54,00	>9
3654,88	46,32	28,70	4,91	-37,20	42,73	500	54,00	>11
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

PEAK RESULT (RBW=1MHz; VBW=1MHz) – HORIZONTAL POLARIZATION								
Frequency	**Reading value**	**Antenna Factor**	**Cable Loss**	**Pre-Amp. Gain**	**Correcting reading**	**Average Limit**	**Average Limit**	**Margin**
(MHz)	**(dBµV)**	**(dB3/m)**	**(dB)**	**(dB)**	**(dBµV/m)**	**(µV/m)**	**(dBµV/m)**	**(dB)**
1827,38	56,10	25,30	3,53	-37,44	47,49	500	54,00	>6
2741,18	49,15	27,50	4,00	-37,47	43,18	500	54,00	>10
3654,88	45,11	28,70	4,91	-37,20	41,52	500	54,00	>12
4567,20	< 40	30,90	5,92	-36,75	< 40	500	54,00	>14
5482,24	< 40	31,90	6,40	-36,70	< 40	500	54,00	>14
6395,95	< 40	34,40	6,94	-36,95	< 40	500	54,00	>14
7309,60	< 40	36,50	7,40	-37,00	< 40	500	54,00	>14
8223,37	< 40	37,10	8,20	-37,20	< 40	500	54,00	>14
9137,00	< 40	37,10	8,80	-37,60	< 40	500	54,00	>14
NOTE: The peak levels measured are under Average Limit (54 dBµV/m), so the Average spurious levels are not been measured. The measures above are the worst case on 3 axes X Y and Z								

7.4 OCCUPIED BANDWIDTH

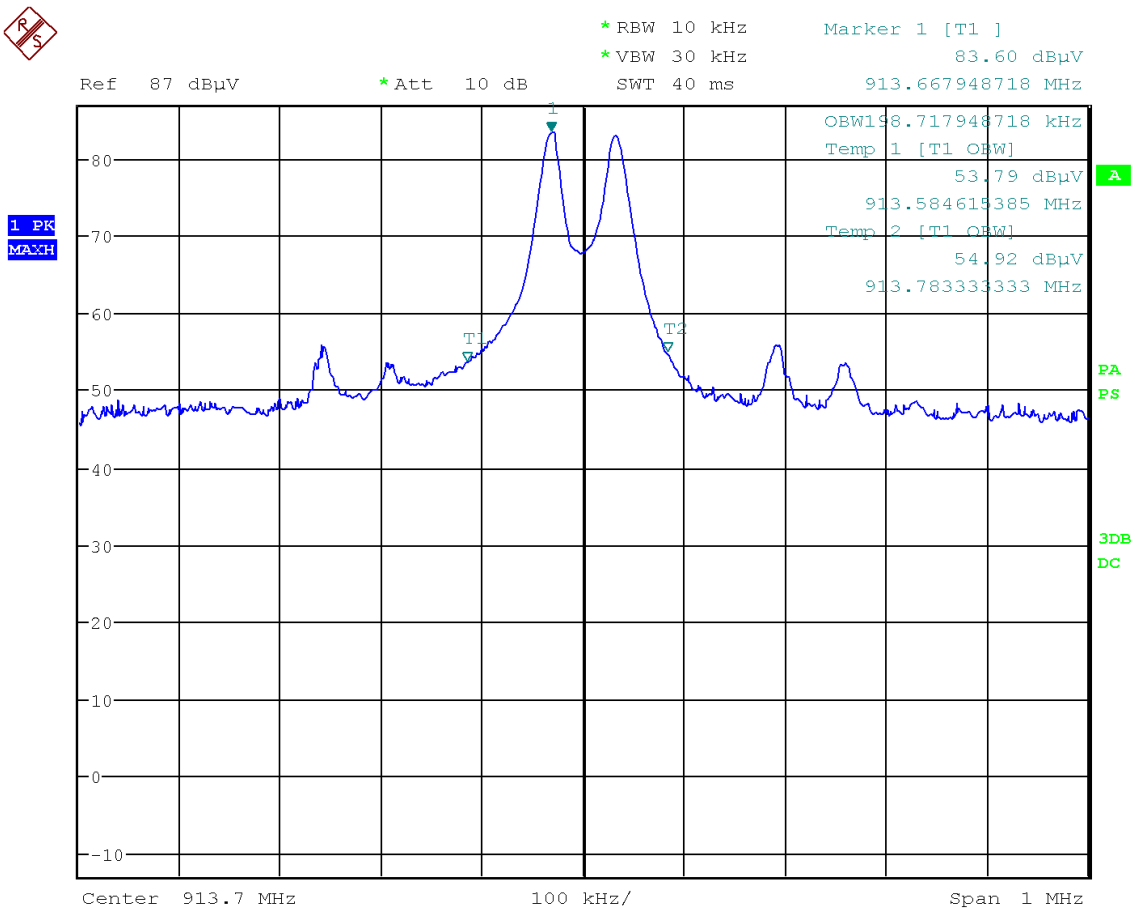
TEST REQUIREMENT

The frequency bandwidth according to CFR 47 Part 2, section 2.202(a) is measured as the 99% of emission bandwidth.

The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean power radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Guide ANSI C63.4

In order to measure the modulated signal properly, a resolution bandwidth that is small compared with the bandwidth required by the procuring or regulatory agency shall be used on the measuring instrument. However, the resolution bandwidth of the measuring instrument shall be set to a value within 1% to 5% of the signal bandwidth requirements.



TEST RESULT

Occupied bandwidth (99%)	198,71 kHz @913,70MHz

7.5 BANDWIDTH OF EMISSIONS

TEST REQUIREMENT	
Spectrum analyzer settings	
Span	1 MHz
Resolution bandwidth (RBW)	10 kHz
Video bandwidth (VBW)	30 kHz
Sweep time (SWT)	Auto
Detector function	Peak
Trace	Max hold
Attenuator	/
Deviation to test procedure	None
EUT operating condition	#1
Remark	None

LIMITS
20 dB below peak output power

TEST RESULT
The EUT meets the requirements of sections 2.1049

TEST PROCEDURE
The EUT is set to transmit with modulation in continuous mode

ANSI C63-4 Specification

13.1.7 Occupied bandwidth measurements

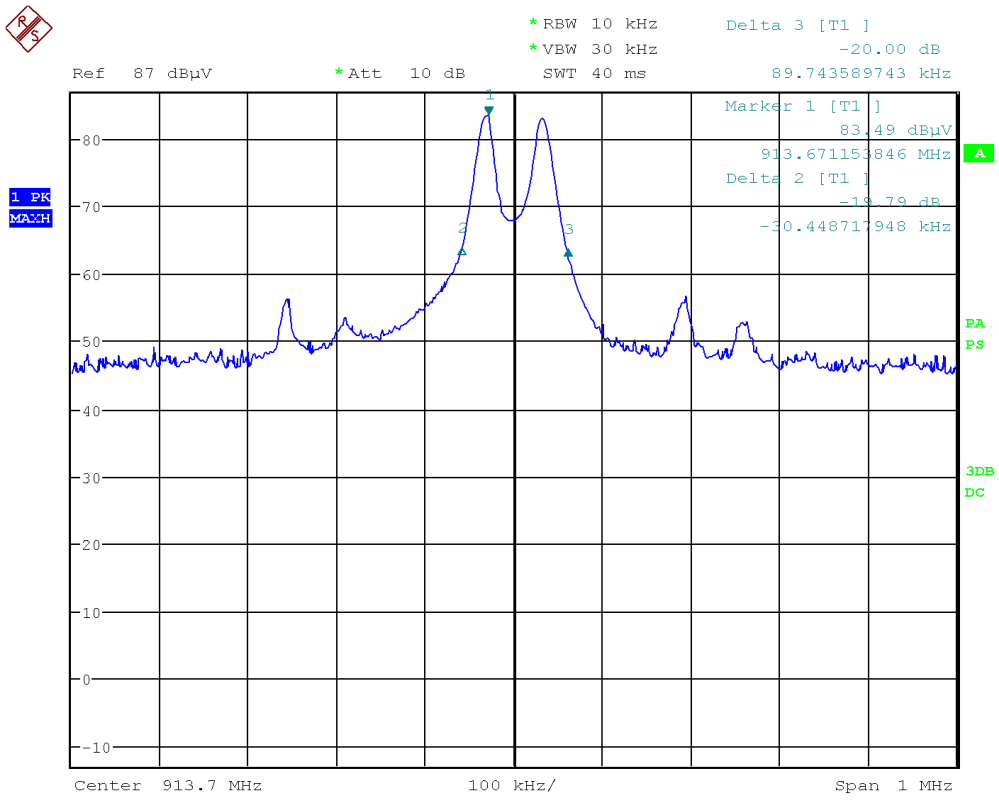
In order to measure the modulated signal properly, a resolution bandwidth that is small compared with the bandwidth required by the procuring or regulatory agency shall be used on the measuring instrument. However, the resolution bandwidth of the measuring instrument shall be set to a value greater than 5% of the bandwidth requirements. When no bandwidth requirements are specified, the minimum resolution bandwidth of the measuring instrument is given in the following table:

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

MEASUREMENTS RESULTS

Channel (No.)	Frequency (MHz)	Channel Bandwidth (kHz)	Plot (No.)
01	913,70	120,18	1

Plot 1



7.6 RF EXPOSURE EVALUATION

TEST REQUIREMENT	
Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines § 1.1307(b)(1).	
EUT classification (fixed, mobile or portable devices)	Portable
Deviation to test procedure	None
EUT operating condition	#1
Remark	None

Limit for maximum permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Avarage Time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3÷3.0	614	1.63	(100)*	6
3.0÷30	1842/f	4.89/f	($900/f^2$)*	6
30÷300	61.4	0.163	1.0	6
300÷1500	--	--	f/300	6
1500÷100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3÷3.0	614	1.63	(100)*	30
3.0÷30	824/f	2.19/f	($180/f^2$)*	30
30÷300	27.5	0.073	0.2	30
300÷1500	--	--	f/1500	30
1500÷100,000	--	--	1.0	30
F = Frequency in MHz *Plane-wave equivalent power density				

The distance from the device's transmitting antenna where the exposure level reaches the maximum permitted limit is calculated using the general equation:

$S = P*G/ 4\pi R^2$

Where:
S = Power Density (mW/cm^2)
P = Conducted power (mW)
G = Linear power gain relative to isotropic radiator (numeric gain)
R = Distance (cm)

RF Exposure evaluation

Low threshold limit			
Exposure category	**Frequency range *f*MHz**	**Limit**	**Limit value (mW/cm^2)**
General population	913,70	f_{MHz}/ 1500	0.609

Both conducted and radiated (EIRP) output power values must be compared to the threshold limit.

MEASUREMENTS RESULTS

T_{on} (ms)	**Total Period (ms)**	**Time average factor (dB)**	**Source-based time averaged output (dBm)**	**Source-based time averaged output (mW)**
143.25	200	-1.44	-3.07	0.493

The time average factor is calculated as follows:

10 * log (T_{on} / *Total Period*) dB

T_{on} and *Total Period* are expressed in ms; measured values are:

T_{on} = 143.25 ms

Total Period = 200 ms

The resulting time average factor used is -1.44 dB.

The highest output power (radiated) is -1.63 dBm (93.60 dBµV/m ⇒ max level measured on 5 transmitters). Therefore the averaged output power is calculated as follows:

-1.63 -1.44 = -3.07 dBm (0.493 mW)

TEST RESULT

This value is less than the low threshold limit corresponding to the general population exposure category and therefore no SAR test is required.

8. MEASUREMENTS AND TESTS UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the IMQ procedure No. IO-DT-U01 and requirement of NIST Technical Note 1297 and NIS 81: 1994 “The Treatment of Uncertainty in EMC Measurements”

Methods	Expanded Uncertainty	Unit	confidence level	Coverage factor	Degree of freedom
Radiated emission (30 ÷ 1000 MHz)	4.77	dB	95 %	2	9
Radiated emission (above 1000 MHz)	3.53	dB	95 %	2	9

9. LIST OF MEASURING EQUIPMENT AND CALIBRATION INFORMATION

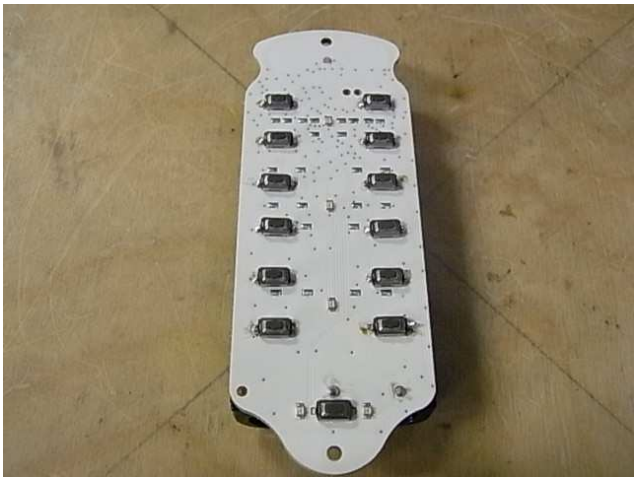
IMQ Serial Number	Instrument	Manufacturer	Type	Last Cal.	Cal. Period.	Calibration Company
P01709	Shielded semi-anechoic chamber	SIDT	/	07-12	12	IMQ
P02486	Turntable controller unit	FRANKONIA	FCTAM01	-	-	-
P02488	Mast antenna	FRANKONIA	FAM4	-	-	-
S02350	EMI Receiver	ROHDE & SCHWARZ	ESMI-RF	05-11	12	INRIM
S04355	EMI Receiver	ROHDE & SCHWARZ	ESCI 3	11-11	12	INRIM
S02508	Loop antenna	ROHDE & SCHWARZ	HFH2-Z2	01-12	36	OKD
S02385	Log antenna	ARA	LPB-2513	07-11	36	NPL
S03463	Horn Antenna	SCHWARZBECK	BBHA 9120D	09-11	36	NPL
S03629	Spectrum Analyzer	Rohde & Schwarz	FSP40	09-11	12	I.N.RI.M.
S03542	Preamplifier	Hewlett Packard	HP 8449B	02-11	24	IMQ
S04159	Multimenter	Fluke	45	02-12	12	IMQ
W-00199/E	Software	ROHDE & SCHWARZ	EMC32 Ver. 6.30			
H-00165	PC		/			

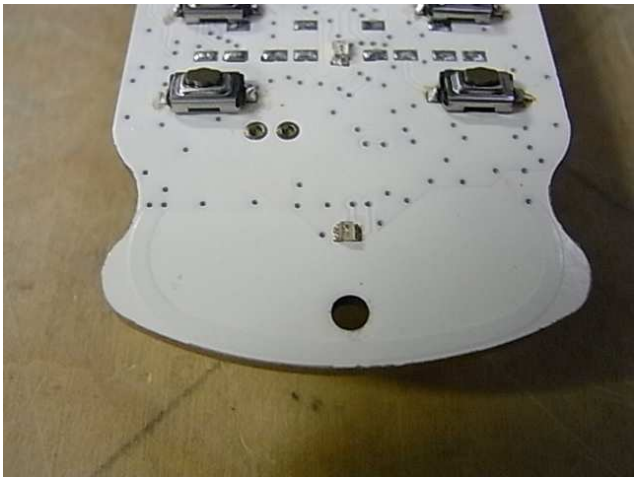
Note: The IMQ instruments are tested and calibrated according to UNI EN 45001, the IMQ procedure IP-037 "Calibration test equipment and measurement" and according to plans set on IMQ operating instruction IO-FT-034 “Criteria for the calibration of test equipment and measurement” which are an integral part of the Quality Manual of IMQ.

10. PHOTOGRAPHIC DOCUMENTATION

EUT IDENTIFICATION (basic model H912)

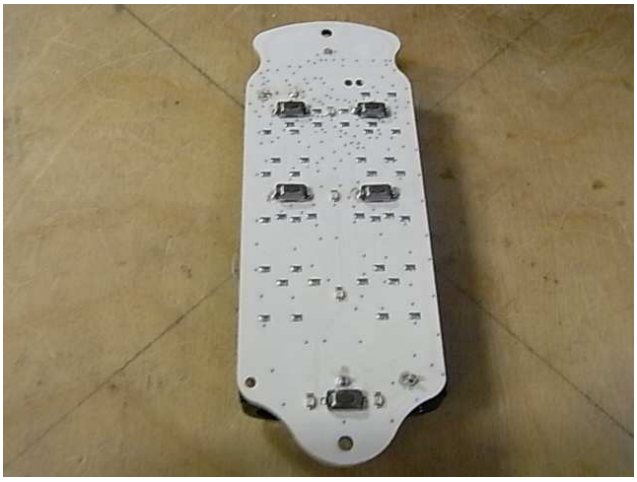
INTERNAL VIEW (basic model H912)

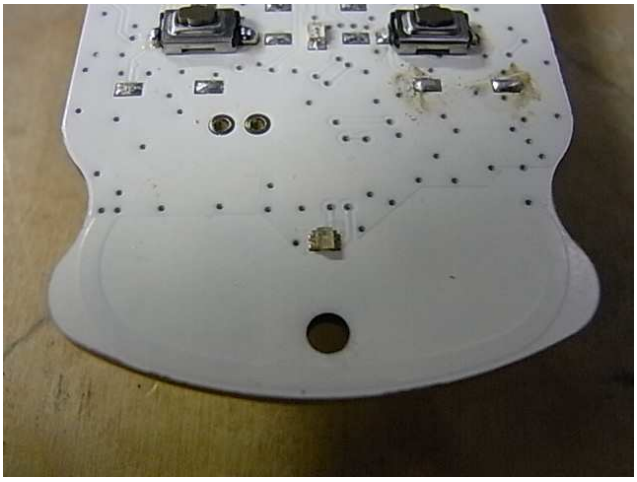




EUT IDENTIFICATION (derived model H904)

INTERNAL VIEW (derived model H904)



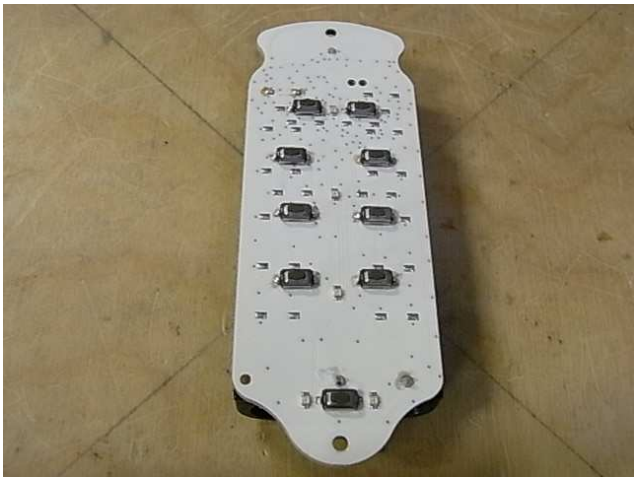


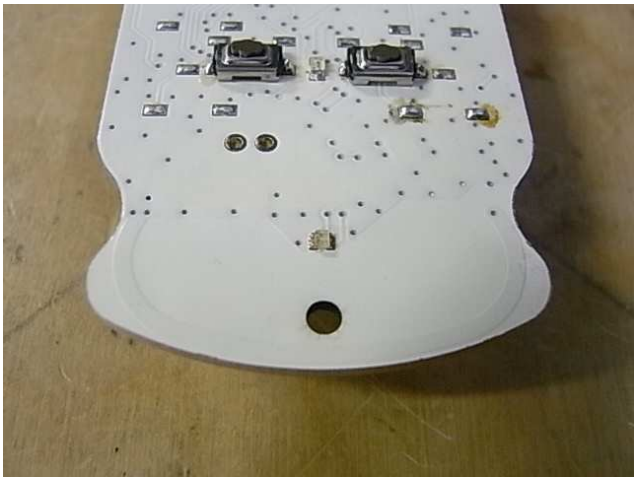
EUT IDENTIFICATION (derived model H902)

INTERNAL VIEW (derived model H902)

EUT IDENTIFICATION (derived model HT98)

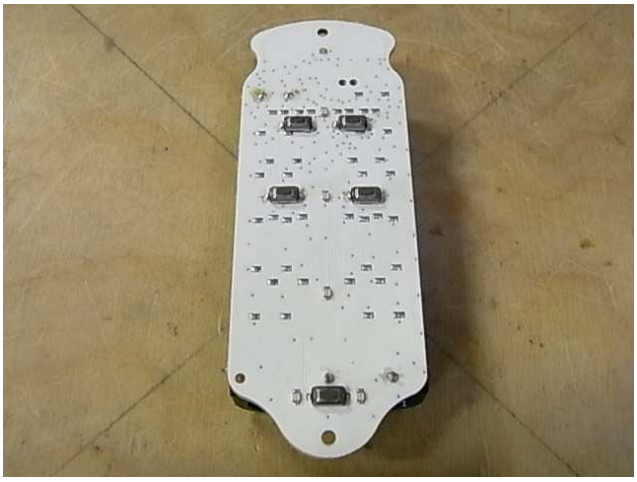
INTERNAL VIEW (derived model HT98)





EUT IDENTIFICATION (derived model HT94)

INTERNAL VIEW (derived model HT94)



SET-UP

Test set-up radiated emission test

END OF REPORT