Tecnolab del Lago Maggiore S.r.l.
ISTITUTO DI PROVE, MISURE E RICERCHE, ING. MICHELE SETARO
Via dell'Industria, 20
28924 Verbania Fondotoce (VB) – Italy

CUSTOMER Cliente	**Schindler Elettronica SA** Via della Pace, 22 6600 Locarno (CH) Switzerland
CONTRACT Commessa	**CO021909- 23/12/2009**
TEST REPORT Rapporto di Prova	**RP002611** **EMC test for FCC Certification procedure on PORT 3.1**
APPLICABLE STANDARDS Norme di riferimento	➢ **FCC Rules : Code of Federal Regulations (CFR) no. 47 Ch1 (10-1-09 Edition)** **PART 15 - RADIO FREQUENCY DEVICES**

11/02/2011	ing. Marco Mai	ing. Danilo Prina	ing. Michele Setaro
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Data Date	Redazione Redaction	Verifica Tecnica Technical Check	Autorizzazione Authorization

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1. GENERAL REMARKS

1.1 Customer data

Customer:	**Schindler Elettronica SA**
Address:	Via della Pace, 22 6600 Locarno (CH) Switzerland

1.2 Identification of equipment and/or subsystem under test (EUT)

EUT (equipment or subsystem) n°:	1
Mark:	**Schindler Elettronica SA**
Model:	Port 3.1
FCC ID	XFIPORT312VER1
Acceptance code:	AC002411/1
Receiving date:	10/02/2011
Description:	Access controller for door system. See Annex 1 and 3 of this test report.

1.3 Identification of auxiliary equipment not under test (AE)

AE (equipment or subsystem) n°:	1
Mark:	Schindler Elettronica SA
Model:	Lonpic – test
Serial number:	Crdx-z0407 HDP 6502
Acceptance code:	AC002411/2
Receiving date:	10/02/2011
Description:	AC/DC power supply. See annex 2 of this test report.

1.4 Identification of connecting cables

Cable nr.:	CV1
Description and length:	AC power input cable. Alcatelx H05VV-F 3G 1.0mm^2. L-N-PE. Length: 1,5m.

Cable nr.:	CV2
Description and length:	DC power input cable. Shielded Cable; HELIKABEL DATAFKLAMM-C4X0.14 QMM / 52367 350V 01960048354. Length: 10,4m

1.5 Sampling

The results shown in this Technical Report exclusively refer to the sample under test, taken away from the production by Customer. Extension of test results to the whole production is the responsibility of manufacturer/importer.

2. SCOPE

Scope of the test and the measurement is to supply the Customer with useful indications in order to evaluate EUT compliance with Electromagnetic Compatibility Reference Standards; the performed test plan is required from the manufacturer.

3. APPLICABLE DOCUMENTS

FCC Rules	FCC Rules : Code of Federal Regulations (CFR) no. 47 Ch1 (10-1-09 Edition) PART 15 - RADIO FREQUENCY DEVICES

3.1 Applicability

Applicable parties regarding the certification procedure for intentional radiator operating within the bands 13.553 – 13.567 MHz.
According to the definition 15.3 (o)EUT is an Intentional Radiator operating within the band 13.553 – 13.567 MHz so it shall fulfil provisions of 47CFR part 15 Subpart C – intentional radiators – and section 15.225.

3.2 Definitions and glossary of terms

Applicable IEC 50 IEV Standard definitions.

AE	Auxiliary Equipment
CE	Conducted Emission
EMC	Electromagnetic Compatibility
EUT	Equipment Under Test
RE	Radiated Emission

3.3 Other definitions and abbreviations

GRP	Ground reference plane
BH	Biconical antenna in horizontal polarization
BV	Biconical antenna in vertical polarization
LH	Log-periodic antenna in horizontal polarization
LV	Log-periodic antenna in vertical polarization
Loop F	Loop antenna in frontal position
Loop L	Loop antenna in lateral position
Pass	In compliance with reference Standard
Fail	Not in compliance with reference Standard

4. EUT FUNCTIONAL DESCRIPTION

4.1 EUT description and operating method during tests

The PORT 3.1 device is used to control access through a door system utilizing either a proximity card, a pre-programmed pin code or a combination of both.
The system is used to get access to the building. Any kind of Building can be considered for example Office, Hotel or Apartment.
PORT 3.1 is a fully integrated component of The PORT Technology.
The version called PORT 3.2 differs from PORT 3.1 only by the absence of keypad. (see Annex 2 and 5 of this test report).
PORT3.1 and PORT3.2 version have the same radio module (NFCUSB1 Rev03).

4.2 Test set-up and EUT configuration

EUT is tested in continuous transmission powered with 230Vac/24Vdc DC power supply (AE1).

5. TECHNICAL COMPETENCE

Technicians qualified for the execution of the tests are engineers with at least three months of experience in Measurements and Testing.

6. TEST PERFORMED

6.1 General

6.1.1 Testing laboratory

Tests were performed at laboratory: Tecnolab del Lago Maggiore S.r.l., Via dell'Industria 20, 28924 Verbania Fondotoce (VB) ITALY.

6.1.2 List and description of tests

Test	Applicable Standard	Paragraph of this test report	Port	Result
Antenna requirement	47 CFR 15.203 /15.204	/	/	Use of permanently attached antenna shall be considered sufficient to comply the provisions of this section.
Conducted emissions measurements	47 CFR 15.207 (a)	AC Power port	6.2	Pass
Radiated emissions measurements	47 CFR 15.205 47 CFR 15.209	Enclosure port	6.3	Pass
Field strength (Operation outside the band 13.110-14.010 MHz)	47 CFR 15.225 (d)	Enclosure port	6.3	Pass
Field strength within assigned band	47 CFR 15.225 (a)	Enclosure port	6.4	Pass
Frequency stability	47 CFR 15.225 (e)	Enclosure port	6.5	Pass

6.1.3 Measurements uncertainty

The measurement uncertainties stated in this document are expressed as expanded uncertainty obtained by multiplying the standard uncertainty by the coverage factor K = 2 corresponds to a confidence level of about 95%.

6.2 Conducted Emission measurements

Date:	11/02/2011
Enviromental condition:	Temperature=18-25°C – Humidity= 30-50%
Applicable Standard:	47 CFR 15.207 (a)
Test levels/Limits:	The reference limits for intentional radiators are: Frequency range — Limits (detector) 0.15 - 0.5 MHz — 66-56 dBμV (QP) " — 56-46 dBμV (AVG) 0.5 - 5 MHz — 56 dBμV (QP) " — 46 dBμV (AVG) 5 - 30 MHz — 60 dBμV (QP) " — 50 dBμV (AVG)
Test procedure:	Test is performed on each wires (L1,L2) of the cable CV1 in the configuration of the top-table equipments with EUT1 24Vdc powered via AE1 and LISN.
Test set-up:	ANSI C63.4 (2009) See par. 4.2 and annex 6 of this test report. The measures shown in annexes listed below were obtained considering the correction factors of cables and LISN used for the test.
Meas. Uncertainty:	3,48 dB
Test results:	**PASS** The emissions from the EUT conducted with PK detector are over the AVG limits; investigations with QP/AVG detectors are necessary. The measurements performed are showed in following annexes: 7. L1: measurement with PK detector in the range 0.15-30 MHz; 8. L1: measurement with QP/AVG detector in the range 0.15-0.18MHz; 9. L1: measurement with QP/AVG detector in the range 4.5-5.5MHz; 10. L1: measurement with QP/AVG detector in the range 13.5-13.6MHz; 11. L2: measurement with PK detector in the range 0.15-30 MHz; 12. L2: measurement with QP/AVG detector in the range 0.15-0.18MHz; 13. L2: measurement with QP/AVG detector in the range 4.6-5.3MHz; 14. L2: measurement with QP/AVG detector in the range 13.5-13.6MHz;

Test instrumentation:

code	type	mark	model	Calibration until
STRIC001	EMI receiver	Hewlett-Packard	8542E	29/03/2012
STRET003	LISN 10 A	EMCO	3810/2	10/11/2012
STATT001	transient limiter	Hewlett-Packard	11947A	13/11/2011
STCAM001	semi-anechoic chamber	Panashield-TDK-Protecno	-	-

6.3 Radiated Emission measurements

Date:	11/02/2010
Enviromental condition:	Temperature= 18-25 °C – Humidity= 30-50%
Applicable Standard:	47 CFR 15.205 / 47 CFR 15.209 / 47 CFR 15.225 (d)
Test levels/Limits:	The electric field radiated emissions is measured at a distance of 3 m from the EUT. The reference limits at 3 m are: Frequency range Limits (detector) 5-30 MHz 69.5 dBμV/m (QP) 30-88 MHz 40 dBμV/m (QP) 88-216 MHz 43.5 dBμV/m (QP) 216-960 MHz 46 dBμV/m (QP) 960-1000 MHz 54 dBμV/m (QP) 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 performer at a separation distance. The applied formula for limits at 30 meter is : Extrapolation (dB)= 40log (300 meter/30 meter) = +80dB Extrapolation (dB)= 40log (30 meter/30 meter) = +40dB
Test procedure:	Measurements are performed with horizontal and vertical polarization of Loop, biconical and log-periodic antennas. The antenna was positioned between 1 and 4 meters high. EUT1 was located on a turntable, the turntable was rotated fully from 0° to 360°. It was recorded the highest level of the electromagnetic radiation disturbance at each frequency. In this test were taken into account the emissions of PORT 3.1version (with keypad) because it is a worst case than PORT3.2 (without keypad).
Test set-up:	ANSI C63.4 (2009) See par. 4.2 and annex 15 of this test report. The measures shown in annexes listed below were obtained considering the correction factors of cables and antennas used for the test.
Measurement Uncertainty:	5.2 dB.
Test results:	**PASS** The radiated emissions from the EUT was conducted with PK detector. Because some measurements were over the limits, it was not necessary an investigations with QP detector. The performed measurements are showed in the annexes: 16. BV: measurement with PK detector in the range 30-216MHz; 17. BH: measurement with PK detector in the range 30-216MHz; 18. LH measurement with PK detector in the range 216-1000 MHz; 19. LV measurement with PK detector in the range 216-1000 MHz; 20. Loop F measurement with PK detector in the range 5-30 MHz; 21. Loop L measurement with PK detector in the range 5-30 MHz. The radiated emissions are under reference limits. To achieve compliance have been made the changes listed in paragraph 7 of this test report.

Test instrumentation:

code	type	mark	model	Calibration until
STRIC001	EMI receiver	Hewlett-Packard	8542E	29/03/2012
STANT019	log-periodic antenna	Emco	3148	04/01/2013
STANT020	biconical antenna	Emco	3110B	09/02/2011

STANT009	Loop Antenna	EMCO	6507	19/10/2013
STCAM001	semi-anechoic chamber	Panashield-TDK-Protecno	-	-

6.4 Field strength within assigned band

Date:	11/04/2011
Enviromental condition:	Temperature= 18-25 °C – Humidity= 30-50%
Applicable Standard:	47 CFR 15.225 (a)
Test levels/Limits:	Frequency: 13.5600 MHz. 15848 µV/m at 30m 84 dBµV/m at 30m 124 dBµV/m at 3m
Test procedure:	Measured performed at 3m. In this test were taken into account the worst case emissions between PORT 3.1 version and PORT3.2 version.
Test set-up:	ANSI C63.4 (2009) The measures listed below were obtained considering the correction factors of cables and antennas used for the test.
Measurement Uncertainty:	<1.5 dB.
Test results:	The performed measure is shown in annex: 22. Loop: measurement with PK detector in the range 13.06-14.06 MHz; 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 performer at a separation distance. The applied formula for limits at 30 meter is : Extrapolation (dB)= 40log (300 meter/30 meter) = +80dB Extrapolation (dB)= 40log (30 meter/30 meter) = +40dB **PASS**

Test instrumentation:

code	type	mark	model	Calibration until
STRIC016	EMC Analyzer	Hewlett-Packard	E7405A	11/11/2013
STANT009	Loop Antenna	EMCO	6507	19/10/2013
STCAM001	Semi-anechoic chamber	Panashield-TDK-Protecno	-	-

6.5 Frequency stability

Date:	14/03/2011
Enviromental condition:	Temperature= 18-25 °C – Humidity= 30-50%
Applicable Standard:	47 CFR 15.225 (c)
Test levels/Limits:	± 0.01% of operating frequency. Frequency drift limits: ± 1.3560 kHz
Test procedure:	Frequency range: 13.553 – 13.567 MHz Power supply: external power supply source Power supply variation: form 85% to 115% of the rated supply voltage. Modulation state: ON Frequency of work: 13.5600 MHz
Test set-up:	ANSI C63.4 (2009) The measures listed below were obtained considering the correction factors of cables and antennas used for the test.
Test results:	

Test condition		Measured frequency (kHz)	Frequency drift (kHz)
Power supply voltage	Temperature		
24 V	- 20 °C	13560.625	+0.63
24 V	-10 °C	13560.225	+0.23
24 V	0 °C	13560.200	+0.20
24 V	10 °C	13560.185	+0.19
24 V	20 °C	13560.175	+0.18
24 V	30 °C	13560.145	+0.15
24 V	40 °C	13560.215	+0.22
24 V	50°C	13560.150	+0.15

Test condition		Measured frequency (kHz)	Frequency drift (kHz)
Power supply voltage	Temperature		
21.6 V	20 °C	13560.175	+0.18
27.6 V	20 °C	13560.155	+0.16

PASS

Test instrumentation:

code	type	mark	model	Calibration until
STRIC016	EMC Analyzer	Hewlett-Packard	E7405A	11/11/2013
STANT009	Loop Antenna	EMCO	6507	19/10/2013
STSCA005	Climatic chamber	ANGELANTONI Industrie S.p.A.	HYGROS 1200	23/10/2012
STCAM001	Semi-anechoic chamber	Panashield-TDK-Protecno	-	-

7. MODIFICATION EXECUTED BY CLIENT

This section lists all changes made to achieve compliance with FCC rules:

- Adding a ferrite **Richco** mod: **RRC-16-8-28-M-K5B** on CV2 in the position shown in ANNEX 4 of this test report. Were carried out two rounds of wire around ferrite.

8. ANNEXES

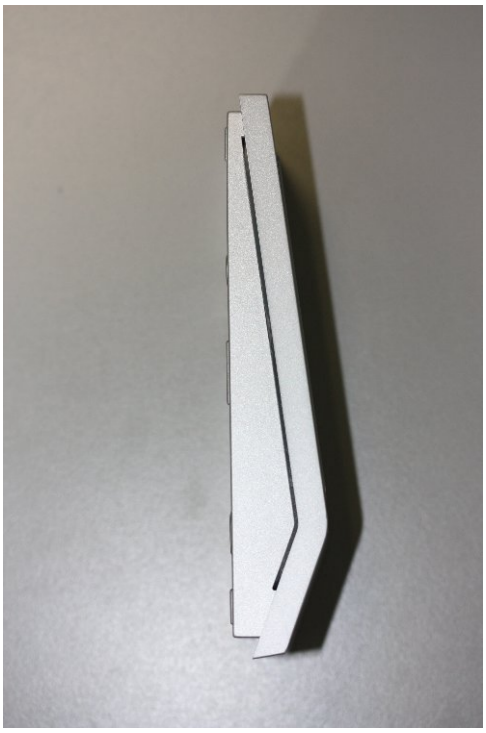
Nr.	Description
1	External view description PORT 3.1
2	External view description PORT 3.2
3	AC/DC power supply
4	Internal view description PORT3.1
5	Internal view description PORT3.2
6	Conducted emissions set-up
7-14	Conducted emissions results
15	Radiated emission set-up
16-21	Radiated emission results
22	Field strength within assigned band results
23	Labelling position

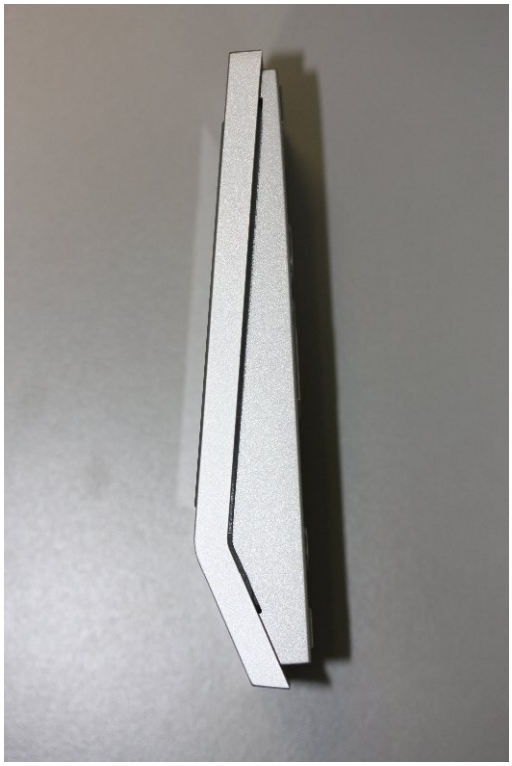

1 2 3
4 5 6
7 8 9
C 0 -


Power supply
24VDC/2W
Schindler
PORT3.1
0051
FCC ID: XFIPORT312VER1

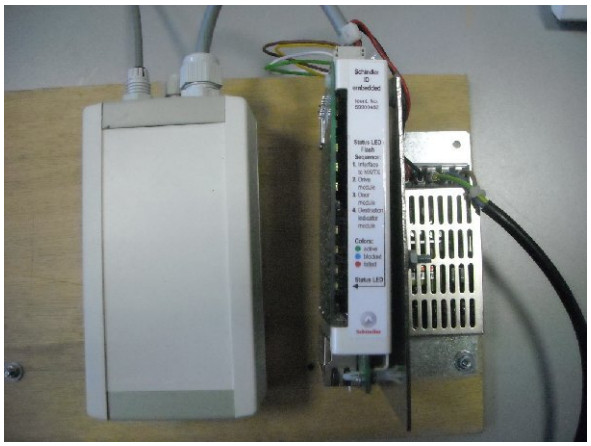

1 2 3
4 5 6
7 8 9
C 0 -

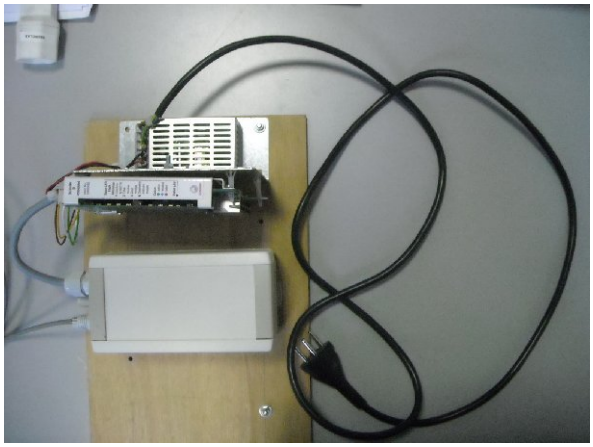

Power supply
24VDC/2W
Schindler
PORT3.1
0051
FCC ID: XFIPORT312VER1

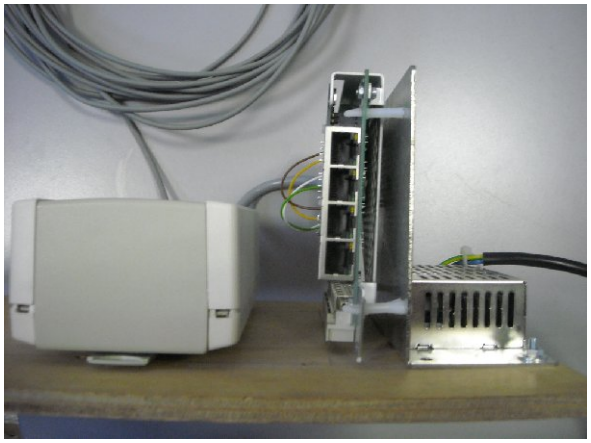


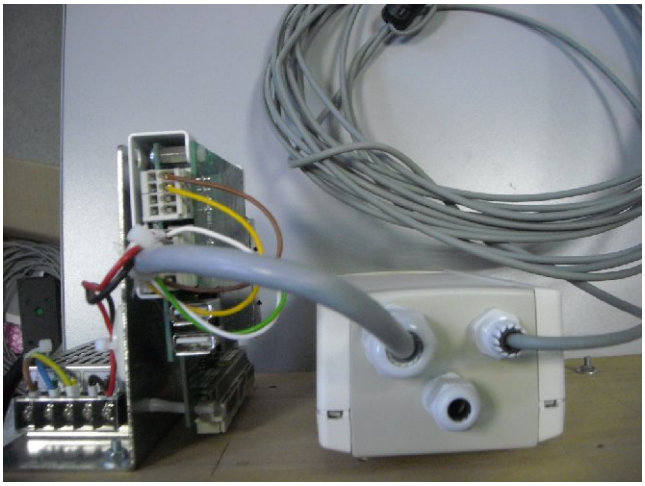



Power supply
24VDC/2W
Schindler
PORT3.2
0051
FCC ID: XFIPORT312VER1

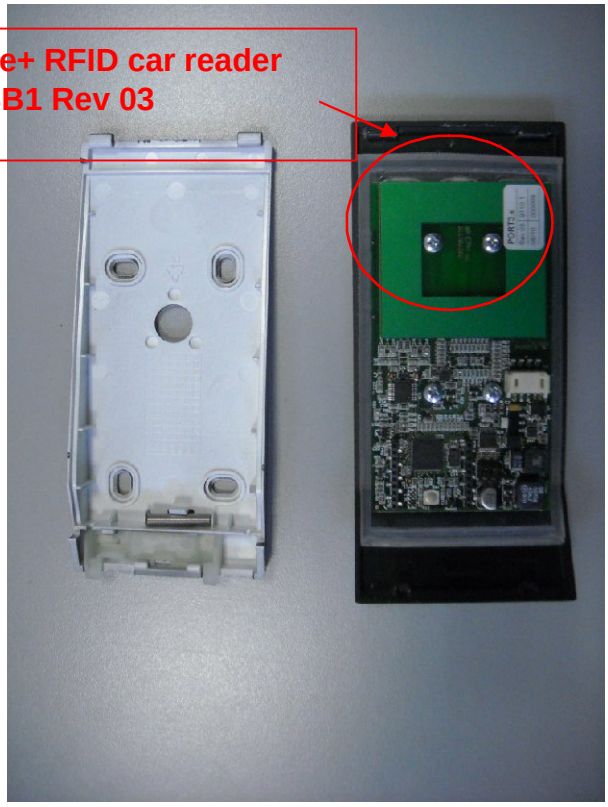


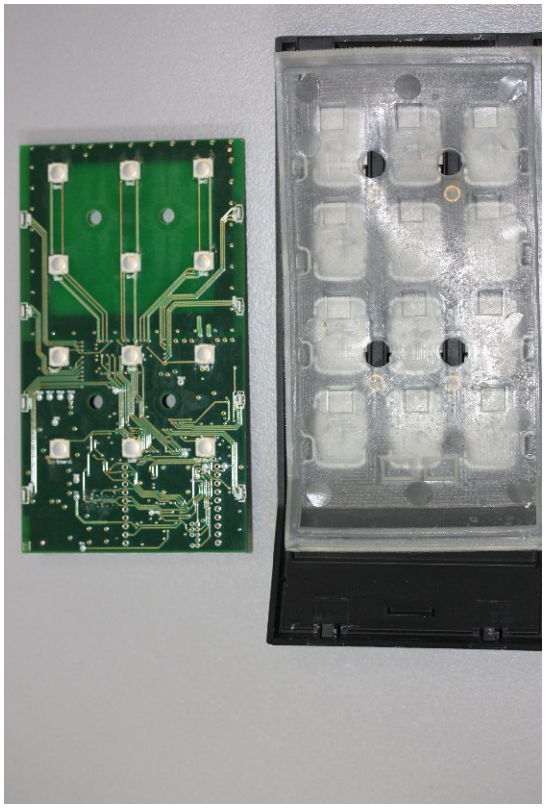


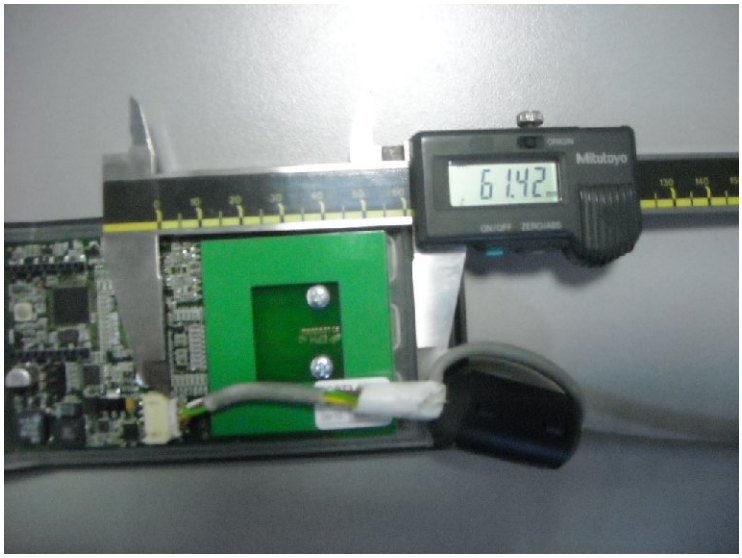




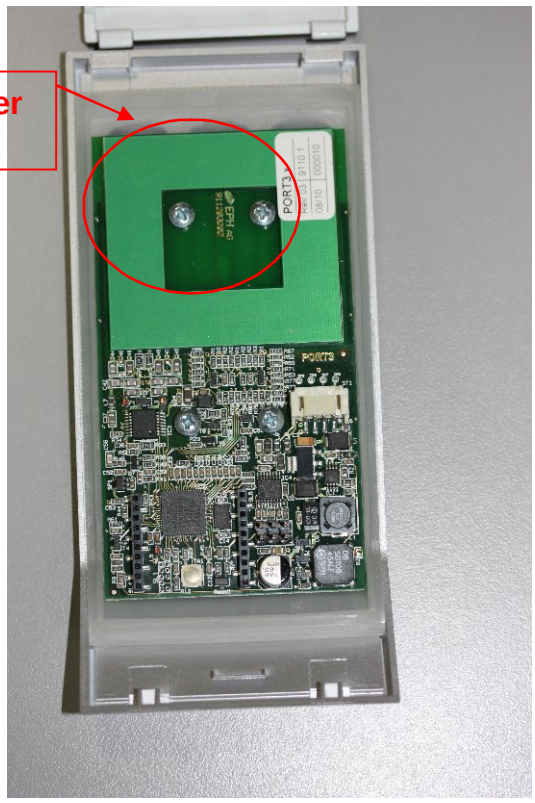
NFC Antenne+ RFID car reader
Mod:NFCUSB1 Rev 03

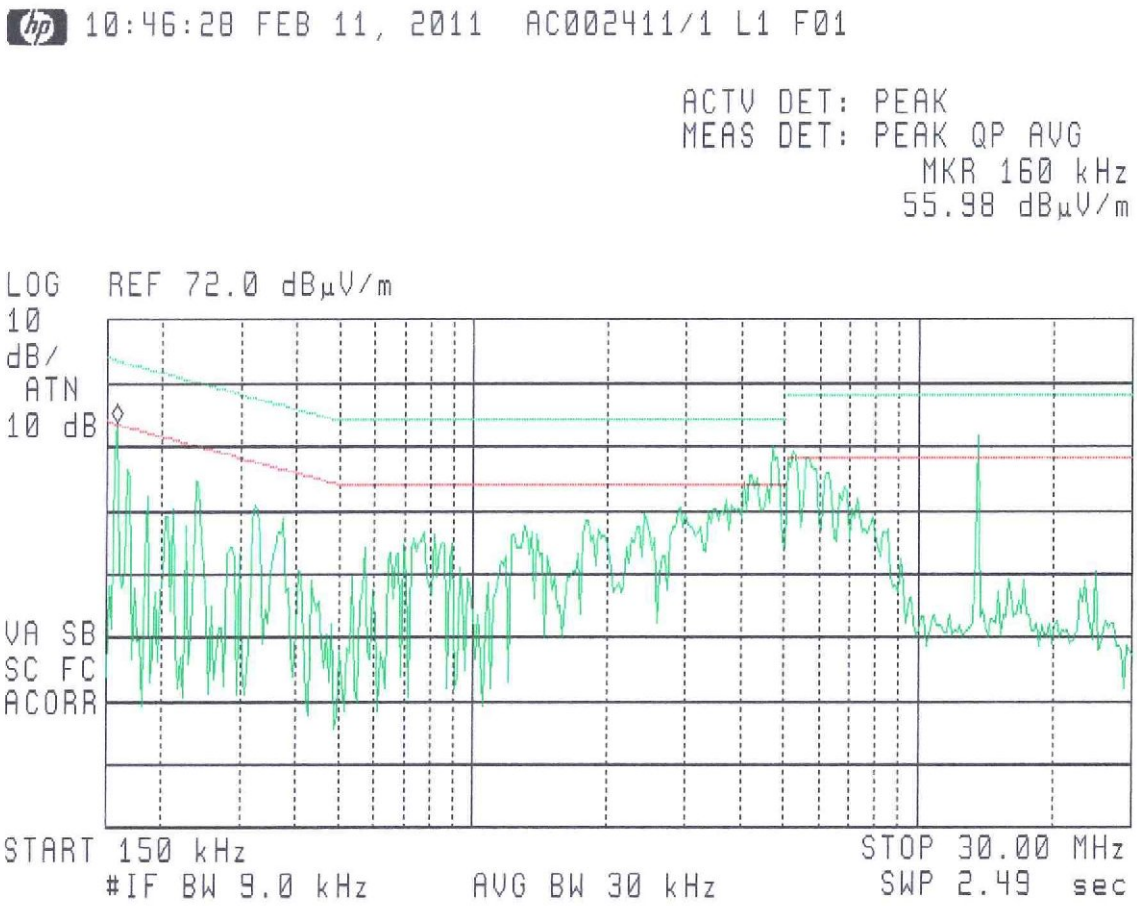






NFC Antenne+ RFID car reader
Mod:NFCUSB1 Rev 03

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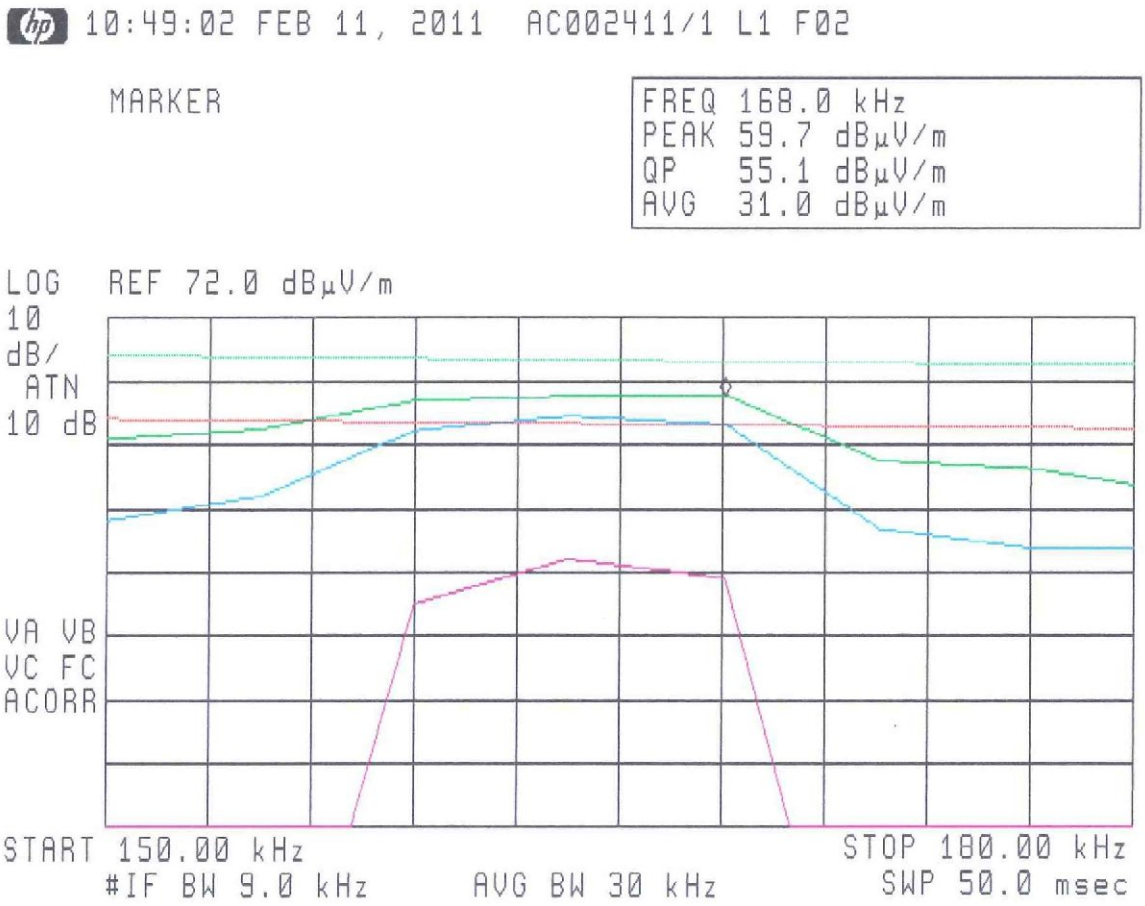
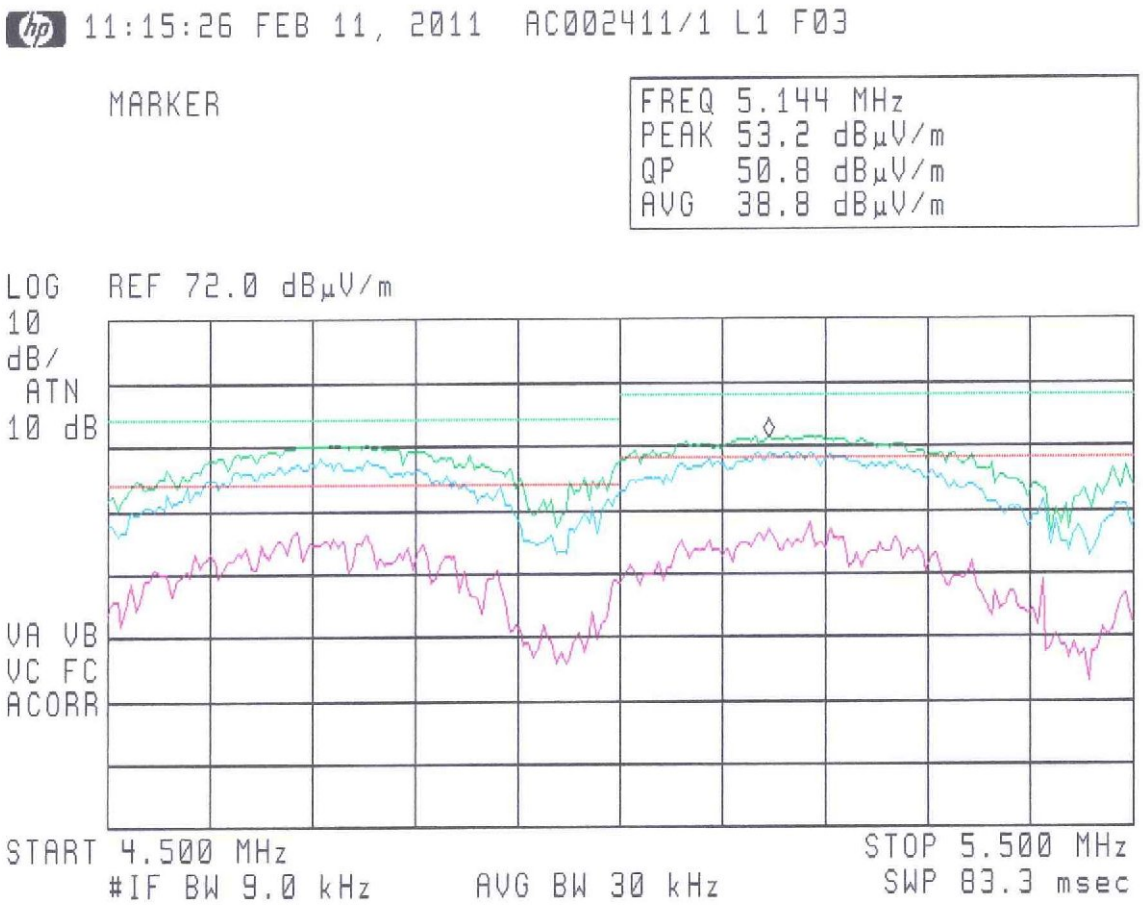
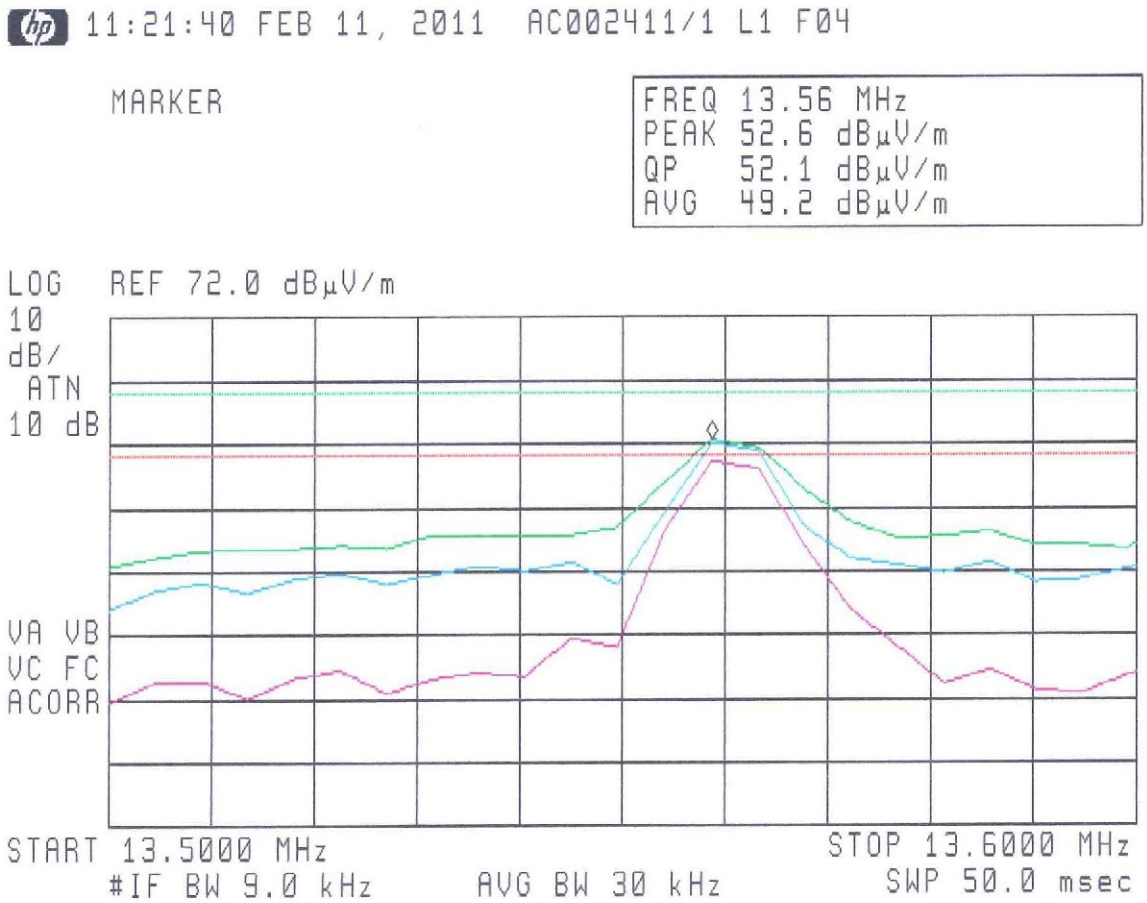
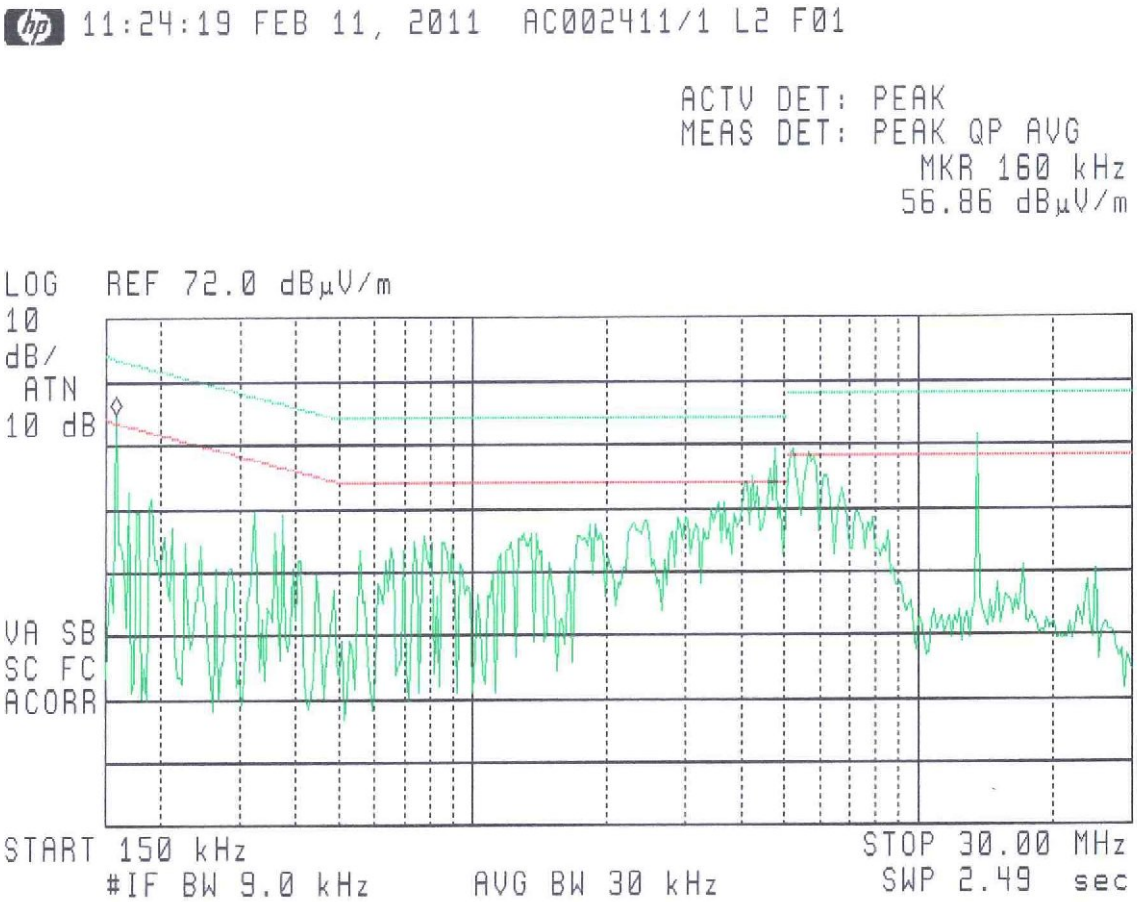
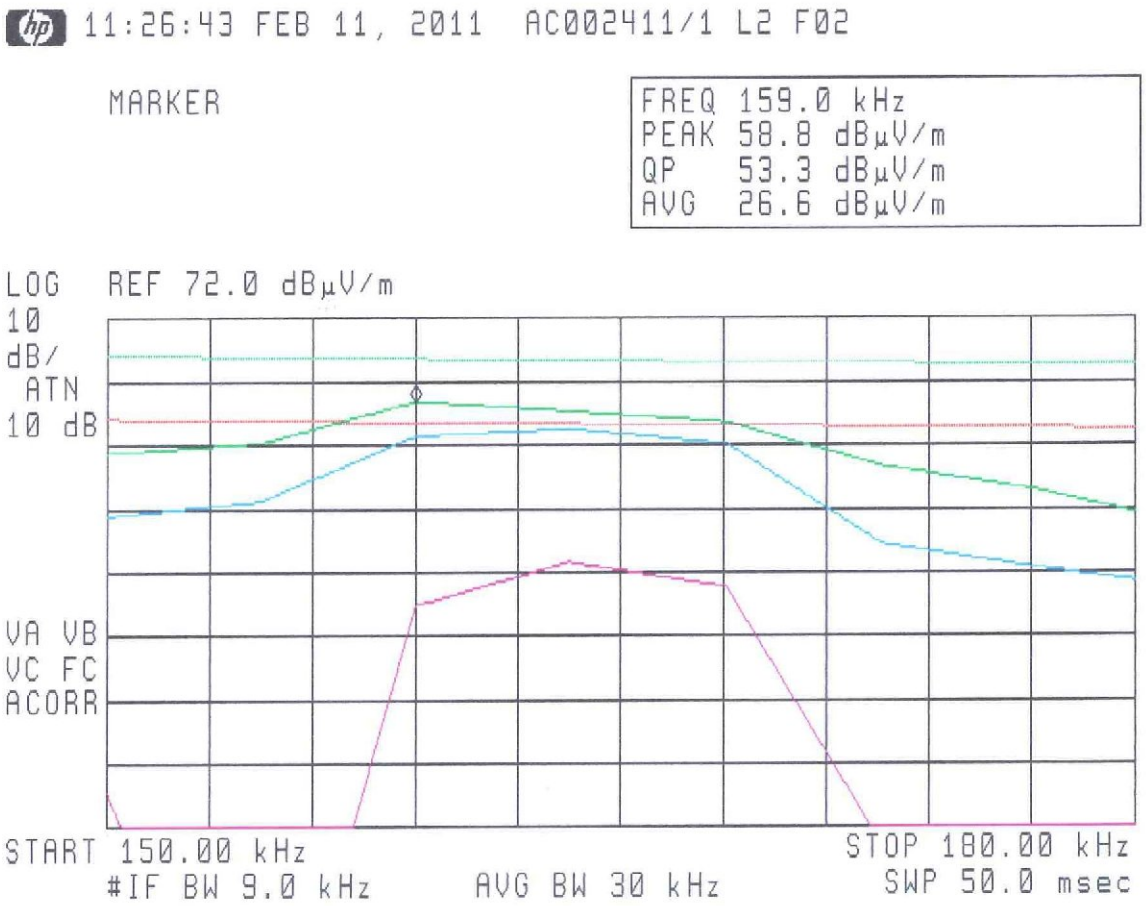
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 160 kHz
55.98 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA SB
SC FC
ACORR
START 150 kHz
STOP 30.00 MHz
#IF BW 9.0 kHz
AVG BW 30 kHz
SWP 2.49 sec


10:49:02 FEB 11, 2011 AC002411/1 L1 F02
MARKER
FREQ 168.0 kHz
PEAK 59.7 dBµV/m
QP 55.1 dBµV/m
AVG 31.0 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA VB
VC FC
ACORR
START 150.00 kHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 180.00 kHz
SWP 50.0 msec


11:15:26 FEB 11, 2011 AC002411/1 L1 F03
MARKER
FREQ 5.144 MHz
PEAK 53.2 dBµV/m
QP 50.8 dBµV/m
AVG 38.8 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA VB
VC FC
ACORR
START 4.500 MHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 5.500 MHz
SWP 83.3 msec


11:21:40 FEB 11, 2011 AC002411/1 L1 F04
MARKER
FREQ 13.56 MHz
PEAK 52.6 dBµV/m
QP 52.1 dBµV/m
AVG 49.2 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA VB
VC FC
ACORR
START 13.5000 MHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 13.6000 MHz
SWP 50.0 msec


11:24:19 FEB 11, 2011 AC002411/1 L2 F01
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 160 kHz
56.86 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA SB
SC FC
ACORR
START 150 kHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 30.00 MHz
SWP 2.49 sec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MARKER
FREQ 159.0 kHz
PEAK 58.8 dBµV/m
QP 53.3 dBµV/m
AVG 26.6 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
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VC FC
ACORR
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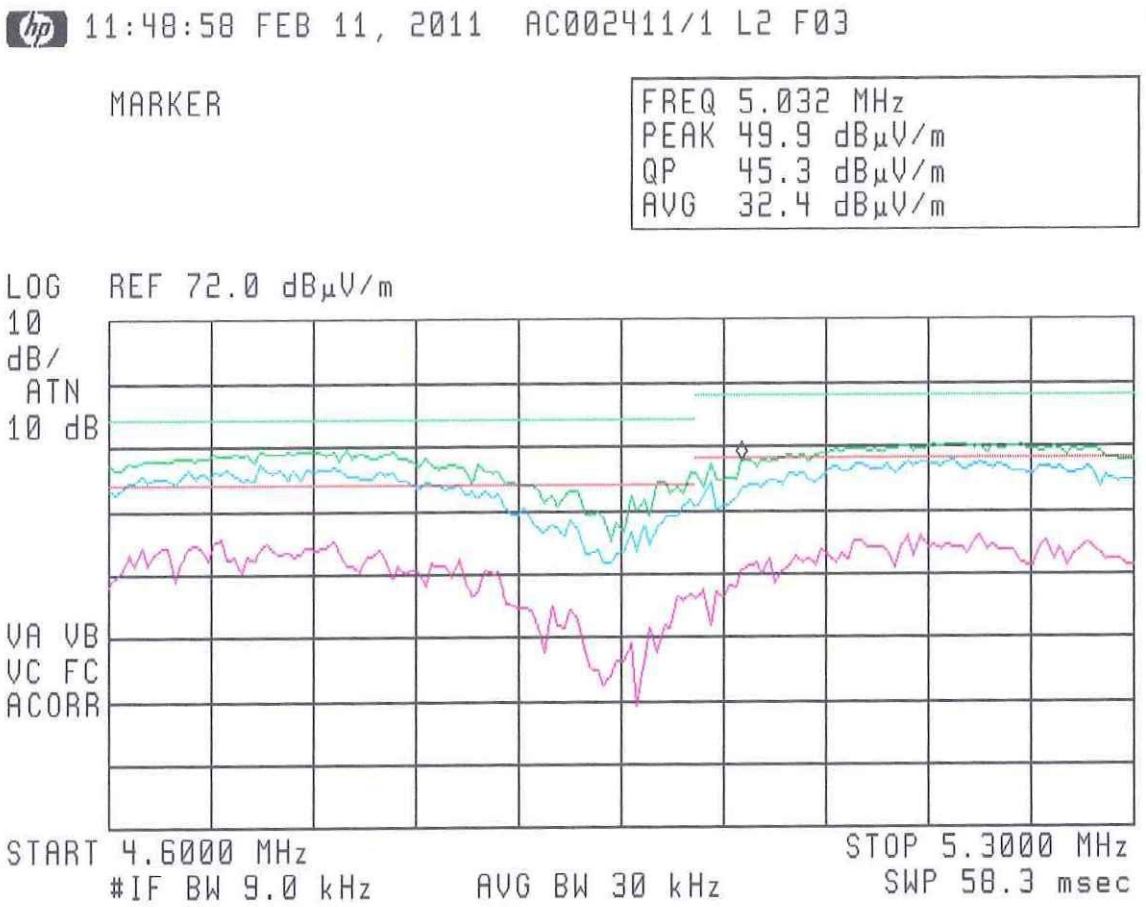
AVG BW 30 kHz
STOP 180.00 kHz
SWP 50.0 msec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MARKER
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PEAK 49.9 dBµV/m
QP 45.3 dBµV/m
AVG 32.4 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA VB
VC FC
ACORR
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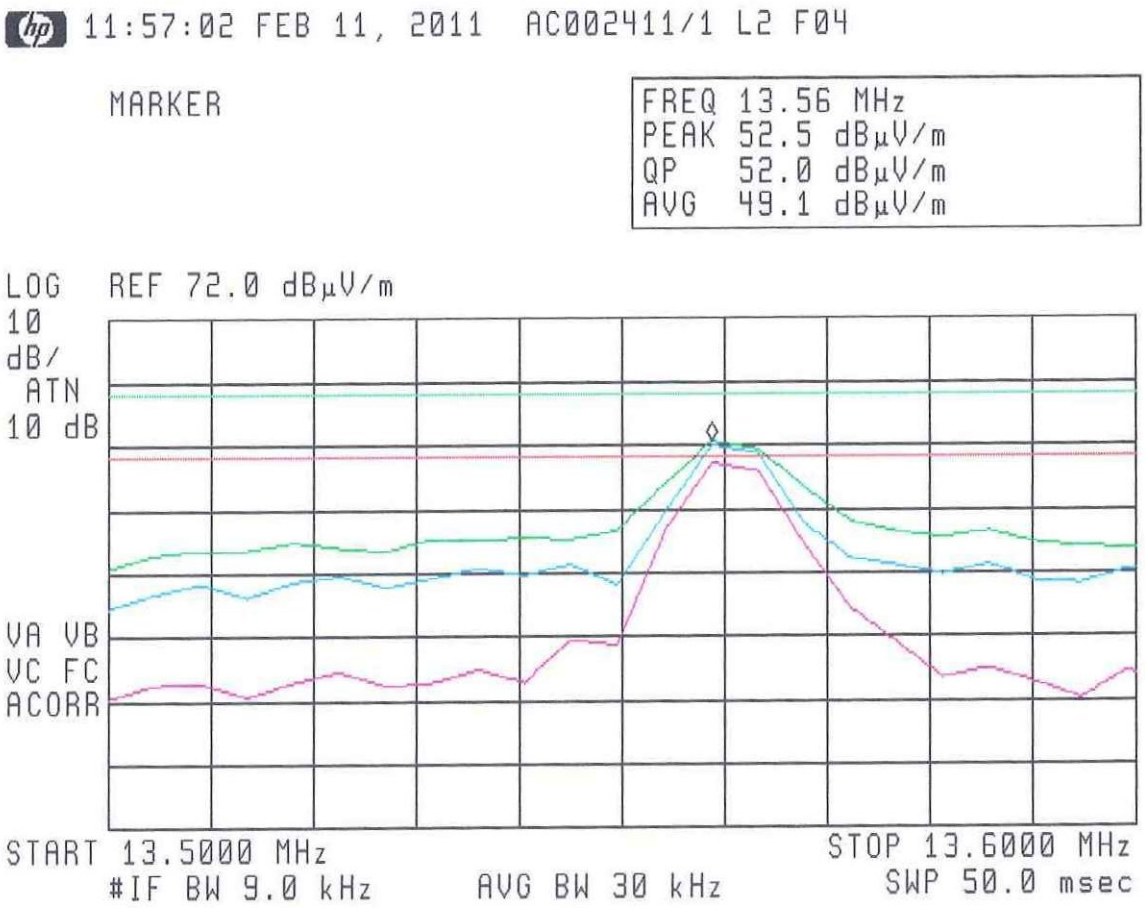
AVG BW 30 kHz
STOP 5.3000 MHz
SWP 58.3 msec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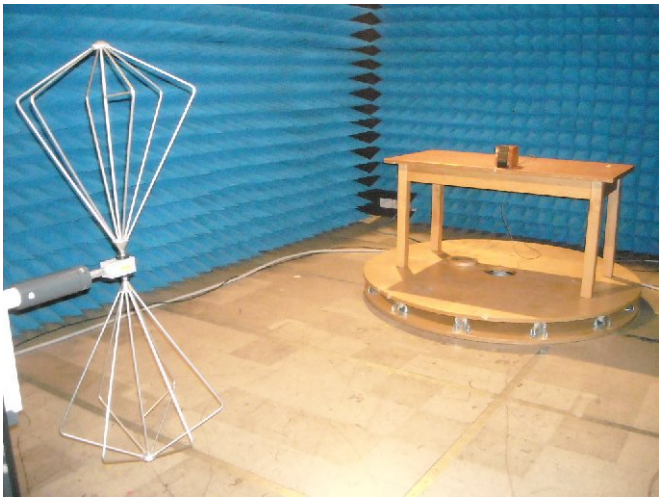
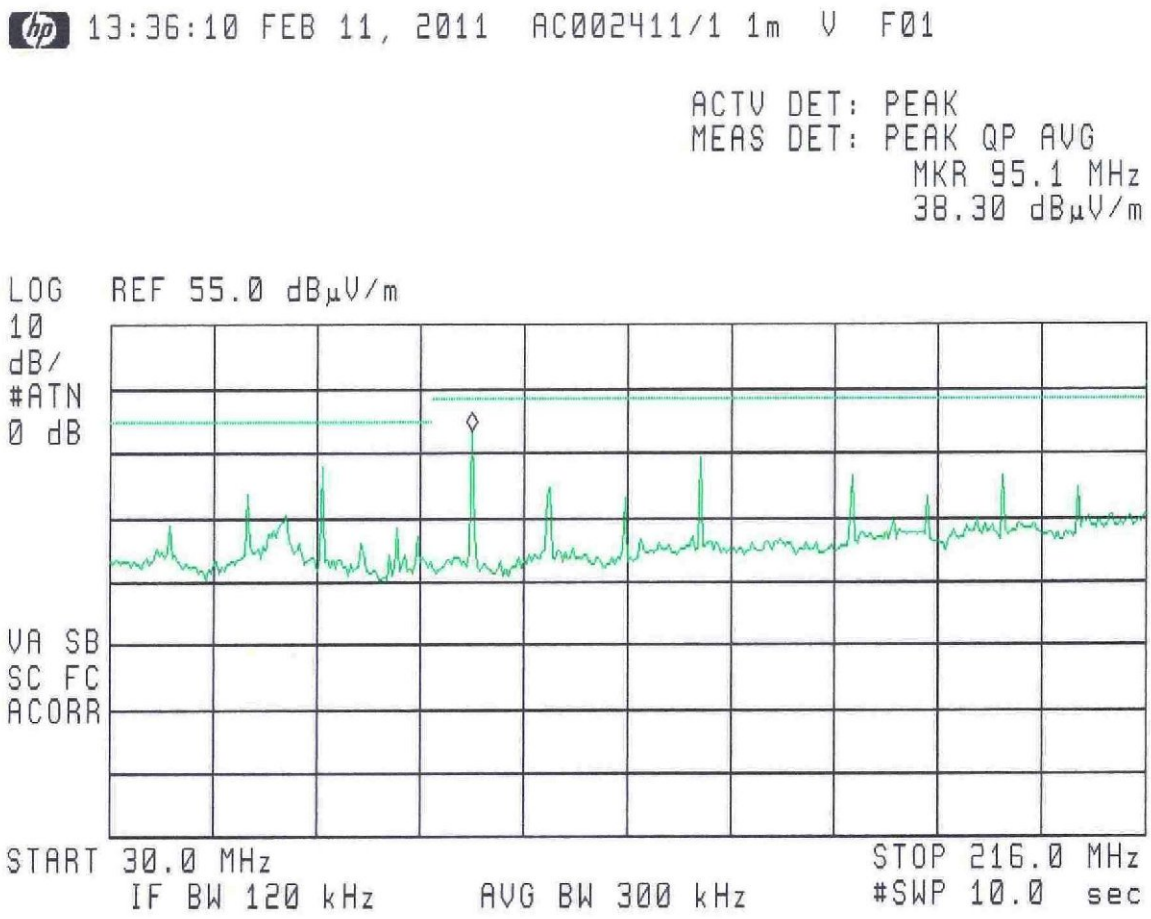
MARKER
FREQ 13.56 MHz
PEAK 52.5 dBµV/m
QP 52.0 dBµV/m
AVG 49.1 dBµV/m
LOG REF 72.0 dBµV/m
10
dB/
ATN
10 dB
VA VB
VC FC
ACORR
START 13.5000 MHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 13.6000 MHz
SWP 50.0 msec

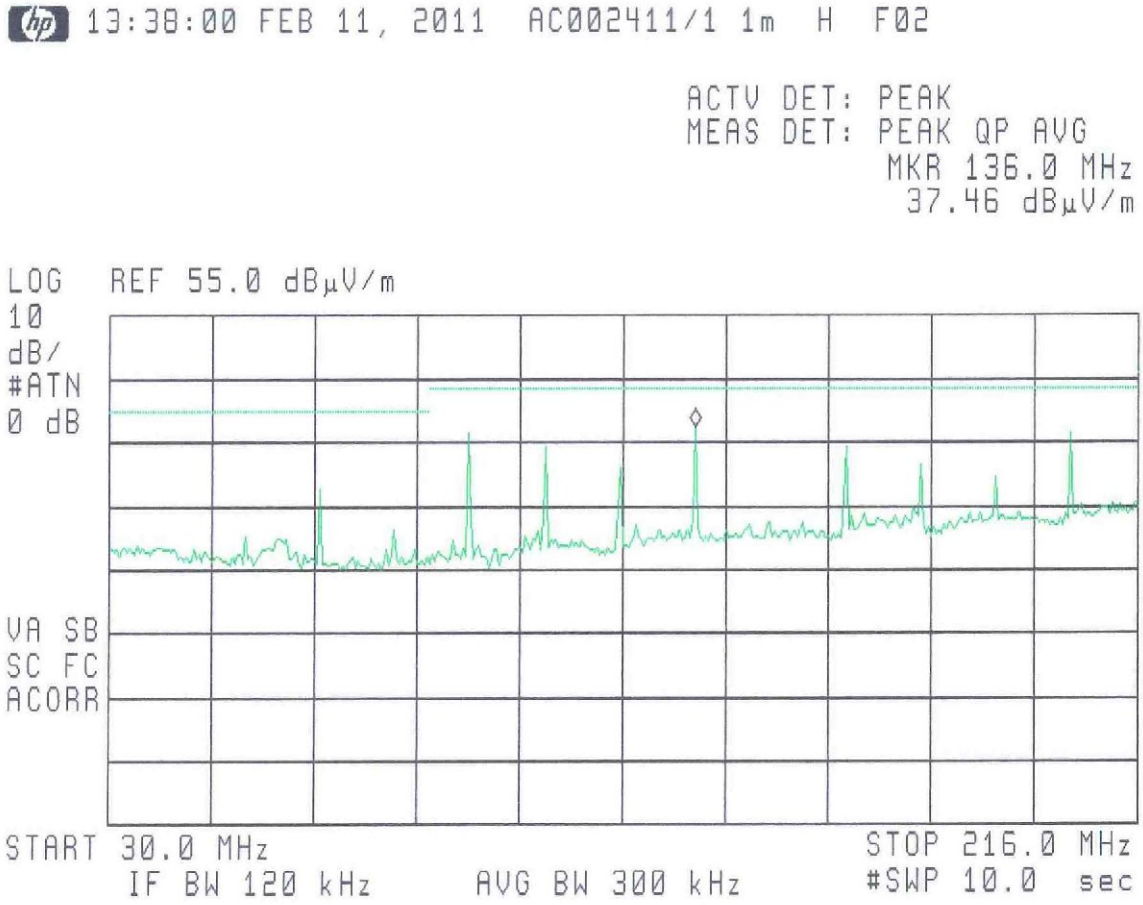
5-30 MHz

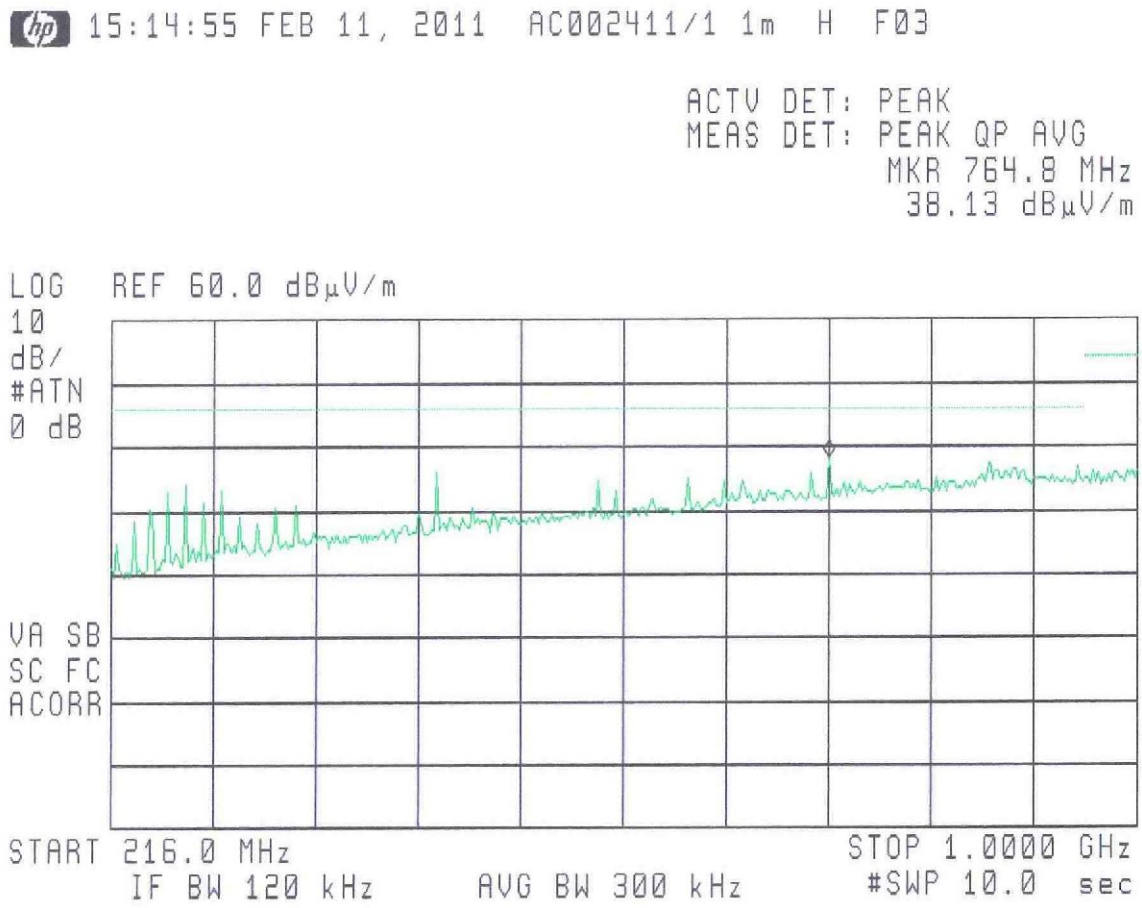


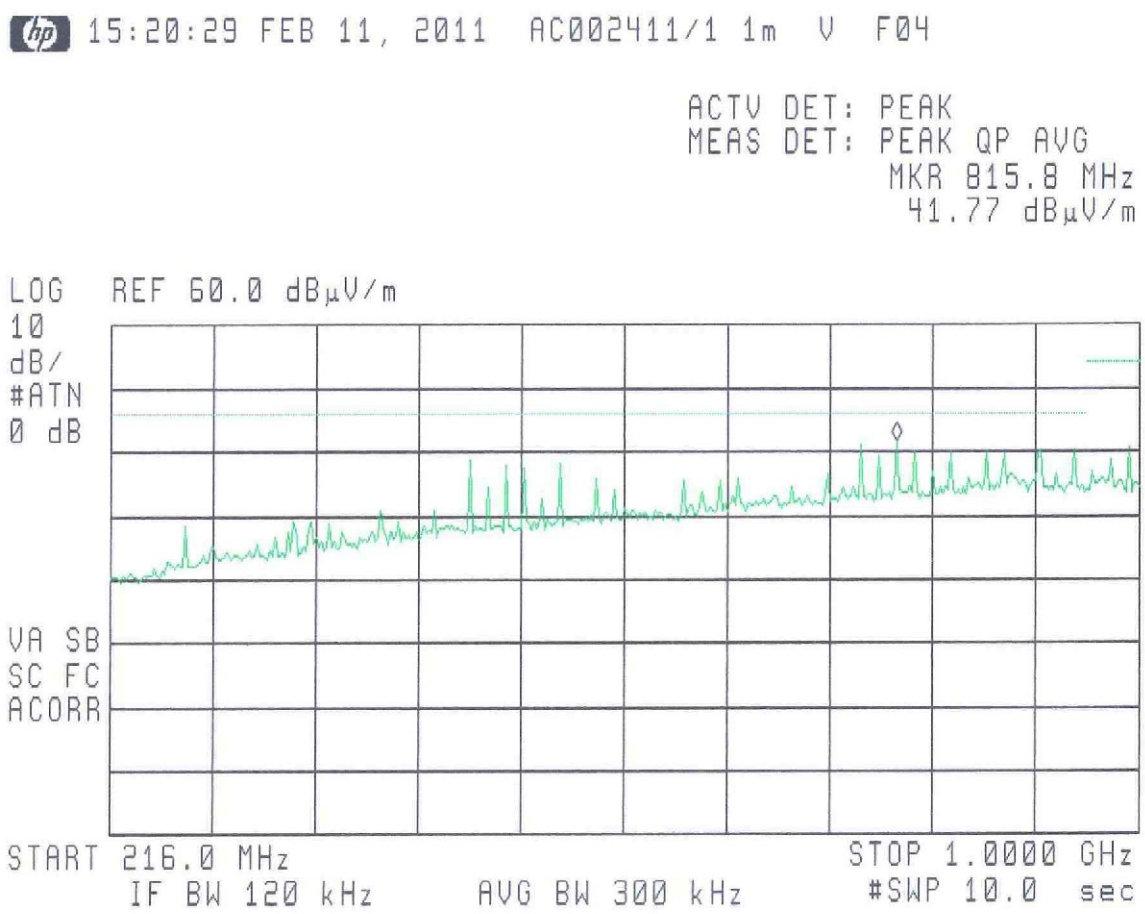
30-216 MHz

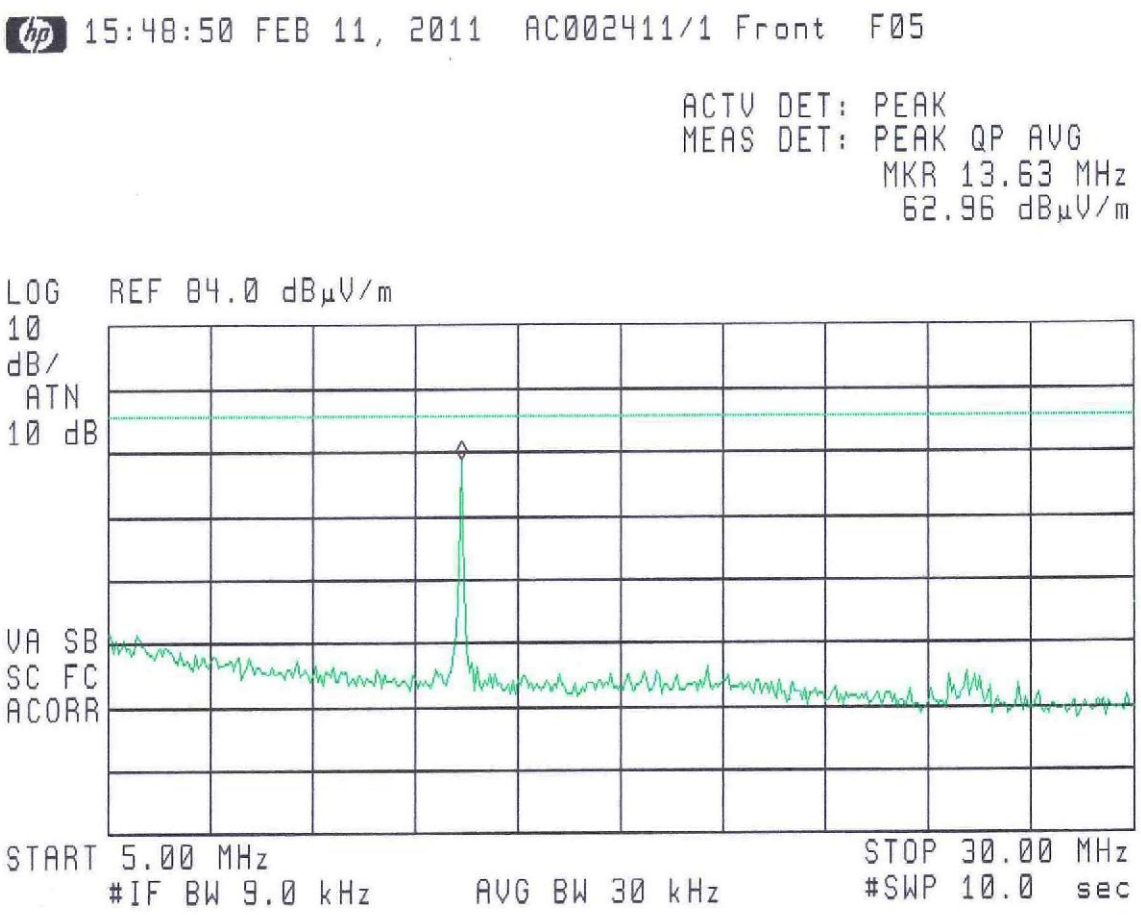
216-1000 MHz

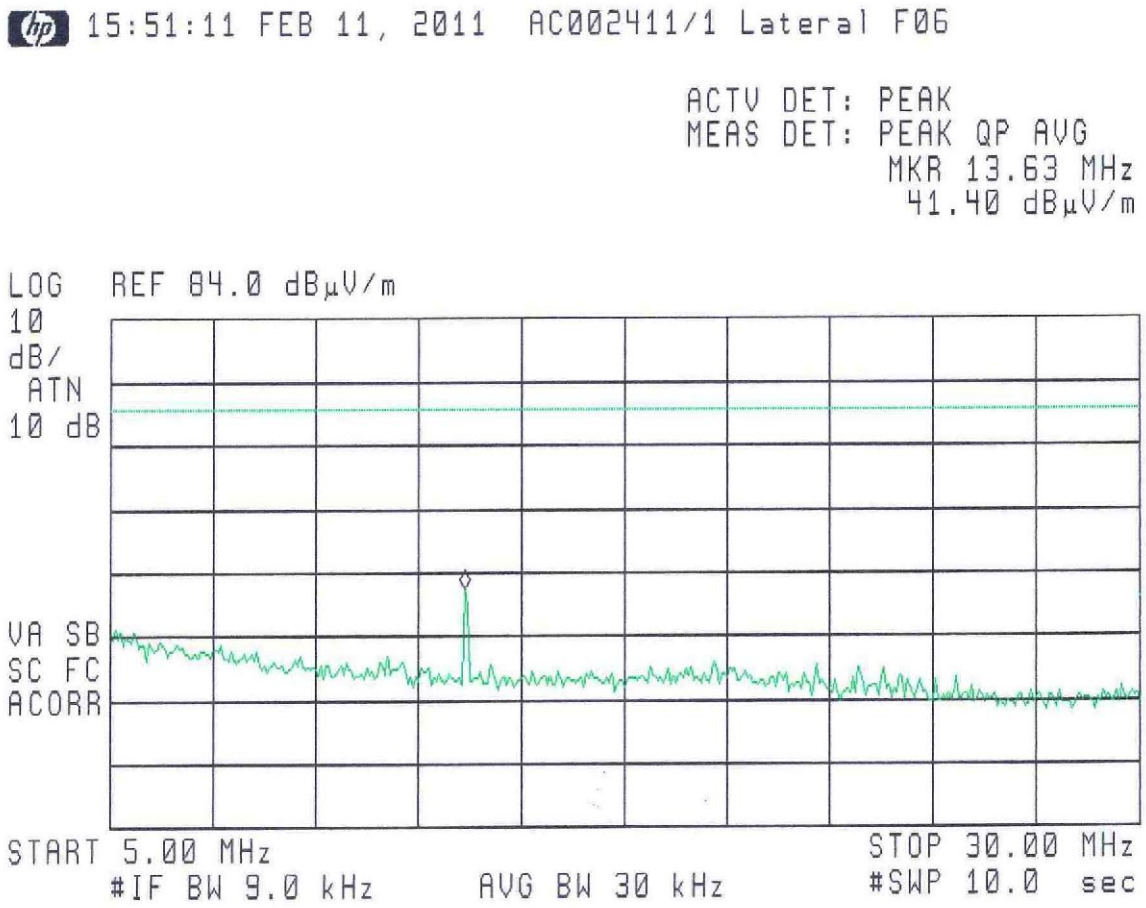

13:36:10 FEB 11, 2011 AC002411/1 1m V F01
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 95.1 MHz
38.30 dBµV/m
LOG REF 55.0 dBµV/m
10
dB/
#ATN
0 dB
VA SB
SC FC
ACORR
START 30.0 MHz
IF BW 120 kHz
AVG BW 300 kHz
STOP 216.0 MHz
#SWP 10.0 sec

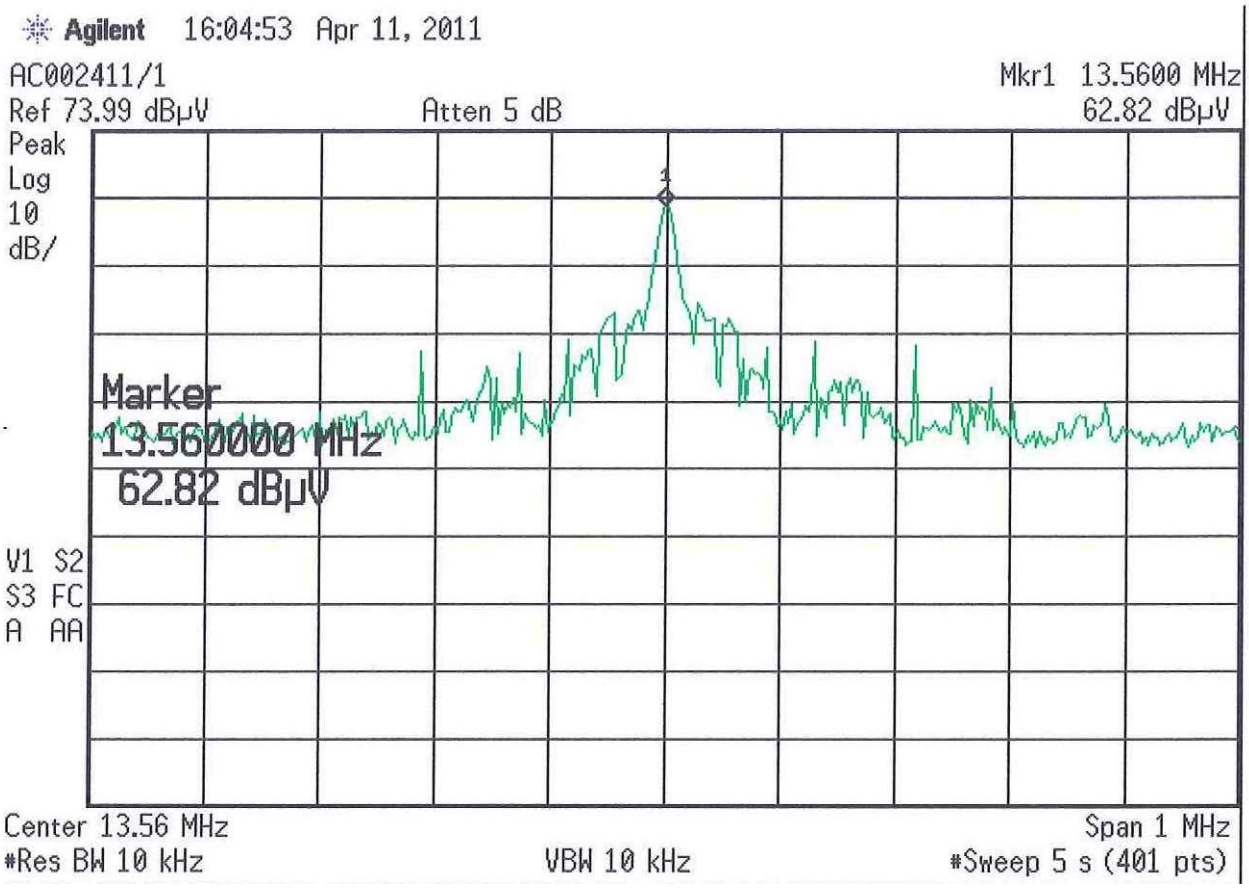

13:38:00 FEB 11, 2011 AC002411/1 1m H F02
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 136.0 MHz
37.46 dBµV/m
LOG REF 55.0 dBµV/m
10
dB/
#ATN
0 dB
VA SB
SC FC
ACORR
START 30.0 MHz
IF BW 120 kHz
AVG BW 300 kHz
STOP 216.0 MHz
#SWP 10.0 sec


15:14:55 FEB 11, 2011 AC002411/1 1m H F03
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 764.8 MHz
38.13 dBµV/m
LOG REF 60.0 dBµV/m
10
dB/
#ATN
0 dB
VA SB
SC FC
ACORR
START 216.0 MHz
IF BW 120 kHz
AVG BW 300 kHz
STOP 1.0000 GHz
#SWP 10.0 sec


15:20:29 FEB 11, 2011 AC002411/1 1m V F04
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 815.8 MHz
41.77 dBµV/m
LOG REF 60.0 dBµV/m
10
dB/
#ATN
0 dB
VA SB
SC FC
ACORR
START 216.0 MHz
IF BW 120 kHz
AVG BW 300 kHz
STOP 1.0000 GHz
#SWP 10.0 sec


15:48:50 FEB 11, 2011 AC002411/1 Front F05
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.63 MHz
62.96 dBµV/m
LOG REF 84.0 dBµV/m
10
dB/
ATN
10 dB
VA SB
SC FC
ACORR
START 5.00 MHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 30.00 MHz
#SWP 10.0 sec


15:51:11 FEB 11, 2011 AC002411/1 Lateral F06
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 13.63 MHz
41.40 dBµV/m
LOG REF 84.0 dBµV/m
10
dB/
ATN
10 dB
VA SB
SC FC
ACORR
START 5.00 MHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 30.00 MHz
#SWP 10.0 sec


Agilent 16:04:53 Apr 11, 2011
AC002411/1
Ref 73.99 dBµV
Atten 5 dB
Mkr1 13.5600 MHz
62.82 dBµV
Peak
Log
10
dB/
1
Marker
13.560000 MHz
62.82 dBµV
V1 S2
S3 FC
A AA
Center 13.56 MHz
#Res BW 10 kHz
VBW 10 kHz
Span 1 MHz
#Sweep 5 s (401 pts)

----------END OF TEST REPORT N°RP002611----------
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