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Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests: April 12~26, 2010
Test Report S/N: LR500191004D
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID. QH7HIT731

APPLICANT HANA Micron Inc.

Classification	:	**Licensed Portable Transmitter Worn on body (PCT)**
Manufacturing Description	:	**Handheld RFID Reader**
Manufacturer	:	**HANA Micron Inc.**
Model name	:	**HIT731-UHF**
Test Device Serial No.:	:	**Identification**
FCC Rule Part(s)	:	**§24(E), §22(H), §2**
TX Frequency Range	:	**824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)**
RX Frequency Range	:	**869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)**
Max. RF Output Power	:	**1.46 W ERP GSM850 (31.63dBm)**
		0.97 W EIRP PCS1900 (29.86dBm)
Emission Designators:	:	**237KGXD(GSM850) / 237KGXD(PCS1900)**
Data of issue	:	**April 28, 2010**

This test report is issued under the authority of:

Kyung-Taek LEE, Technical Manager

The test was supervised by:

Hyun-Chae You, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.

NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.

Address : 243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 449-822

Web site : http://www.ltalab.com

E-mail : chahn@ltalab.com

Telephone : +82-31-323-6008

Facsimile +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2010-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2010-05-03	IC filing

2. Information's about test item

2-1 Client & Manufacturer

Company name	:	HANA Micron Inc.
Address	:	2F, Fortis B/D, 106-3, Imae-dong Bundang-guSeongnam-City, Gyeonggi-Do South Korea
Tel / Fax	:	+82-31-697-7029 / +82-31-697--7033

2-2 Equipment Under Test (EUT)

Classification	:	Handheld RFID Reader
Model name	:	HIT731-UHF
Serial number	:	Identification
Date of receipt	:	April 07, 2010
EUT condition	:	Pre-production, not damaged
Antenna type / Gain	:	Dipole antenna (Peak Gain: 3.762dBi)
Tx Frequency Range	:	824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)
Rx Frequency Range	:	869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)
RF output power Range	:	1.46 W ERP GSM850 (31.63dBm) 0.97 W EIRP PCS1900 (29.86dBm)
Frequency Tolerance	:	±0.00025% (2.5ppm)
Modulation(s)	:	GMSK
Emission Designators	:	237KGXD(GSM850) / 237KGXD(PCS1900)
Power Source	:	7.4VDC by Battery

2-3 Tested frequency

	GSM 850		PCS 1900	
	Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
LOW	128	824.2	512	1850.2
MID	190	836.6	661	1880.0
HIGH	251	848.8	810	1909.8

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP Compaq dx7400 Microtower	CNG8330J95	HP
Monitor	HPL1710	CNC816QHF2	HP
KEYBOARD	SK-8115	68A-04Q6	DELL
MOUSE	MO56UO	520107013	DELL
PRINTER	STYLUS C65	-	EPSON

3. Test Report

3.1 Summary of tests

Parameter	Status
Transmitter Requirements	
Output Power	C
Occupied Bandwidth	C
Field Strength of Spurious Radiation	C
AC Conducted Emissions	C
Spurious Radiation at Antenna Terminal	C
Frequency Stability	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

Emission Designator: - GSM850

EMISSION Designator = 237KGXD

GSM BW = 237KHz

G = Phase Modulation

X = Cases not otherwise covered

D = Data

Emission Designator: - PCS1900

EMISSION Designator = 237KGXD

GSM BW = 237KHz

G = Phase Modulation

X = Cases not otherwise covered

D = Data

3.2 DESCRIPTION OF TESTS

3.2.1 Effective Radiated Power Output

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For GSM signals, an average detector is used, with RBW=VBW=3MHz, SPAN=10MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

3.2.2 Radiation Spurious and Harmonic Emissions

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. The Spectrum was investigated from 30MHz to the 10^{th} Harmonic of the fundamental. A peak detector is used. With RBW=VBW=1MHz. The value that we could measure was only reported. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

3.2.3 Occupied Bandwidth

The 99% power bandwidth was measured with a calibrated spectrum analyzer.

3.2.4 Spurious Emission at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10 GHz.

3.2.5 Occupied Bandwidth Emission Limits

(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

(b) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

3.2.6 Frequency Stability/Temperature Variation

The frequency stability of the transmitter is measured by:

a) **Temperature** :The temperature is varied from -30°C to + 60°C using an environmental chamber.
b) **Primary Supply Voltage** :The primary supply voltage is varied from 85% to 115% of the voltage Normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification –The minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

Specification — The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025(±2.5ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27 °C to provide a reference)
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight ”soak” at -30°C(usually 14-16 hours),the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is made at 10°C interval up to room temperature. At least a period of one and one half hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10intervals starting at -30°C up to +60°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

3.3 DESCRIPTION OF TESTS

3.3.1 Output Power

Measurement Procedure:

- During the process of testing, the EUT was controlled via Radio Communication tester to ensure max. Power transmission and proper modulation.
- Power output was measured at the RF output terminals when the transmitter is adjusted in accordance with Communication tester (or the tune-up procedure).

Measurement Data:

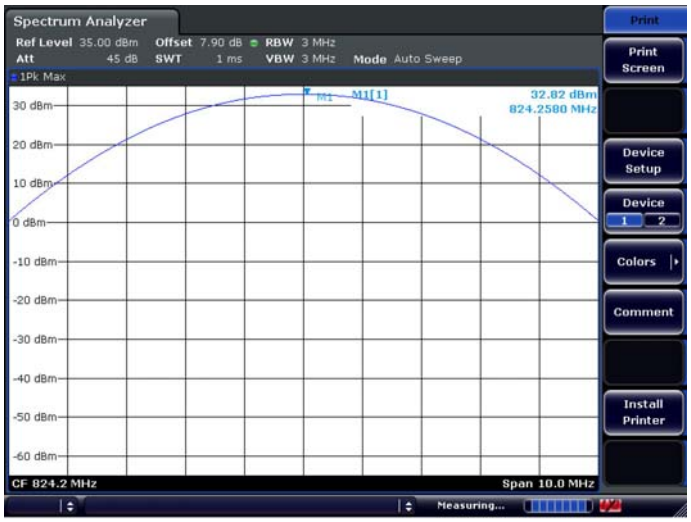
GSM850

Channel	Frequency (MHz)	TEST CONDITIONS (dBm)			
		1 Time Slot		2 Time Slot	
		Peak	AV	Peak	AV
128	824.2	**32.80**	**32.77**	**32.82**	**32.79**
190	836.6	**32.77**	**32.73**	**32.79**	**32.78**
251	848.8	**32.59**	**32.56**	**32.60**	**32.57**

PCS1900

Channel	Frequency (MHz)	TEST CONDITIONS (dBm)			
		1 Time Slot		2 Time Slot	
		Peak	AV	Peak	AV
512	1850.2	**29.11**	**29.08**	**29.12**	**29.09**
661	1880.0	**29.21**	**29.18**	**29.24**	**29.21**
810	1909.8	**29.50**	**29.45**	**29.52**	**29.48**

POWER OUT. GSM850 Ch.128



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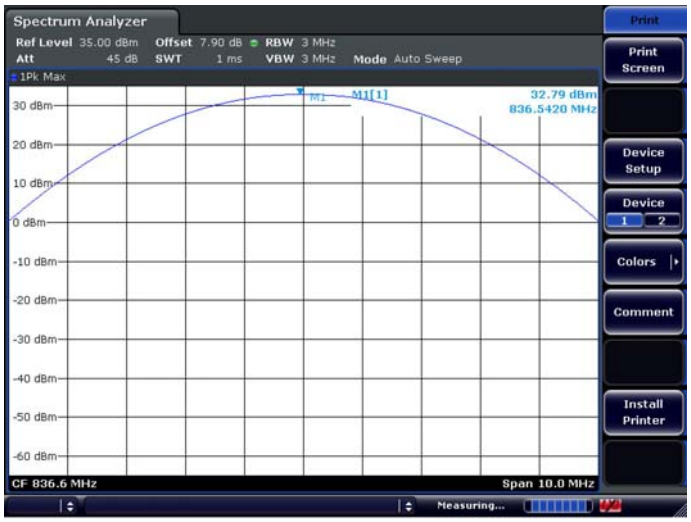
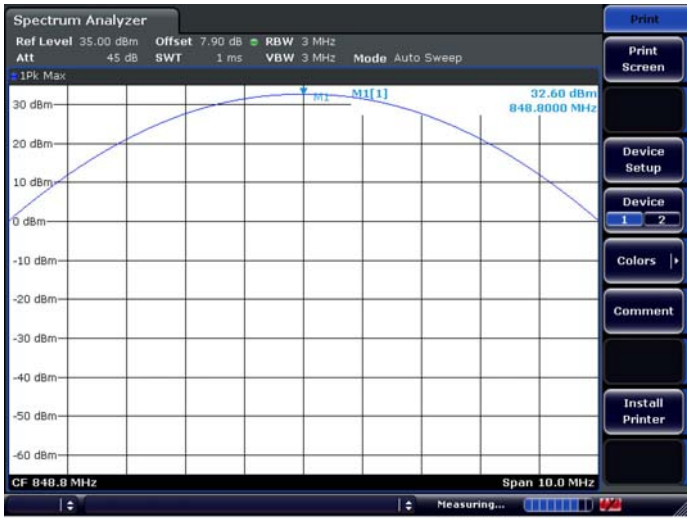
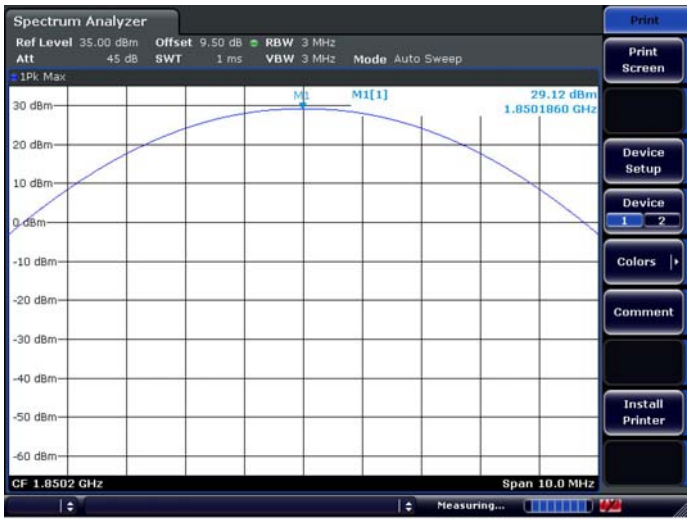


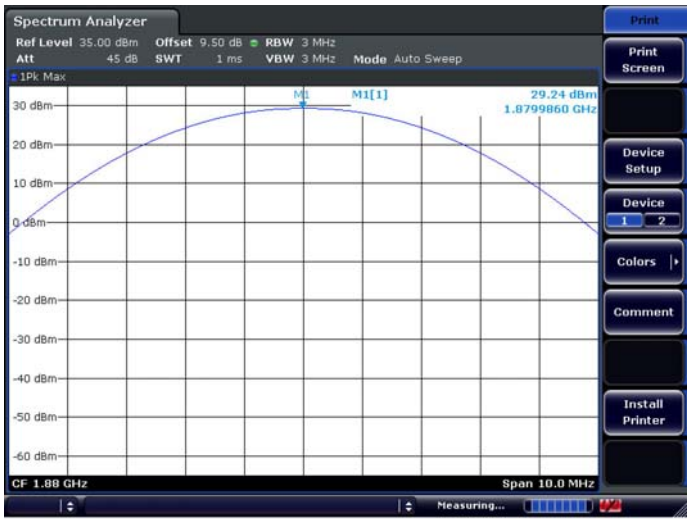
POWER OUT. GSM850 Ch.251



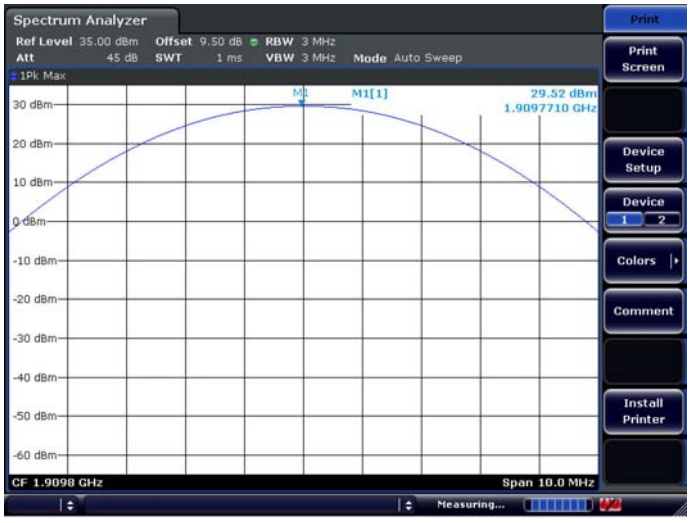
POWER OUT. PCS1900 Ch.512



POWER OUT. PCS1900 Ch.661



POWER OUT. PCS1900 Ch.810



Effective Radiated Power Output (GSM850)

Measurement Data:

GSM850

Channel	Frequency (MHz)	TEST CONDITIONS				
		Ref. level (dBm)	Pol. (H/V)	CORR. FACTOR (dB)	ERP (dBm)	ERP (W)
128	824.2	26.31	H	5.1	31.41	1.38
190	836.6	26.53	H	5.1	31.63	1.46
251	848.8	26.25	H	5.1	31.35	1.36

Note 1: Radiated measurements at 3 meters by Substitution Method.

Equivalent Isotropic Radiated Power (PCS1900)

Measurement Data:

PCS1900

Channel	Frequency (MHz)	TEST CONDITIONS				
		Ref. level (dBm)	Pol. (H/V)	CORR. FACTOR (dB)	EIRP (dBm)	EIRP (W)
512	1850.2	20.76	H	9.1	29.86	0.97
661	1880.0	18.43	H	9.1	27.53	0.57
810	1909.8	18.82	H	9.1	27.92	0.62

Note 2: Radiated measurements at 3 meters by Substitution Method.

3.3.2 Field Strength of Harmonics

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz) — Peak mode: VBW = 1 MHz

= 1 MHz (1 GHz ~ 10th harmonic) — Average mode: VBW = 10Hz

Span = 100 MHz — Detector function = Peak & average

Trace = max hold — Sweep = auto

Measurement Data:

→ **Refer to the Next page**

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Minimum Standard: FCC Part 15.109

Frequency (MHz)	Limit (uV/m) @ 10m
30 ~ 88	90
88 ~ 216	150
216 ~ 960	210
Above 960	300

Radiated Emissions - PC

LTA
Laboratory for Test & Approval Co.,Ltd.

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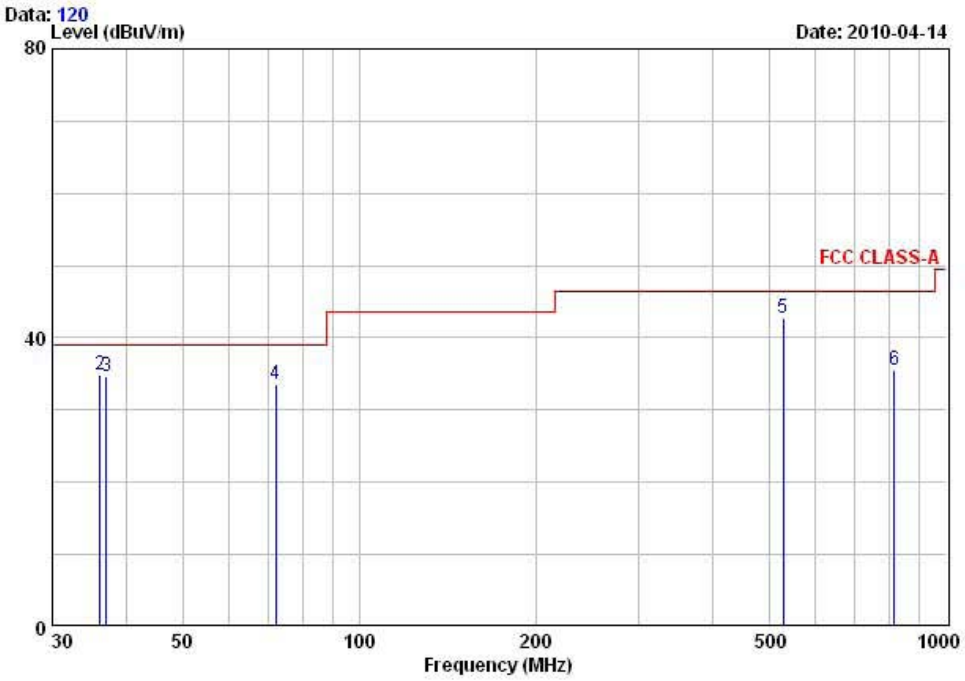
Fax:+82-31-3236010

EUT/Model No.: HIT731-UHF TEST MODE: PC mode

Temp Humi : 9 / 53 Tested by: KIM.K.I



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	30.00	49.80	-15.78	34.02	39.00	4.98	100	135	VERTICAL
2	36.20	50.08	-15.14	34.94	39.00	4.06	100	213	VERTICAL
3	37.12	49.80	-15.04	34.76	39.00	4.24	100	210	VERTICAL
4	72.02	49.60	-16.13	33.47	39.00	5.53	100	106	VERTICAL
5	527.99	47.30	-4.49	42.81	46.40	3.59	153	203	VERTICAL
6	815.99	34.50	0.93	35.43	46.40	10.97	124	220	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions - Printer

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Laboratory for Test & Approval Co.,Ltd.

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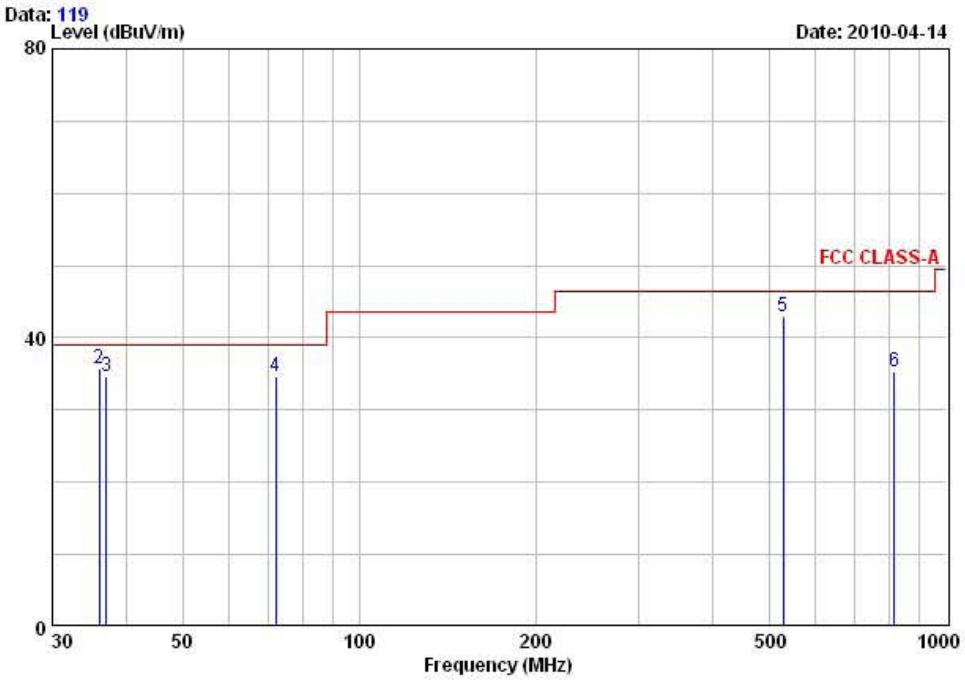
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: HIT731-UHF TEST MODE: Printer mode

Temp Humi : 9 / 53 Tested by: KIM.K.I



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	30.00	51.30	-15.78	35.52	39.00	3.48	100	195	VERTICAL
2	36.01	50.90	-15.16	35.74	39.00	3.26	100	106	VERTICAL
3	37.05	49.80	-15.05	34.75	39.00	4.25	100	360	VERTICAL
4	72.03	50.80	-16.13	34.67	39.00	4.33	100	106	VERTICAL
5	527.99	47.40	-4.49	42.91	46.40	3.49	178	66	VERTICAL
6	815.98	34.40	0.93	35.33	46.40	11.07	130	142	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions - GPRS

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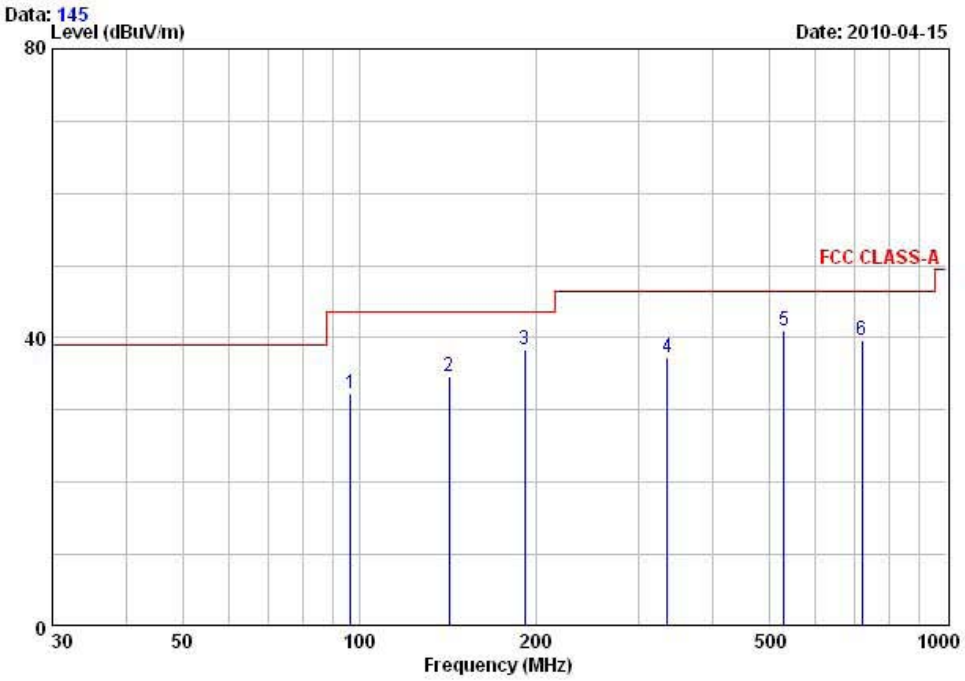
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: HIT731-UHF TEST MODE: GPRS mode

Temp Humi : 17 / 27 Tested by: KIM.K.I



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	96.55	48.60	-16.36	32.24	43.50	11.26	145	202	HORIZONTAL
2	142.13	46.70	-12.05	34.65	43.50	8.85	221	302	HORIZONTAL
3	191.30	50.50	-12.22	38.28	43.50	5.22	242	132	HORIZONTAL
4	335.66	45.10	-7.81	37.29	46.40	9.12	100	255	HORIZONTAL
5	530.23	45.50	-4.43	41.07	46.40	5.33	220	120	HORIZONTAL
6	720.22	40.20	-0.63	39.57	46.40	6.83	201	133	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.3.2 Field Strength of spurious Radiation --- Continue

OPERATING FREQUENCY : 824.2 MHz

CHANNEL : 128(Low)

MEASURED OUTPUT POWER : 31.63 dBm = 1.46 W

MODULATION : GPRS(Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 44.64 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected are a level greater than 20dB below limit.					
-	-	-	-	-	-

Note1: Radiated measurements at 3 meters by Substitution Method.

--- Blank ---

3.3.2 Field Strength of spurious Radiation --- Continue

OPERATING FREQUENCY : 836.6 MHz

CHANNEL : 190(Mid)

MEASURED OUTPUT POWER : 31.63 dBm = 1.46 W

MODULATION : GPRS(Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 44.64 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected are a level greater than 20dB below limit.					
-	-	-	-	-	-

Note1: Radiated measurements at 3 meters by Substitution Method.

--- Blank ---

3.3.2 Field Strength of spurious Radiation --- Continue

OPERATING FREQUENCY : 848.8 MHz

CHANNEL : 251(High)

MEASURED OUTPUT POWER : 31.63 dBm = 1.46 W

MODULATION : GPRS(Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 44.64 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected are a level greater than 20dB below limit.					
-	-	-	-	-	-

Note1: Radiated measurements at 3 meters by Substitution Method.

--- Blank ---

3.3.2 Field Strength of spurious Radiation --- Continue

OPERATING FREQUENCY : 1850.2 MHz

CHANNEL : 512(Low)

MEASURED OUTPUT POWER : 29.86 dBm = 0.97 W

MODULATION : GPRS(Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 42.87 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected are a level greater than 20dB below limit.					
-	-	-	-	-	-

Note1: Radiated measurements at 3 meters by Substitution Method.

--- Blank ---

3.3.2 Field Strength of spurious Radiation --- Continue

OPERATING FREQUENCY : 1880.0 MHz

CHANNEL : 661(Mid)

MEASURED OUTPUT POWER : 29.86 dBm = 0.97 W

MODULATION : GPRS(Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 42.87 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected are a level greater than 20dB below limit.					
-	-	-	-	-	-

Note1: Radiated measurements at 3 meters by Substitution Method.

--- Blank ---

3.3.2 Field Strength of spurious Radiation --- Continue

OPERATING FREQUENCY : 1909.8 MHz

CHANNEL : 810(High)

MEASURED OUTPUT POWER : 29.86 dBm = 0.97 W

MODULATION : GPRS(Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 42.87 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected are a level greater than 20dB below limit.					
-	-	-	-	-	-

Note1: Radiated measurements at 3 meters by Substitution Method.

--- Blank ---

3.3.3 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 10dB below limit.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Class B

Frequency Range	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

Class A

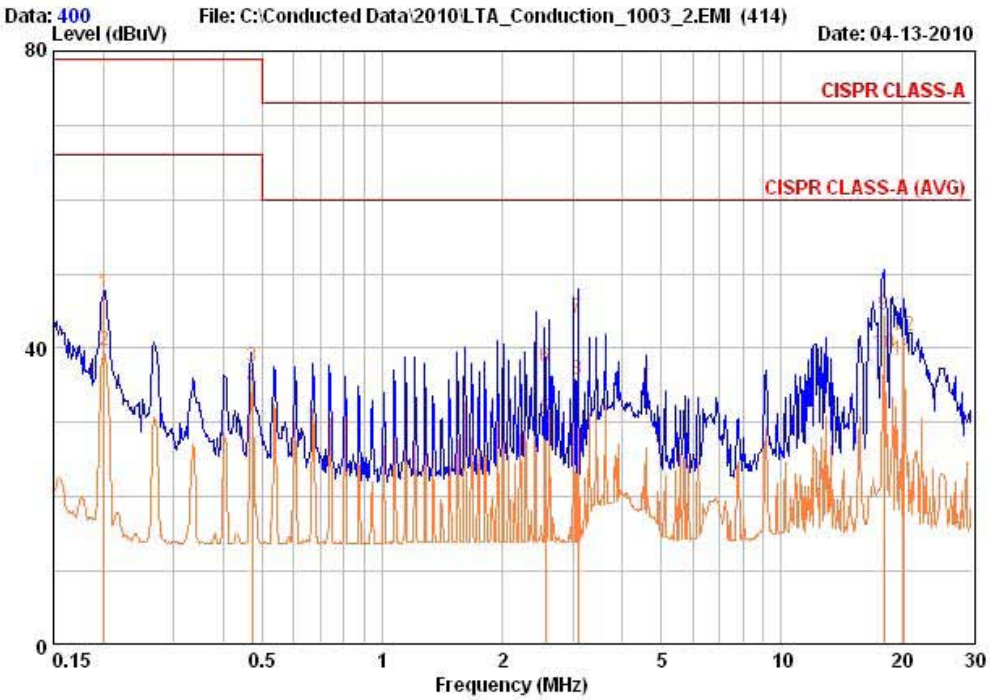
Frequency Range	**quasi-peak**	**Average**
0.15 ~ 0.5 MHz	**79 dBuV**	**66 dBuV**
0.5 ~ 30 MHz	**73 dBuV**	**60 dBuV**

AC Conducted Emissions – PC – Line

LTA
Laboratory for Test & Approval Co.,Ltd.

243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No.	: HIT731-UHF	Phase	: LINE
Test Mode	: PC mode	Test Power	: 120 / 60
Temp./Humi.	: 18 / 24	Test Engineer	: KIM.K.I



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.201	37.69	29.99	9.65	47.34	39.64	79.00	66.00	31.66	26.36
0.472	27.75	24.95	9.67	37.42	34.62	79.00	66.00	41.58	31.38
2.559	27.65	20.65	9.83	37.49	30.49	73.00	60.00	35.51	29.51
3.097	34.24	25.84	9.85	44.09	35.69	73.00	60.00	28.91	24.31
18.049	33.91	28.81	10.52	44.44	39.34	73.00	60.00	28.56	20.66
20.275	31.13	27.73	10.60	41.72	38.32	73.00	60.00	31.28	21.68

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – PC – Neutral

LTA
Laboratory for Test & Approval Co.,Ltd.

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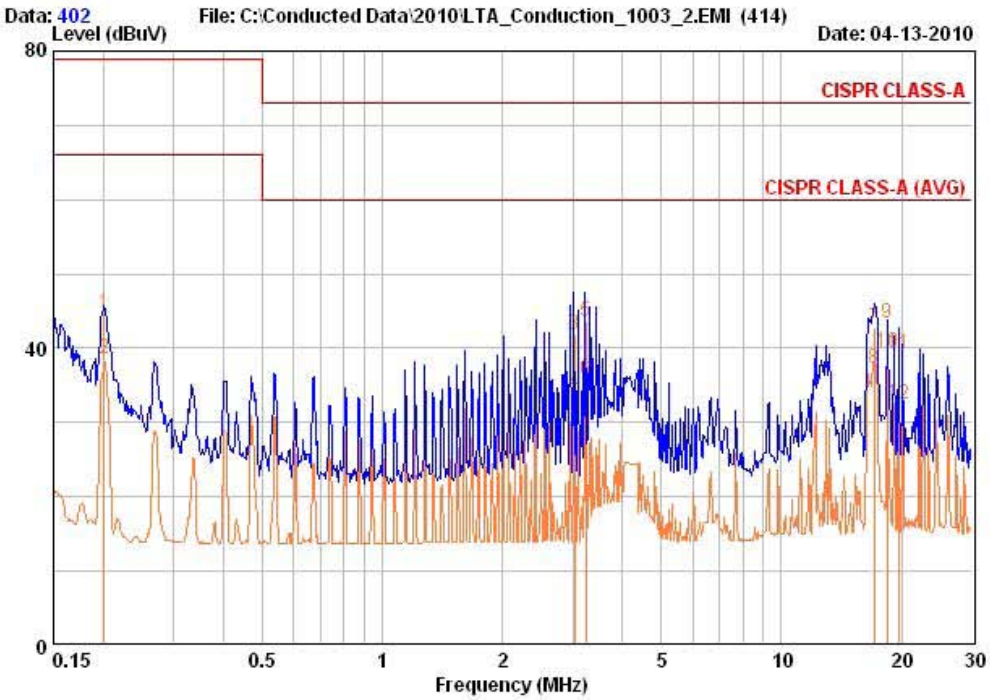
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No.	: HIT731-UHF	Phase	: NEUTRAL
Test Mode	: PC mode	Test Power	: 120 / 60
Temp./Humi.	: 18 / 24	Test Engineer	: KIM.K.I



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.201	34.99	28.89	9.66	44.65	38.55	79.00	66.00	34.35	27.45
3.030	32.04	24.14	9.85	41.89	33.99	73.00	60.00	31.11	26.01
3.233	33.64	25.84	9.86	43.50	35.70	73.00	60.00	29.50	24.30
17.114	32.31	26.81	10.50	42.81	37.31	73.00	60.00	30.19	22.69
18.395	32.92	28.92	10.54	43.46	39.46	73.00	60.00	29.54	20.54
19.675	28.72	21.92	10.59	39.31	32.51	73.00	60.00	33.69	27.49

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – Printer – Line

LTA
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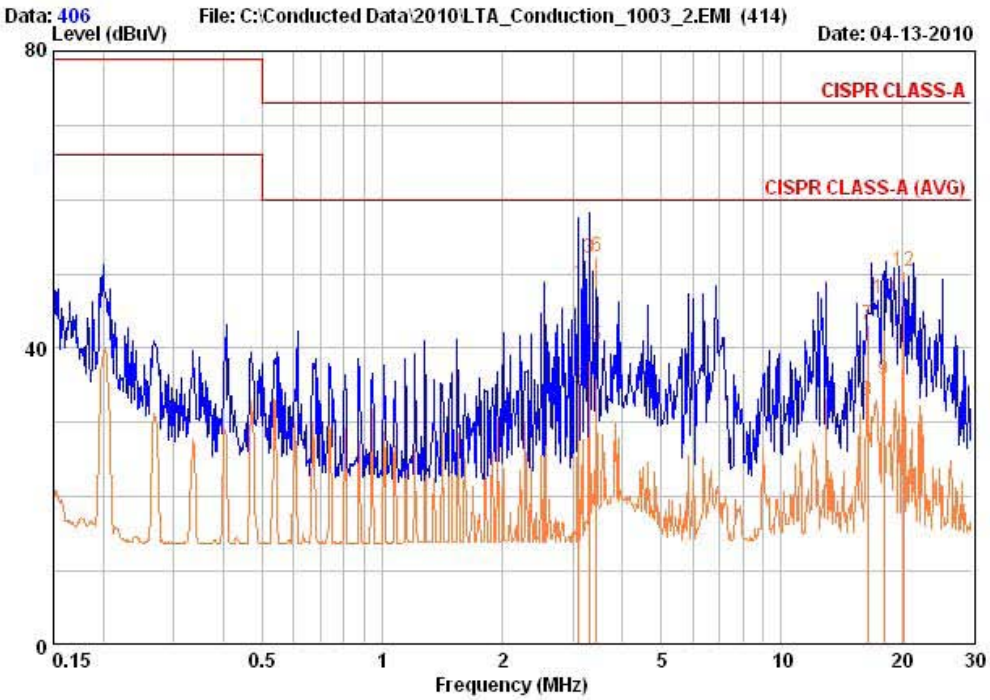
Fax:+82-31-3236010

EUT / Model No.	: HIT731-UHF	Phase	: LINE
Test Mode	: Printer mode	Test Power	: 120 / 60
Temp./Humi.	: 18 / 24	Test Engineer	: KIM.K.I



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
3.100	38.74	24.74	9.85	48.59	34.59	73.00	60.00	24.41	25.41
3.299	42.14	30.34	9.86	52.00	40.20	73.00	60.00	21.00	19.80
3.435	42.44	30.44	9.86	52.30	40.30	73.00	60.00	20.70	19.70
16.445	32.70	22.40	10.46	43.17	32.87	73.00	60.00	29.83	27.13
18.037	36.11	25.31	10.52	46.63	35.83	73.00	60.00	26.37	24.17
20.206	39.73	28.53	10.59	50.32	39.12	73.00	60.00	22.68	20.88

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – Printer – Neutral

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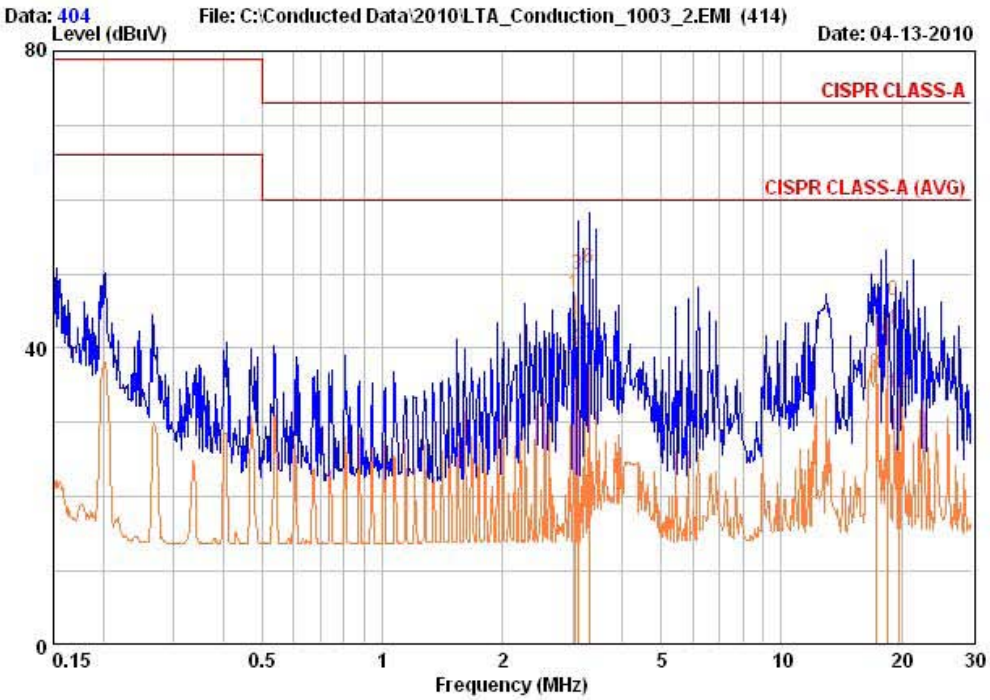
Fax:+82-31-3236010

EUT / Model No.	: HIT731-UHF	Phase	: NEUTRAL
Test Mode	: Printer mode	Test Power	: 120 / 60
Temp./Humi.	: 18 / 24	Test Engineer	: KIM.K.I



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
3.033	37.44	28.64	9.85	47.29	38.49	73.00	60.00	25.71	21.51
3.095	40.14	30.24	9.85	49.99	40.09	73.00	60.00	23.01	19.91
3.296	41.04	30.84	9.86	50.90	40.70	73.00	60.00	22.10	19.30
17.216	33.91	26.21	10.50	44.41	36.71	73.00	60.00	28.59	23.29
18.426	35.82	30.22	10.55	46.36	40.76	73.00	60.00	26.64	19.24
19.634	31.92	23.42	10.59	42.51	34.01	73.00	60.00	30.49	25.99

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – GPRS – Line

LTA
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Gyeonggi-do 449-822 Korea
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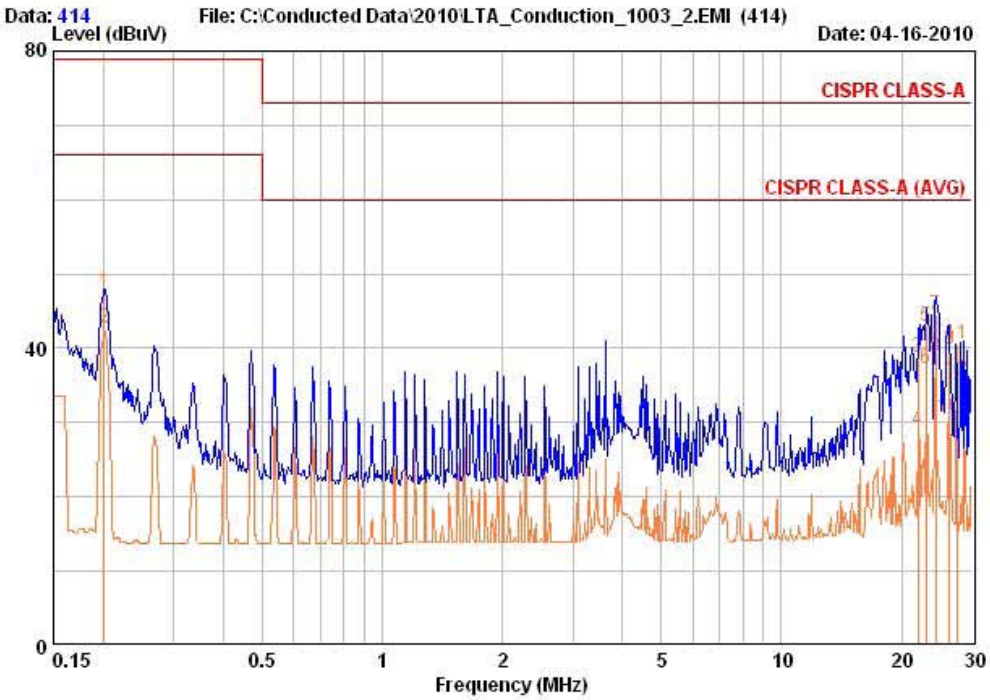
Fax:+82-31-3236010

EUT / Model No.	: HIT731-UHF	Phase	: LINE
Test Mode	: GPRS mode	Test Power	: 120 / 60
Temp./Humi.	: 19 / 27	Test Engineer	: KIM.K.I



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.201	37.79	33.09	9.65	47.44	42.74	79.00	66.00	31.56	23.26
21.978	28.24	18.44	10.63	38.87	29.07	73.00	60.00	34.13	30.93
23.054	32.34	26.54	10.65	43.00	37.20	73.00	60.00	30.00	22.80
24.400	33.76	28.06	10.68	44.43	38.73	73.00	60.00	28.57	21.27
26.425	29.17	20.07	10.71	39.88	30.78	73.00	60.00	33.12	29.22
27.576	29.78	25.08	10.73	40.51	35.81	73.00	60.00	32.49	24.19

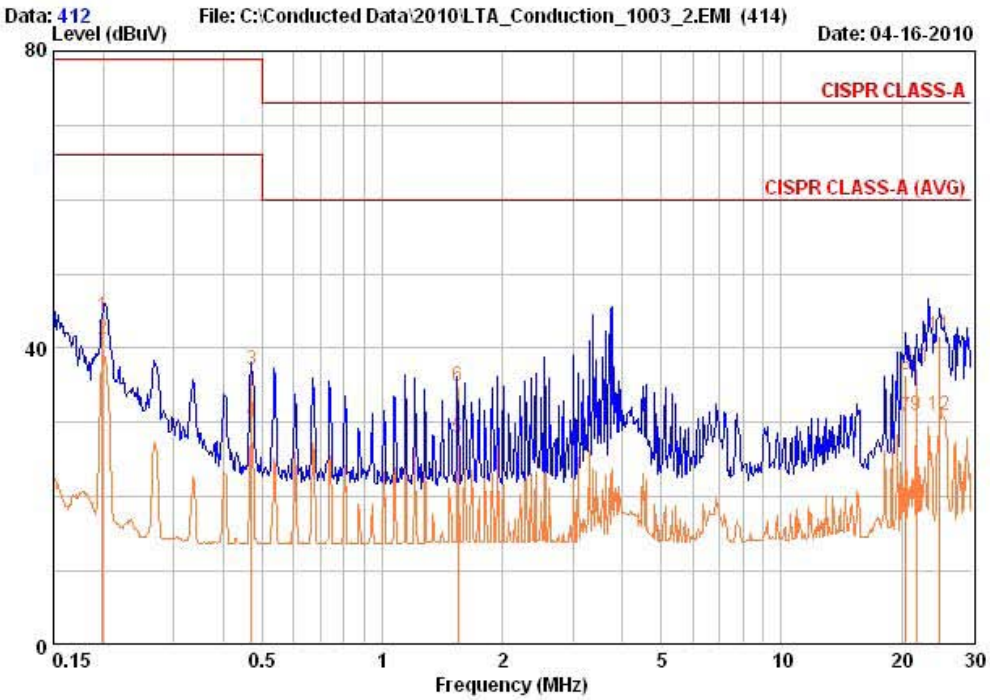
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – GPRS – Neutral

LTA
Laboratory for Test & Approval Co.,Ltd.

243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No.	: HIT731-UHF	Phase	: NEUTRAL
Test Mode	: GPRS mode	Test Power	: 120 / 60
Temp./Humi.	: 19 / 27	Test Engineer	: KIM.K.I



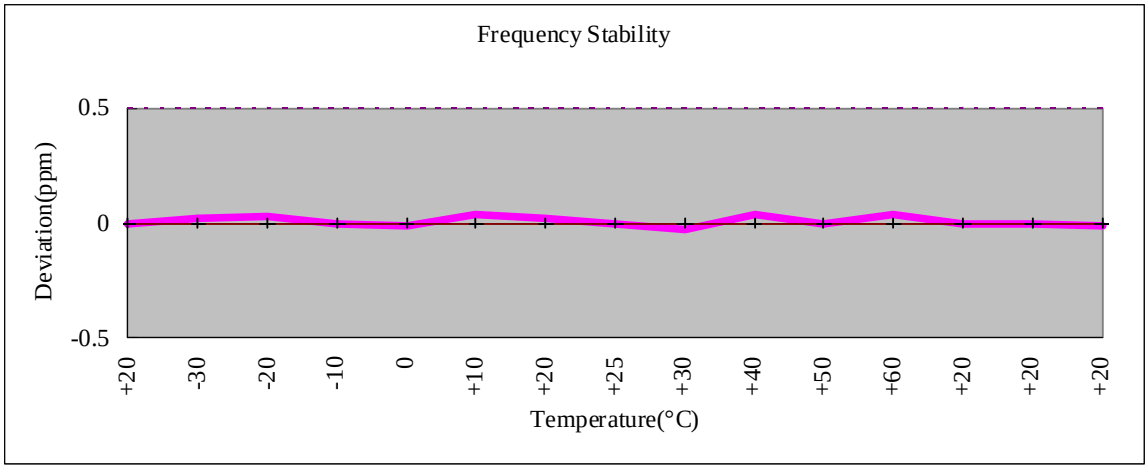
Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.199	34.69	31.59	9.66	44.35	41.25	79.00	66.00	34.65	24.75
0.470	27.35	20.45	9.66	37.01	30.11	79.00	66.00	41.99	35.89
1.548	25.15	18.05	9.80	34.95	27.85	73.00	60.00	38.05	32.15
20.465	25.73	20.23	10.61	36.34	30.84	73.00	60.00	36.66	29.16
21.816	26.74	20.24	10.64	37.38	30.88	73.00	60.00	35.62	29.12
24.910	30.86	20.16	10.70	41.56	30.86	73.00	60.00	31.44	29.14

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

3.3.4 Frequency Stability

OPERATING FREQUENCY : 836,599,938 Hz
CHANNEL : 190(Mid)
REFERENCE VOLTAGE : 7.4 VDC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

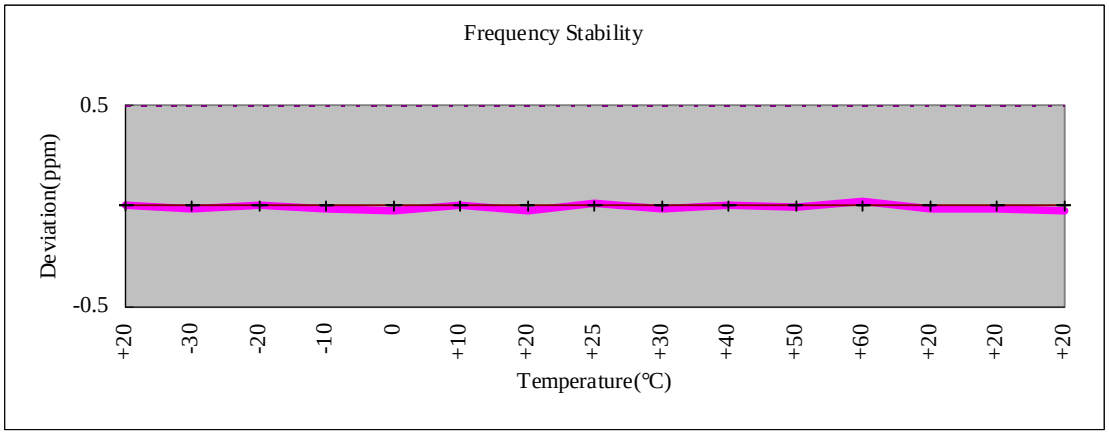
VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	7.40	+20(Ref)	836,599,938	0.000000
100%		-30	836,599,954	-0.000002
100%		-20	836,599,962	-0.000003
100%		-10	836,599,938	0.000000
100%		0	836,599,925	0.000002
100%		+10	836,599,971	-0.000004
100%		+20	836,599,955	-0.000002
100%		+25	836,599,935	0.000000
100%		+30	836,599,914	0.000003
100%		+40	836,599,968	-0.000004
100%		+50	836,599,935	0.000000
100%		+60	836,599,972	-0.000004
85%	6.29	+20	836,599,933	0.000001
115%	8.51	+20	836,599,935	0.000000
BATT.ENDPOINT	-	-	-	-



3.3.4 Frequency Stability - Continues

OPERATING FREQUENCY : 1,879,999,758 Hz
CHANNEL : 0661(Mid)
REFERENCE VOLTAGE : 7.4 VDC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	7.40	+20(Ref)	1,879,999,758	0.000000
100%		-30	1,879,999,731	-0.000001
100%		-20	1,879,999,764	0.000000
100%		-10	1,879,999,735	-0.000001
100%		0	1,879,999,714	-0.000002
100%		+10	1,879,999,765	0.000000
100%		+20	1,879,999,715	-0.000002
100%		+25	1,879,999,775	0.000001
100%		+30	1,879,999,733	-0.000001
100%		+40	1,879,999,771	0.000001
100%		+50	1,879,999,748	-0.000001
100%		+60	1,879,999,799	0.000002
85%	6.29	+20	1,879,999,734	-0.000001
115%	8.51	+20	1,879,999,725	-0.000002
BATT.ENDPOINT	-	-	-	-



3.4 CONCLUSION

The data collected shows that the **HANA Micron Inc. Handheld RFID Reader FCC ID: Q7HHIT731** complies with all the requirements of Parts 2, 22, 24 of the FCC Rules.

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3.5 TEST PLOTS

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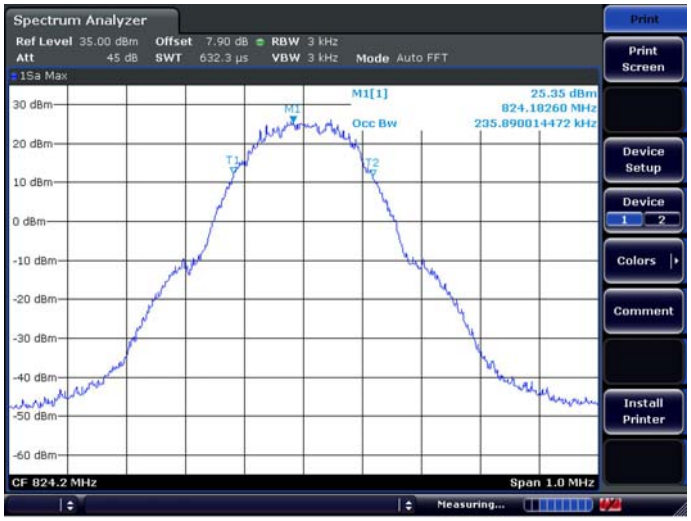
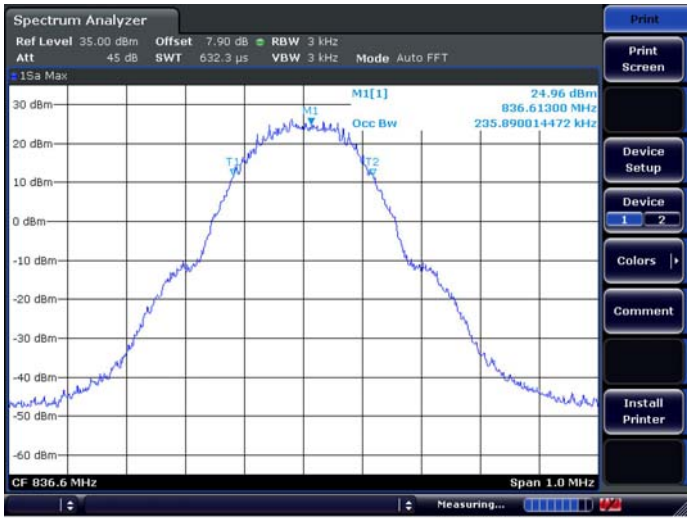
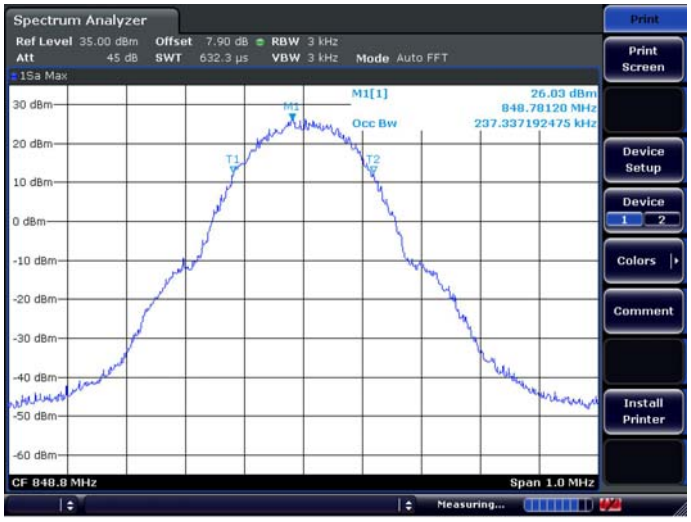
GSM850 99 % Bandwidth Ch. 128



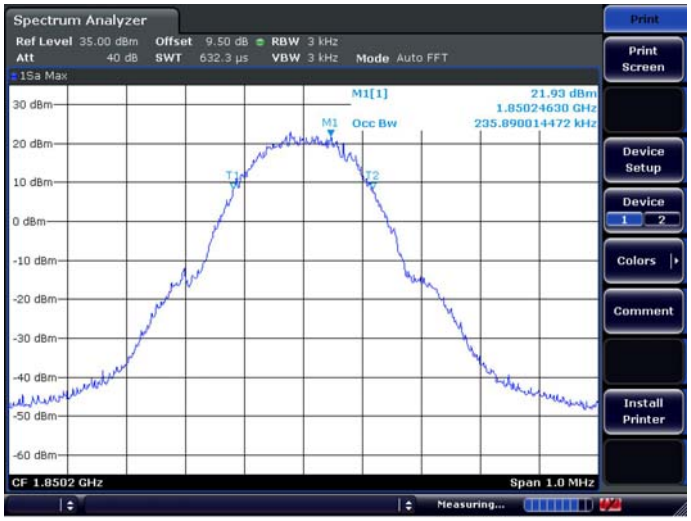
GSM850 99 % Bandwidth Ch. 190



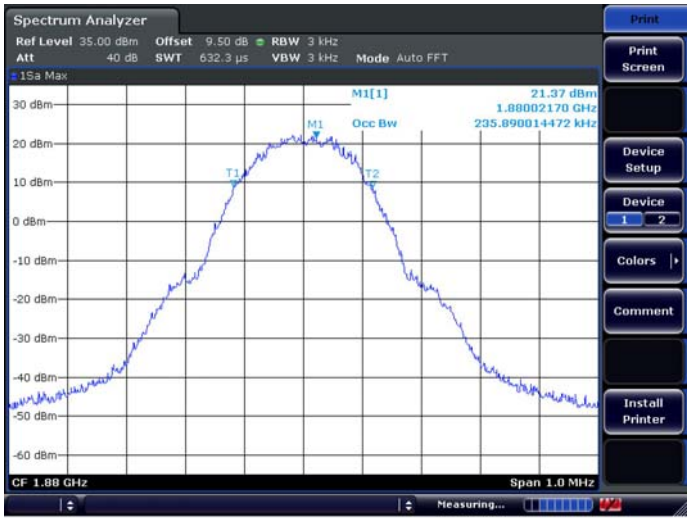
GSM850 99 % Bandwidth Ch. 251



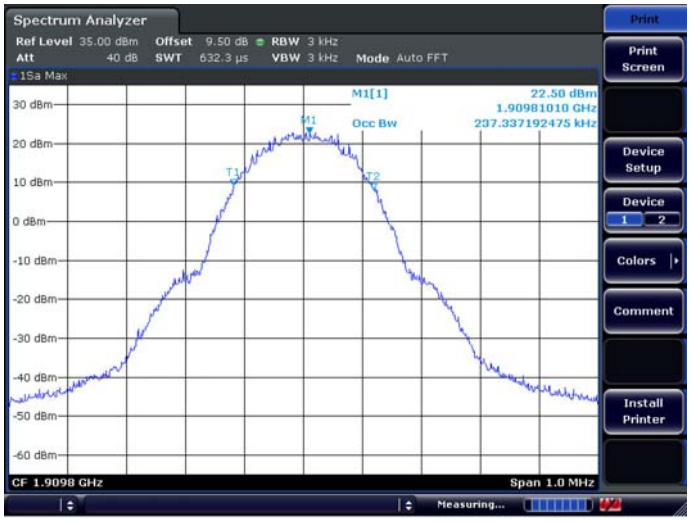
PCS1900 99 % Bandwidth Ch. 512



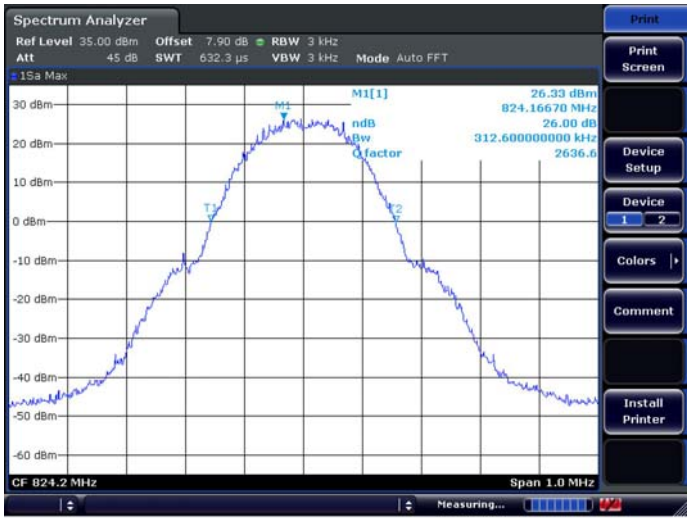
PCS1900 99 % Bandwidth Ch. 661



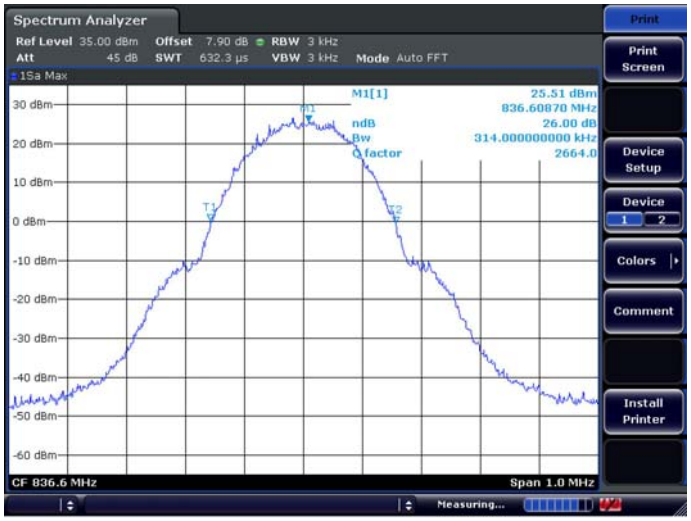
PCS1900 99 % Bandwidth Ch. 810



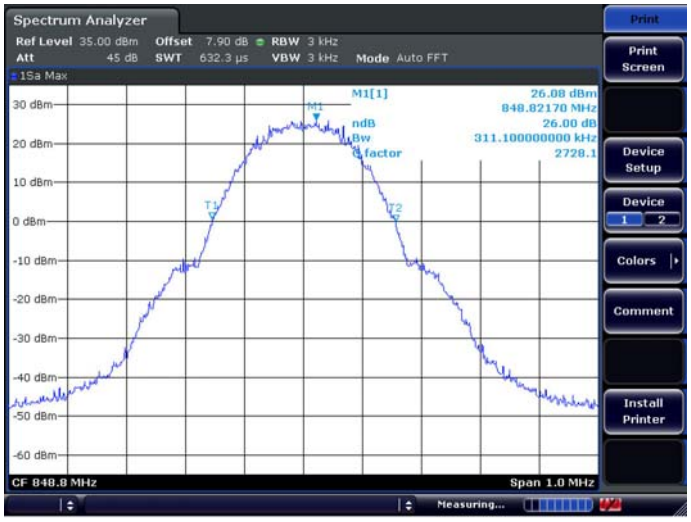
GSM850 -26dBc Bandwidth Ch. 128



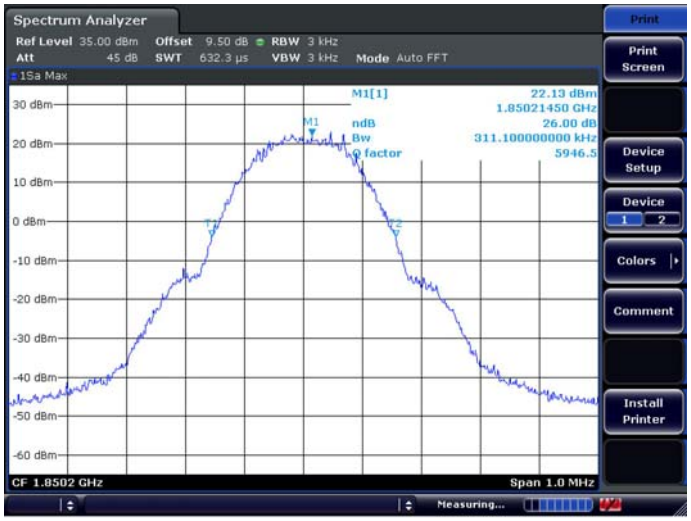
GSM850 -26dBc Bandwidth Ch. 190



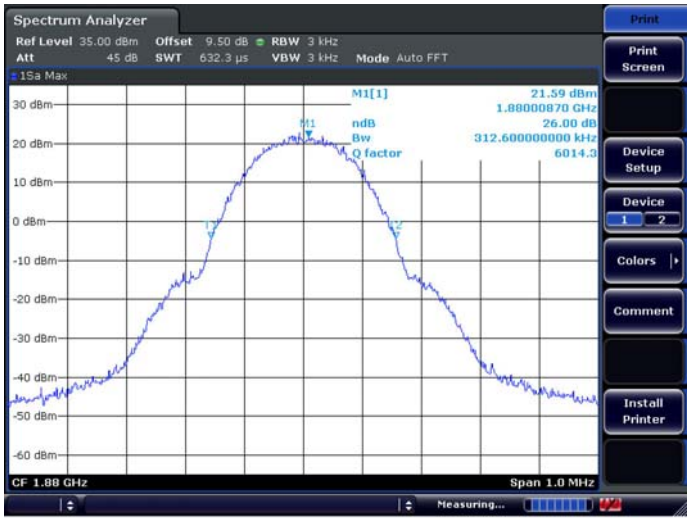
GSM850 -26dBc Bandwidth Ch. 251



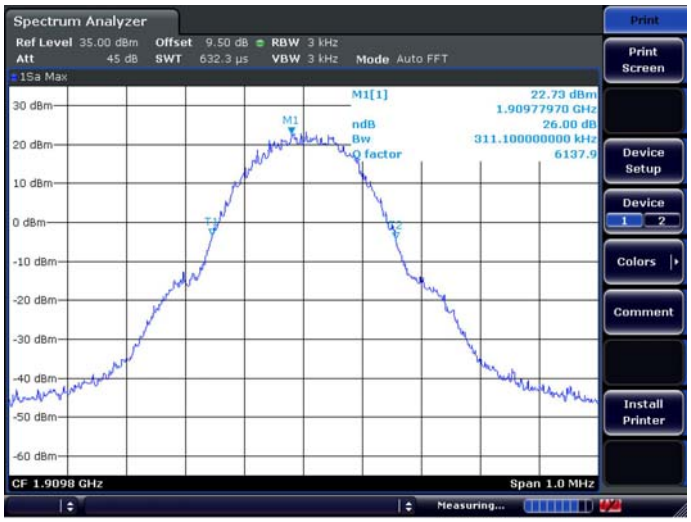
PCS1900 -26dBc Bandwidth Ch. 512



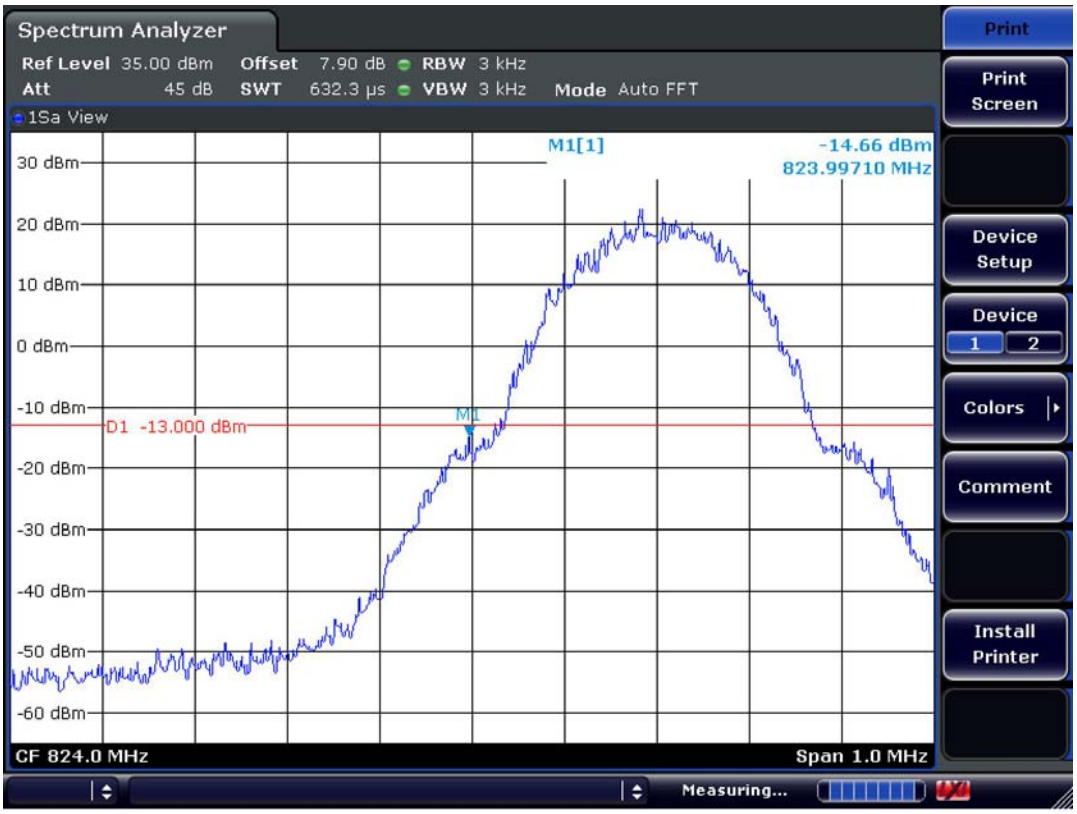
PCS1900 -26dBc Bandwidth Ch. 661



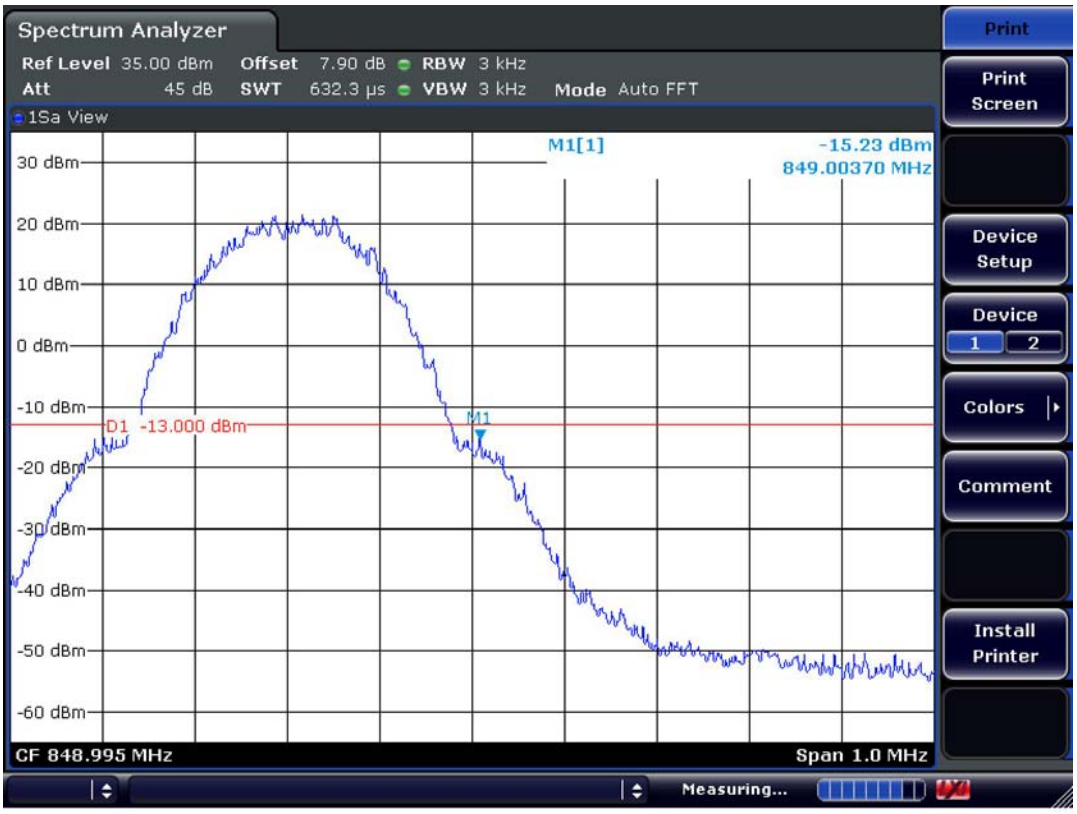
PCS1900 -26dBc Bandwidth Ch. 810



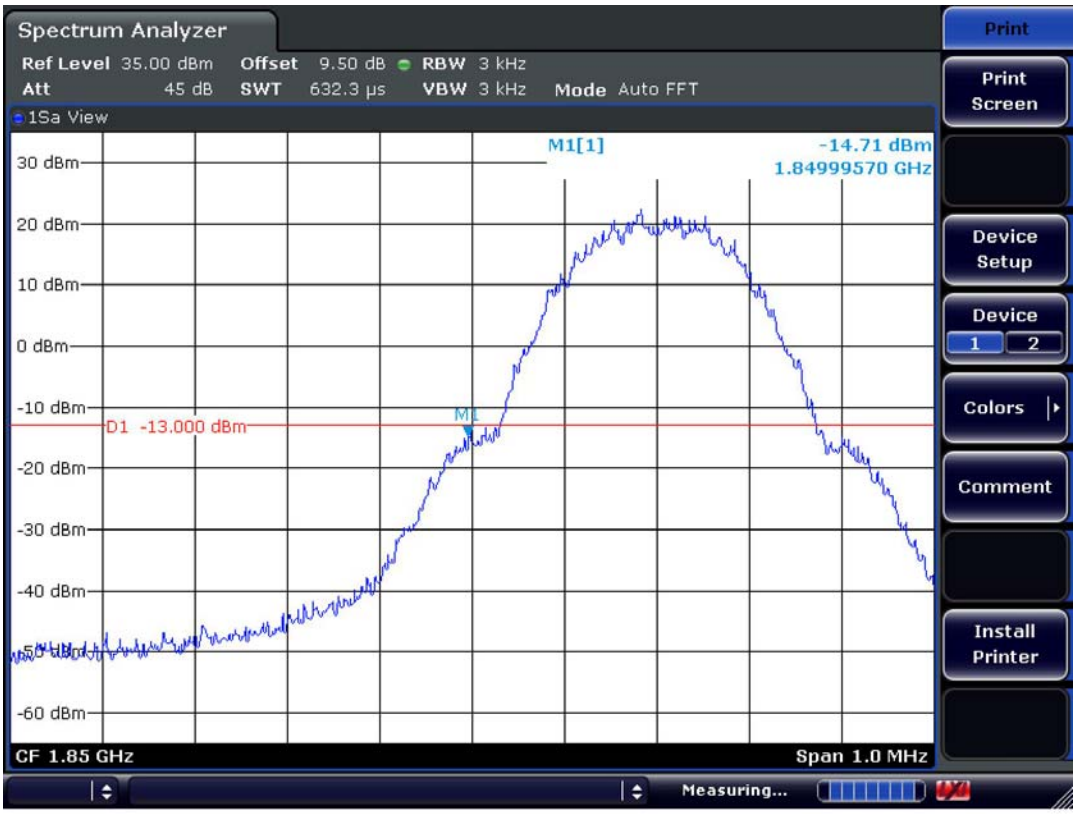
GSM850 Band Edge Ch. 128



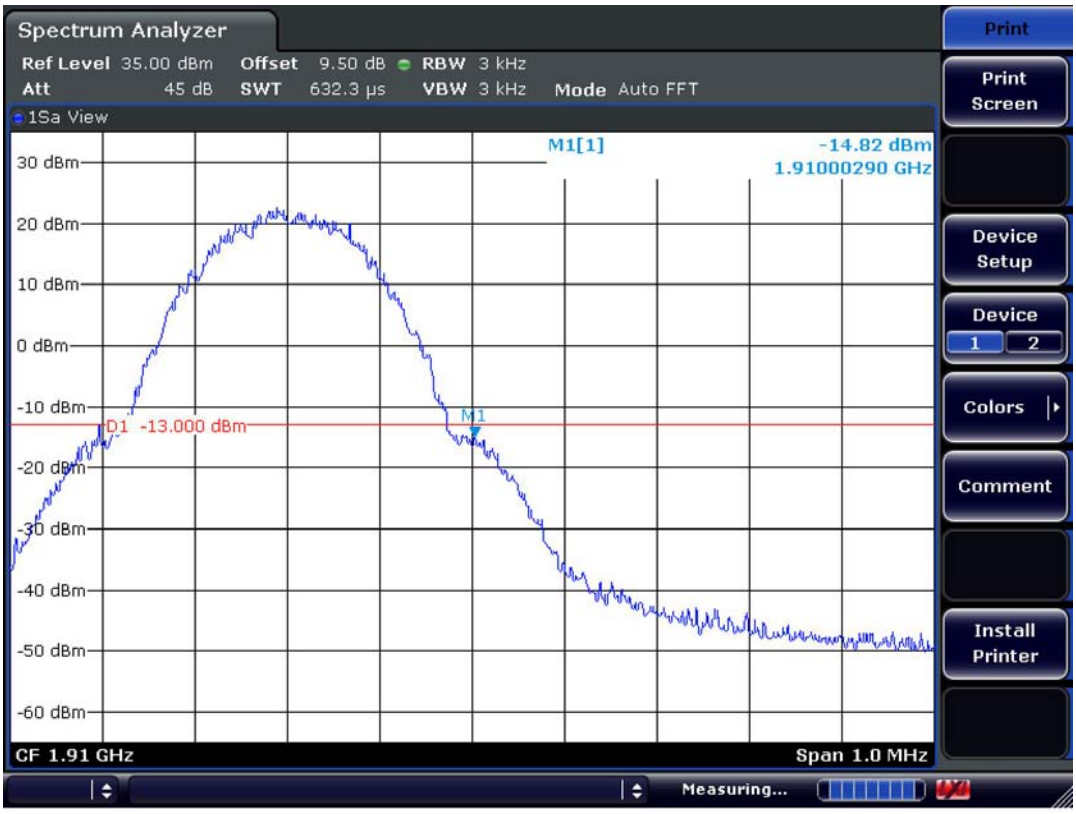
GSM850 Band Edge Ch. 251



PCS1900 Band Edge Ch. 512



PCS1900 Band Edge Ch. 810

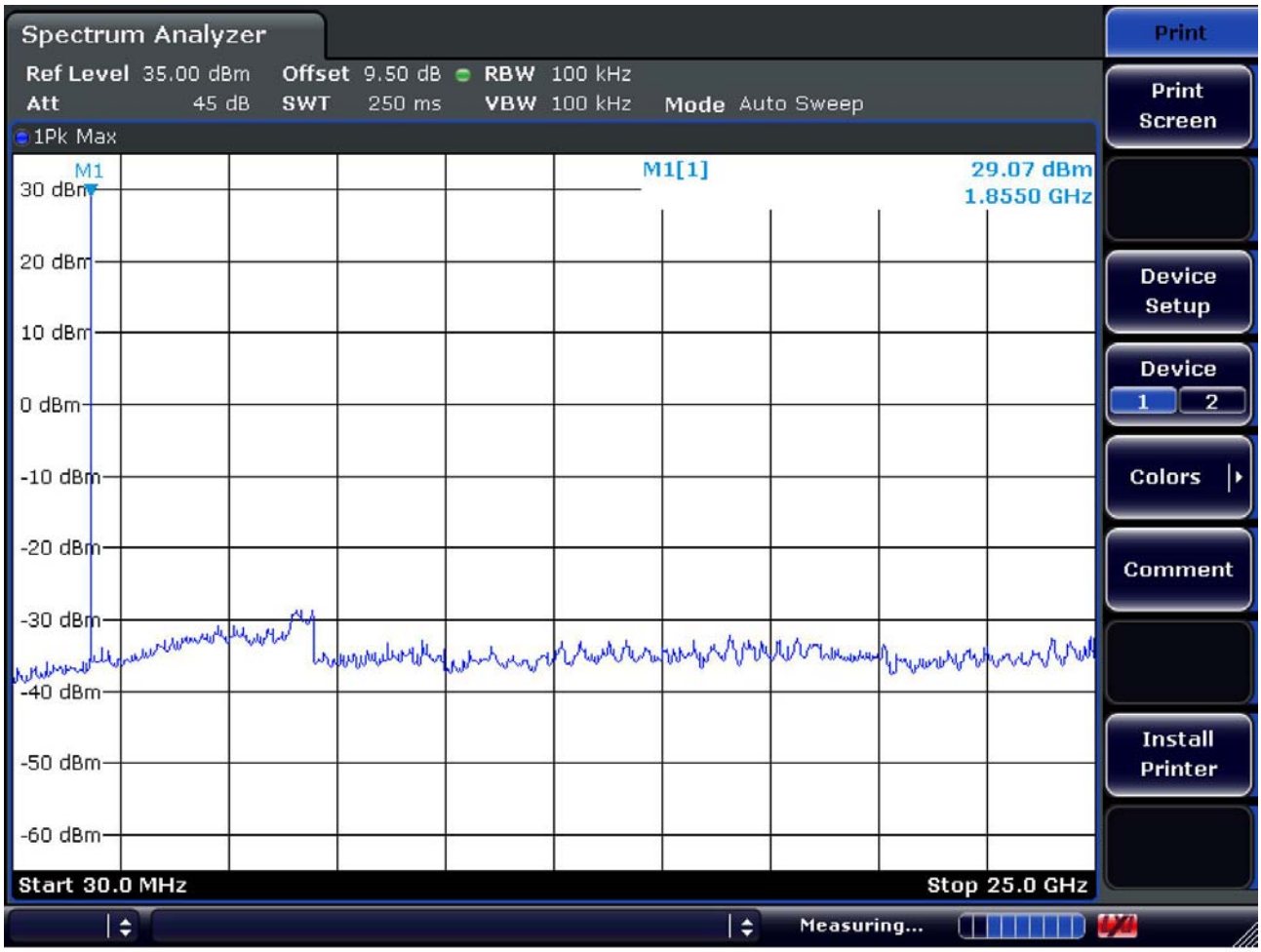


GSM850 Spurious Emissions at Antenna Terminal / Ch.128

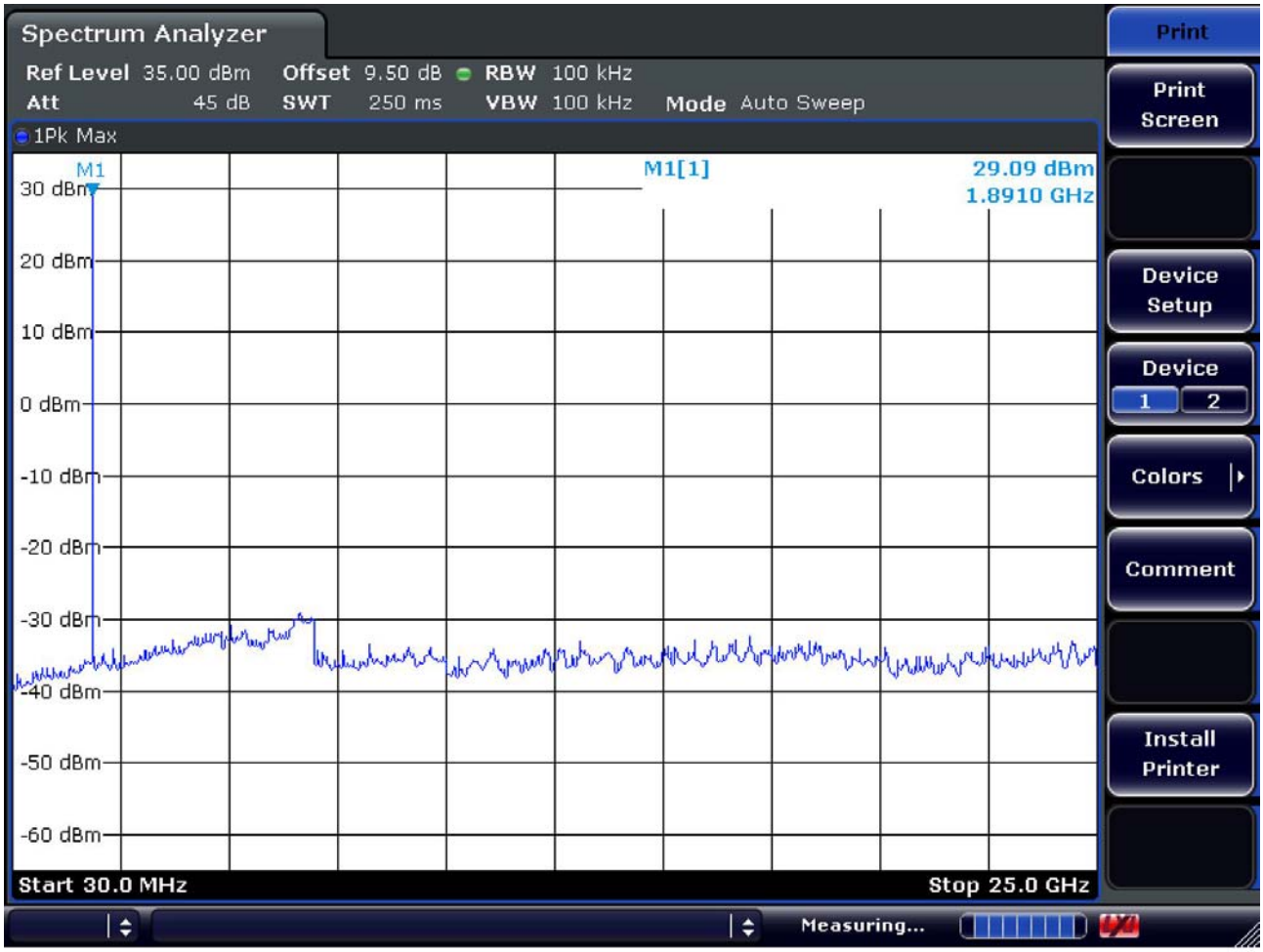
GSM850 Spurious Emissions at Antenna Terminal / Ch.190

GSM850 Spurious Emissions at Antenna Terminal / Ch.251

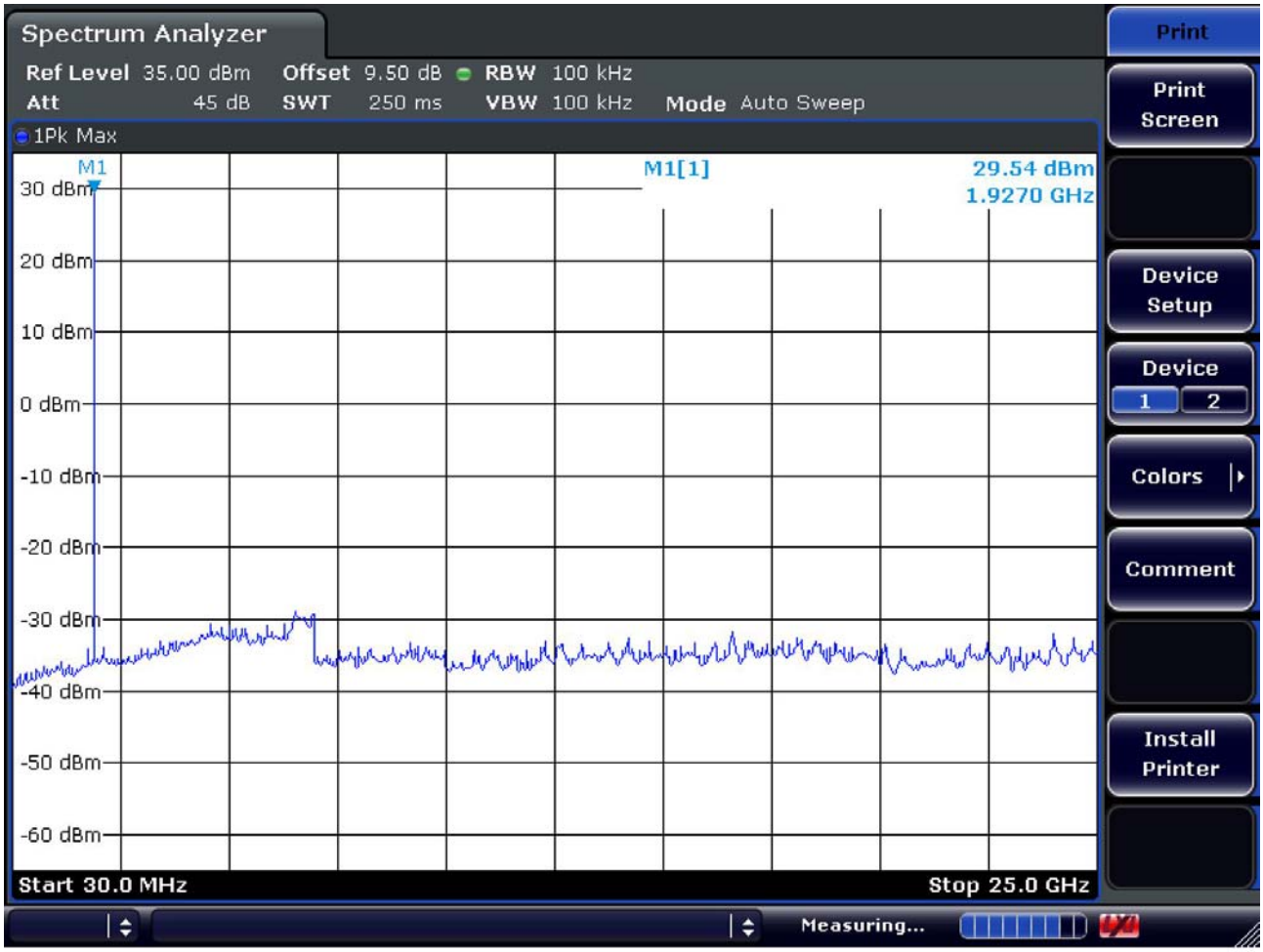
PCS1900 Spurious Emissions at Antenna Terminal / Ch.512



PCS1900 Spurious Emissions at Antenna Terminal / Ch.661



PCS1900 Spurious Emissions at Antenna Terminal / Ch.810



APPENDIX 1

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-11
2	Spectrum Analyzer	8563E	3425A02505	HP	Mar-11
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-10
4	Signal Generator	8648C	3623A02597	HP	Mar-11
5	Signal Generator	83711B	US34490456	HP	Mar-11
6	Attenuator (3dB)	8491A	37822	HP	Oct-10
7	Attenuator (10dB)	8491A	63196	HP	Oct-10
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-10
9	EMI Test Receiver	ESVD	843748/001	R&S	Mar-11
10	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-10
11	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-10
12	RF Amplifier	8447D	2949A02670	HP	Oct-10
13	RF Amplifier	8449B	3008A02126	HP	Mar-11
14	Test Receiver	ESHS10	828404/009	R&S	Mar-11
15	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
16	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
17	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
18	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
19	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-11
20	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-10
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-10
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-10
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-10
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Mar-11
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-10
28	DC Power Supply	6622A	3448A03079	HP	Oct-10
29	Frequency Counter	5342A	2826A12411	HP	Mar-11
30	Power Meter	EPM-441A	GB32481702	HP	Mar-11
31	Power Sensor	8481A	2702A64048	HP	Mar-11
32	Audio Analyzer	8903B	3729A18901	HP	Oct-10
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-10
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-10
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Mar-11