Transmitter Certification
Test Report

FCC ID: NWJ22A001A

FCC Rule Part: CFR 47 Part 24 Subpart E

ACS Report Number: 04-0261-24E

Manufacturer: MATSUSHITA MOBILE COMMUNICATIONS DEVELOPMENT CORPORATION

Equipment Type: Broadband PCS Handheld Phone
Model: X700 and X701

Test Begin Date: August 10, 2004
Test End Date: August 10, 2004

Report Issue Date: August 17, 2004

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This report contains 18 pages

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1.0 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with the following rule parts:

- Emission Limitations (At antenna terminal only)
  - FCC Part 2.1051
  - FCC Part 24.238
- Occupied Bandwidth
  - FCC Part 2.1049
- Frequency Stability
  - FCC Part 2.1055
  - FCC Part 24.235
- Peak Output Power
  - FCC Part 2.1046
  - FCC Part 24.232

1.2 Product Description

The Matsushita Mobile Communications Development Corporation X700 and X701 are portable GSM Broadband PCS handsets.

2.0 LOCATION OF TEST FACILTY

All testing was performed by qualified ACS personnel located at the following address:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

Both sites have been fully described and submitted to, and accepted by the FCC and Industry Canada. FCC registration number 89450 and Industry Canada Lab Code IC 4175 have been assigned in recognition of the sites

2.1 DESCRIPTION OF TEST FACILITY

Both the Open Area Test Site(OATS) and Conducted Emissions site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment.

The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 89450
Industry Canada Lab Code: IC 4175
VCCI Member Number: 1831
- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

NVLAP Lab Code: 200612

2.1.1 Open Area Test Site

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane, however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.1.1-1 below:

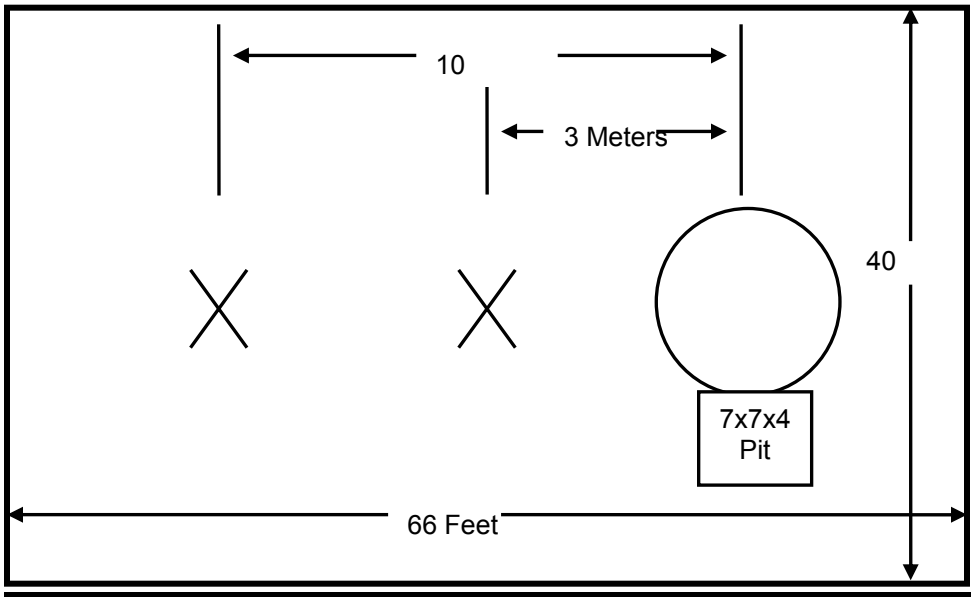

Figure 2.1.1-1: Open Area Test Site

2.1.2 Conducted Emissions Test Site Description

The AC mains conducted EMI site is a shielded room with the following dimensions:

- Height: 3.0 Meters
- Width: 3.6 Meters
- Length: 4.9 Meters

The room is manufactured by Rayproof Corporation and installed by Panashield, Inc. Earth ground is provided to the room via an 8' copper ground rod. Each panel of the room is connected electrically at intervals of 4".

Power to the room is filtered to prevent ambient noise from coupling to the EUT and measurement equipment. Filters are models 1B42-60P manufactured by Rayproof Corporation.

The room is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 2.1.2-1:

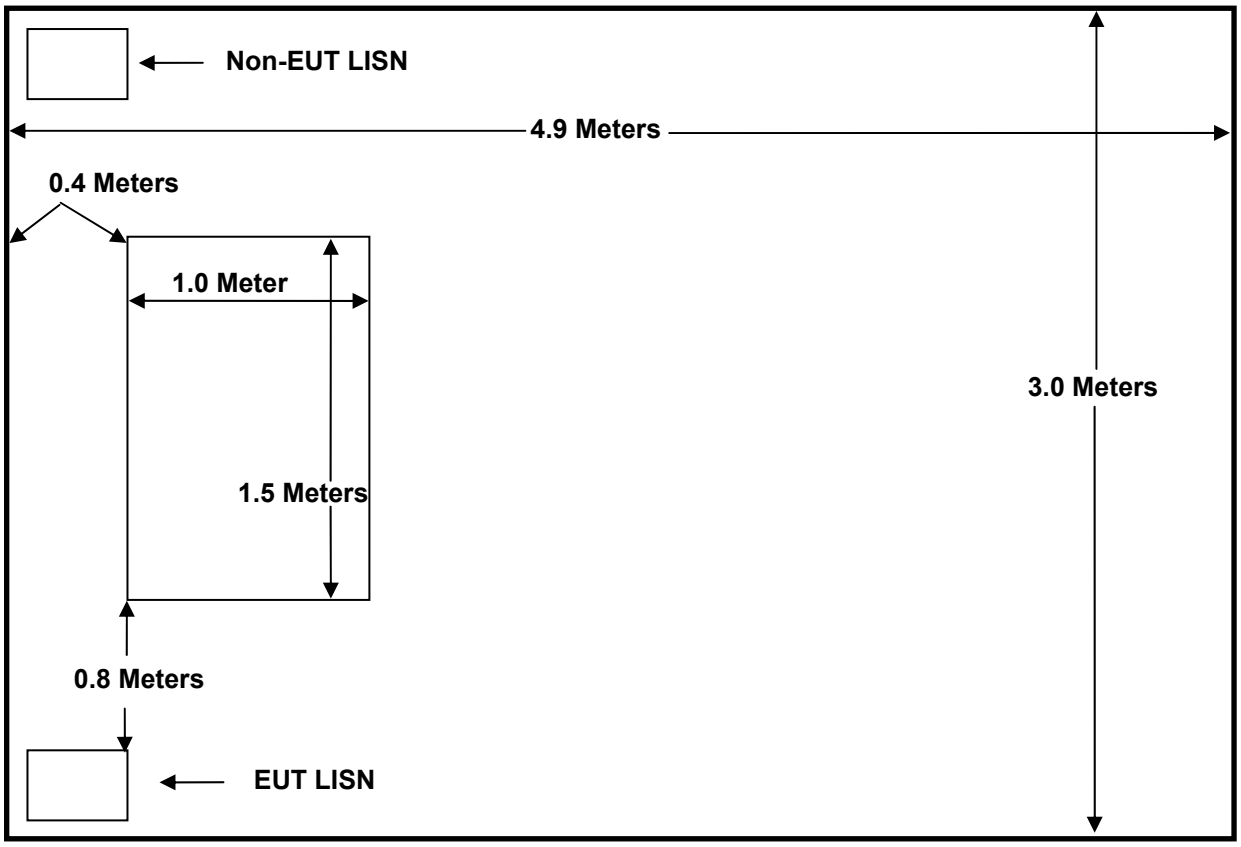

Figure 2.1.2-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-1992: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures (October 2003)
- US Code of Federal Regulations (CFR): Title 47, Part 24, Subpart E: Broadband Personal Communication Service (October 2003)

4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturer's specifications.

Table 4-1: Test Equipment

Equipment Calibration Information					
ACS #	**Mfg.**	**Eq. type**	**Model**	**S/N**	**Cal. Due**
---	Agilent	Spectrum Analyzer	E7402A	US40240259	02/26/05
26	Chase	Bi-Log Antenna	CBL6111	1044	10/14/04
152	EMCO	LISN	3825/2	9111-1905	01/08/05
153	EMCO	LISN	3825/2	9411-2268	12/11/04
193	ACS	OATS Cable Set	RG8	193	01/09/05
167	ACS	Conducted EMI Cable Set	RG8	167	01/09/05
5	Harbour Industries	Cable	LL-335	None	08/20/04
6	Harbour Industries	Cable	LL-335	None	08/06/04
22	Agilent	Pre-Amplifier	8449B	3008A00526	09/18/04
73	Agilent	Pre-Amplifier	8447D	272A05624	04/30/05
---	Gigatronics	Power Meter	5651A	8650863	3/15/05
---	Gigatronics	Power Sensor	80601A	1830502	3/15/05
1	Rohde & Schwarz	Receiver	804.8932.52	833771/007	02/26/05
2	Rohde & Schwarz	Receiver	1032.5640.53	839587/003	02/26/05
3	Rohde & Schwarz	ESMI Receiver	804.8932.52	839379/011	*
4	Rohde & Schwarz	ESMI Receiver	1032.5640.53	833827/003	*
213	Test Equipment Corp.	Pre-Amplifier	PA-102	44927	06/28/05
211	Eagle	Band Reject Filter	C7RFM3NFNM	n/a	06/28/05
168	Hewlett Packard	Pulse Limiter	11947A	3107A02268	04/30/05
93	Chase	EM Clamp	CIC 8101	65	01/12/05
184	ACS	Cable	RG8	184	01/09/05
169	Solar Electronics	LISN	9117-5-TS-50-N	031032	04/12/05
6	n/a	HF RF Cable	n/a	00006	03/15/05
7	n/a	HF RF Cable	n/a	00007	03/15/05
208	n/a	HF RF Cable	n/a	00208	06/14/05
---	Rohde & Schwarz	Base Station Simulator	CMU 200	100930	03/08/05

5.0 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Diagram #	Manufacturer	Equipment Type	Model Number	Serial Number	FCC ID
1	Matsushita Mobile Communications Development Corporation	EUT	X700/X701	None	SDBMATSUSHITA MOBILE COMMUNICATIONS DEVELOPMENT CORPORATIONX700
2	Matsushita Mobile Communications Development Corporation	Test Fixture	---	---	----
3	Hewlett Packard	DC Power Supply	PS73C	36095	None
4	Rohde & Schwarz	Spectrum Analyzer	ESMI	78-TFN16 96/12	839587/003
5	Rohde & Schwarz	Base Station Simulator	CMU 200	100930	None
6	Gigatronics	Power Meter	5651A	8650863	None
7	Gigatronics	Power Sensor	80601A	1830502	None

6.0 EQUIPMENT UNDER TEST SETUP AND BLOCK DIAGRAM

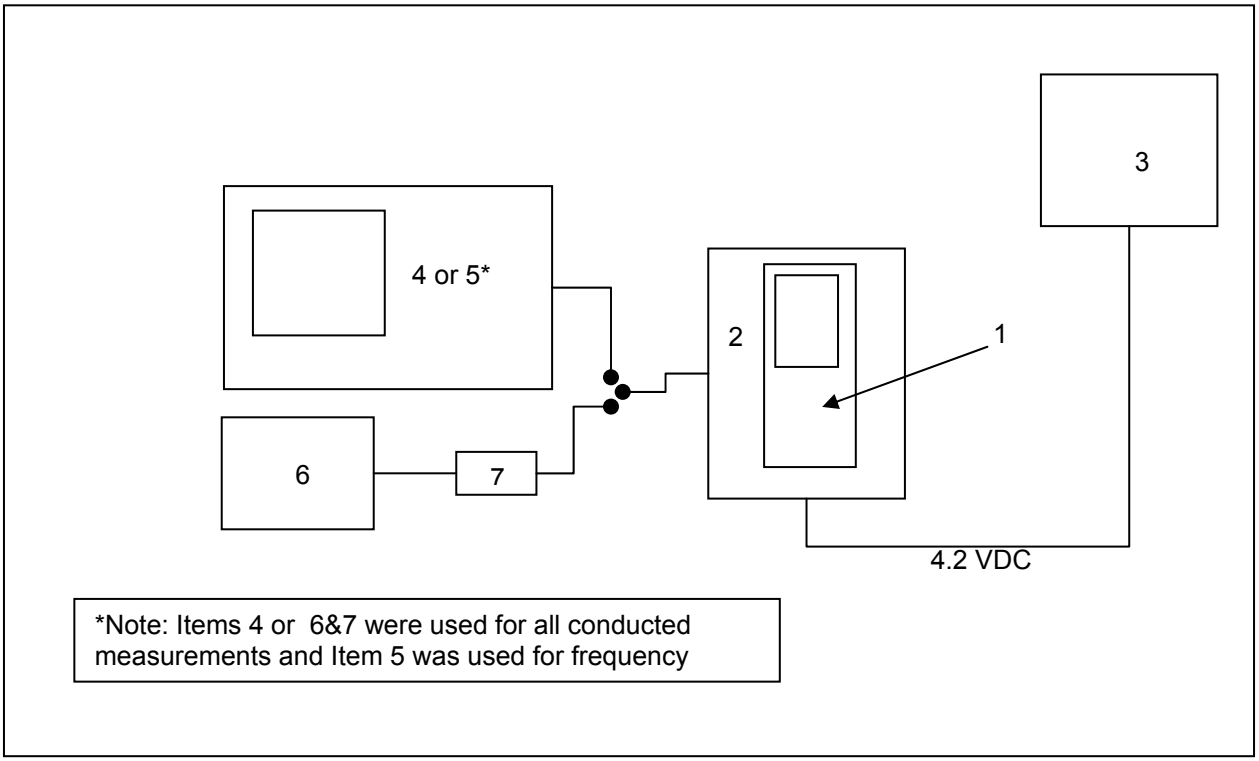

Figure 6.0-1: EUT Test Setup

The EUT was powered by an external DC power supply as shown above. An RF connector was provided through a test fixture for making conducted measurements and was created for this purpose. The attenuation of the cable assembly and test fixture was factored out during the test.

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Frequency Stability

7.1.1 Measurement Procedure

The EUT was setup in an environmental chamber as shown in figure 6.0-1 using the CMU 200 base station simulator instead of the spectrum analyzer. The RF output is directly coupled to the input of the measurement equipment and a power supply is attached to the primary supply voltage.

The base station simulator initiated a call to the EUT and made a measurement of the frequency deviation.

Frequency measurements were made at the extremes of the of temperature range -30º C to +50º C and at intervals of 10º C at normal supply voltage. A period of time sufficient to stabilize all components of the equipment was allowed at each frequency measurement.

At a temperature 20º C the supply voltage was varied from 85% to 115% from the normal. The maximum variation of frequency was recorded.

Results of the test are shown below in Tables 7.1.2-1 through 7.1.2-4 for high, mid and low channels.

7.1.2 Measurement Results

Table 7.1.2-1: Frequency Stability – Low Channel

Assigned Carrier Frequency (MHz)	Temperature (C)	Frequency Deviation (Hz)
1850.2	-30	27
	-20	16
	-10	7
	0	-4
	10	-14
	20	-6
	30	-21
	40	-12
	50	0

Table 7.1.2-2: Frequency Stability – Middle Channel

Assigned Carrier Frequency (MHz)	Temperature (C)	Frequency Deviation (Hz)
1889.2	-30	11
	-20	-8
	-10	7
	0	-5
	10	1
	20	12
	30	14
	40	-16
	50	-8

Table 7.1.2-3: Frequency Stability – High Channel

Assigned Carrier Frequency (MHz)	Temperature (C)	Frequency Deviation (Hz)
1909.8	-30	-14
	-20	-9
	-10	-7
	0	-5
	10	17
	20	-12
	30	15
	40	5
	50	-20

Table 7.1.2-4: Frequency Stability - Voltage

Battery Endpoint Voltage (VDC)	Frequency Deviation (Hz)
Low Channel	
3.17	-7
4.2	11
Middle Channel	
3.17	12
4.2	14
High Channel	
3.17	16
4.2	8

7.2 Spurious Emissions at Antenna Terminals

7.2.1 Measurement Procedure

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a test fixture. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator losses. The spectrum was investigated in accordance to CFR 47 Part 2.1055.

7.2.2 Measurement Results

The magnitude of all spurious emissions were attenuated more than 20 dB below the permissible value and therefore not specified in this report. Worst case emission plots are supplied in Figure 7.2.2-1 through 7.2.2.4.

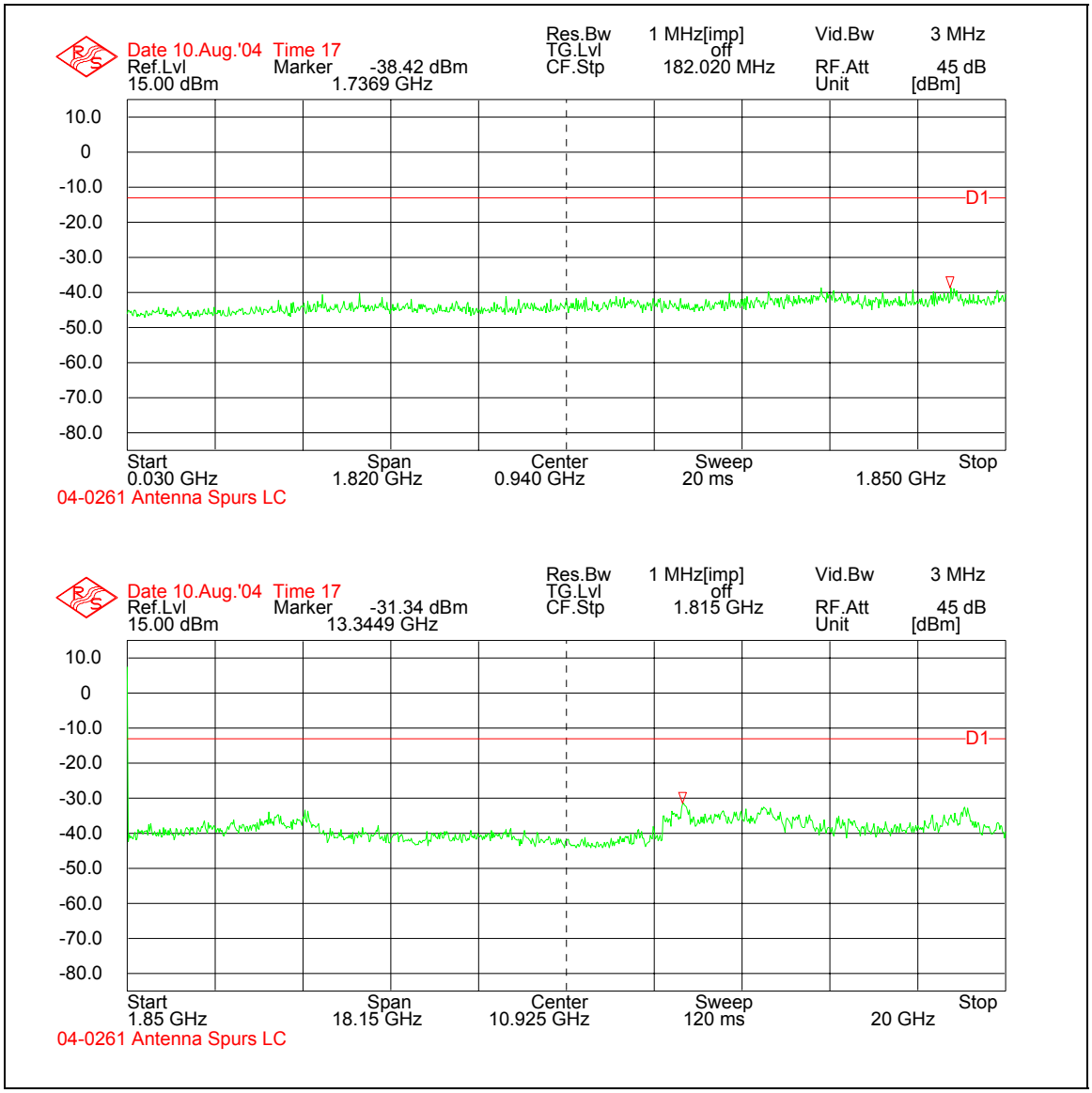

Figure 7.2.2-1: Low Channel

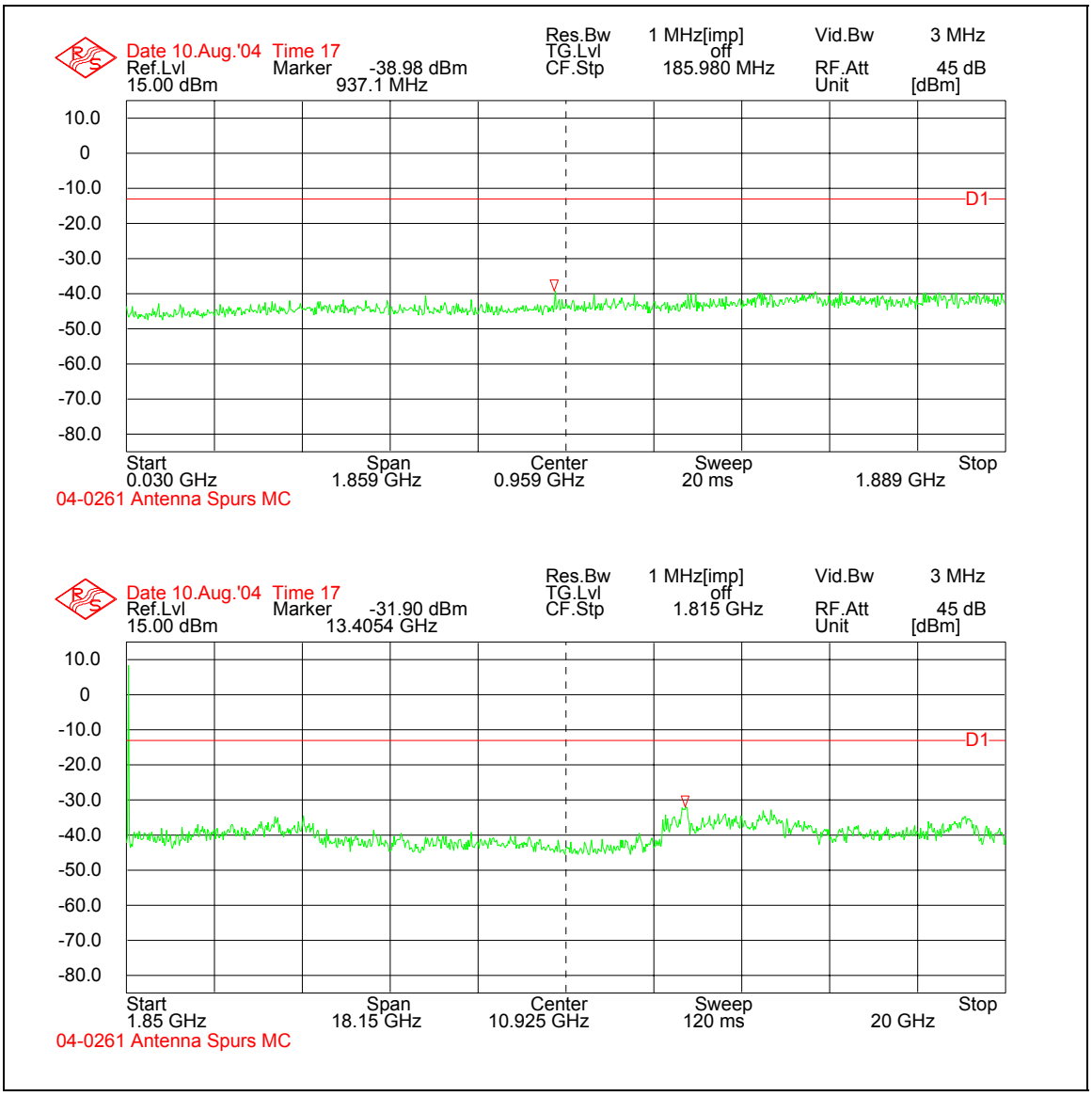

Figure 7.2.2-2: Middle Channel

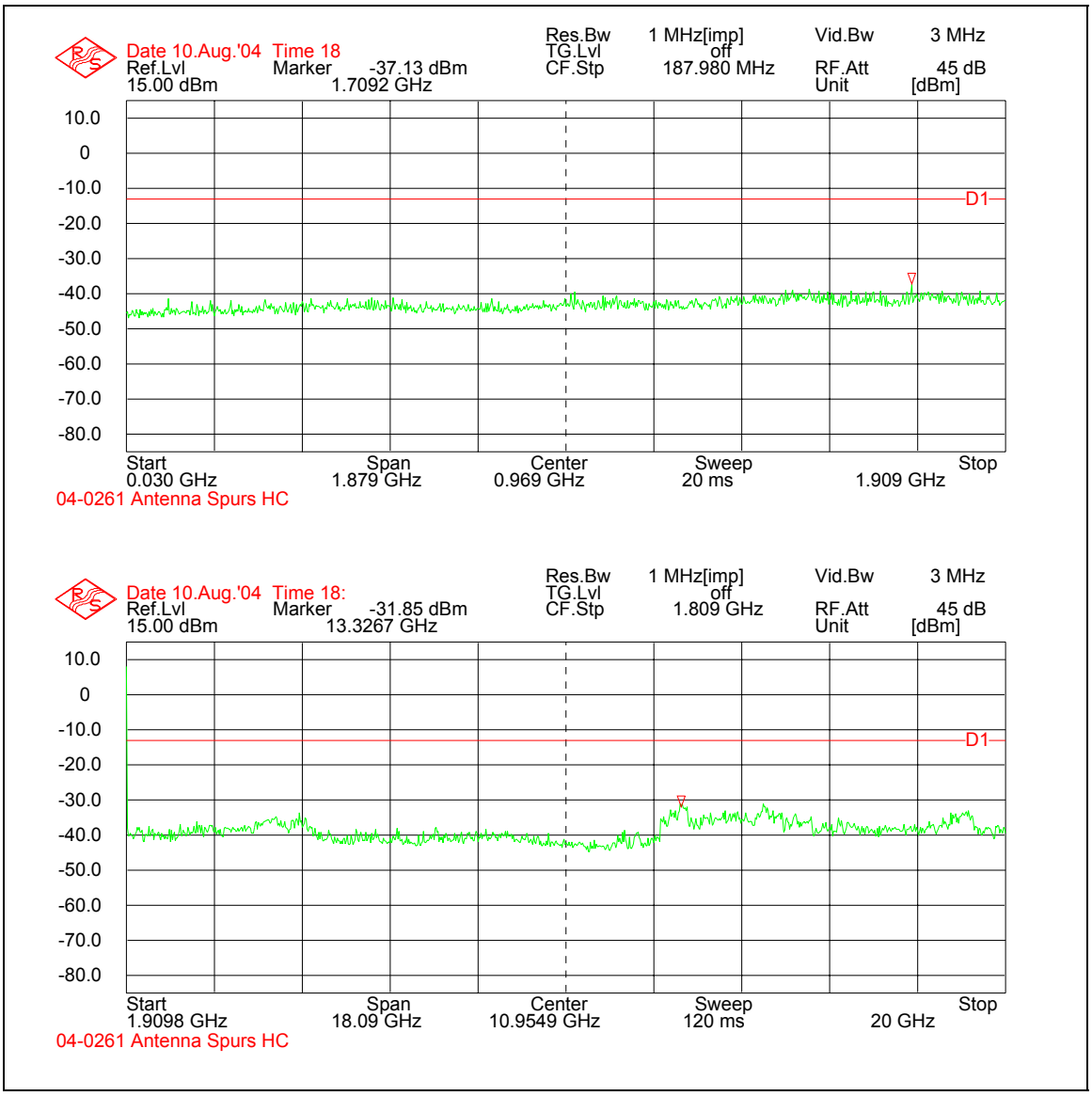

Figure 7.2.2-3: High Channel

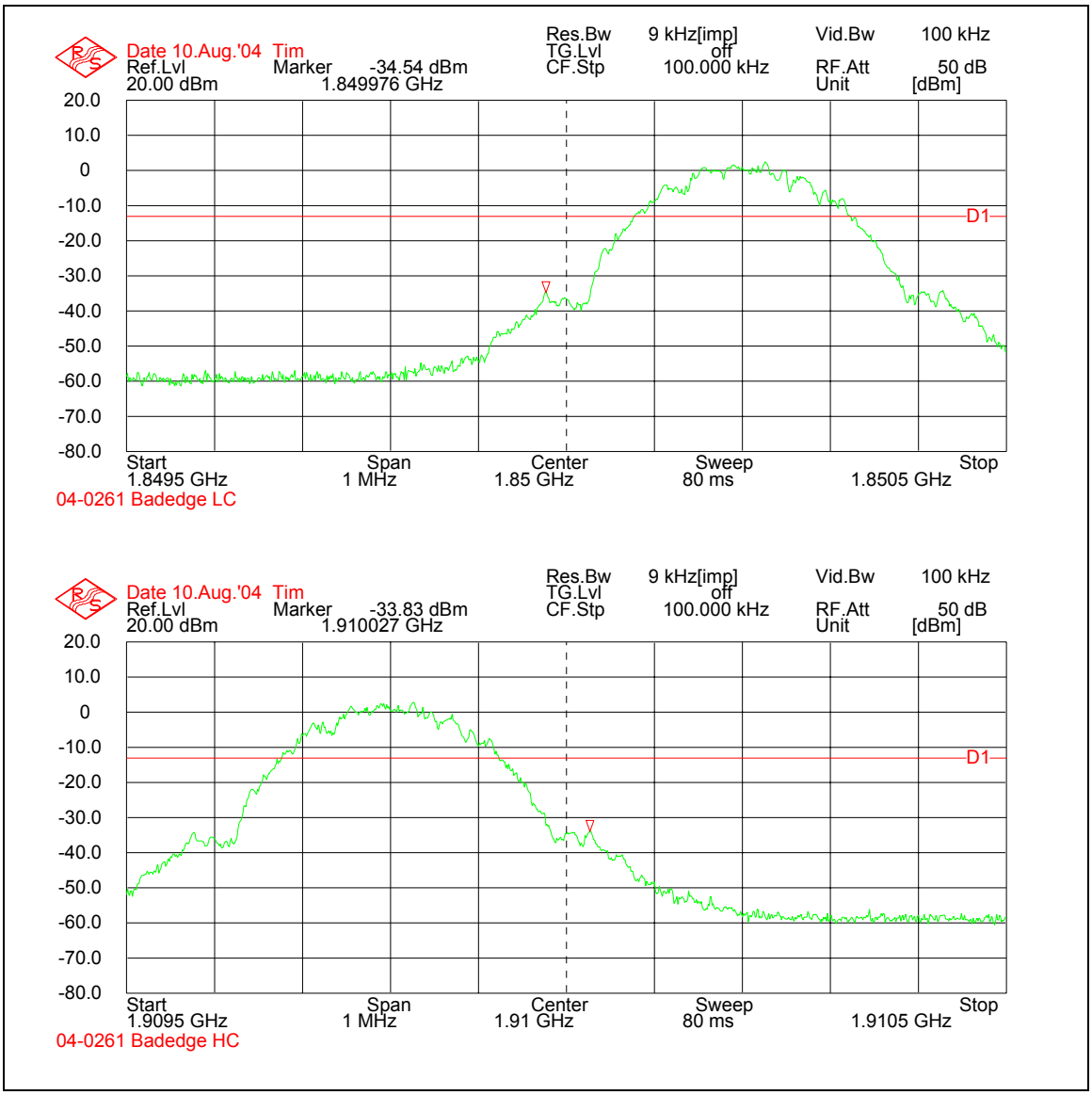

Figure 7.2.2-4: Bandedges

7.3 Occupied Bandwidth

7.3.1 Measurement Procedure

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a test fixture. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator losses.

Both 26dB and 99% Occupied Bandwidth were measured.

7.3.2 Measurement Results

Plots of both the 26dB and 99% occupied bandwidth are shown below in figures 7.3.2-1 through 7.3.2-6.

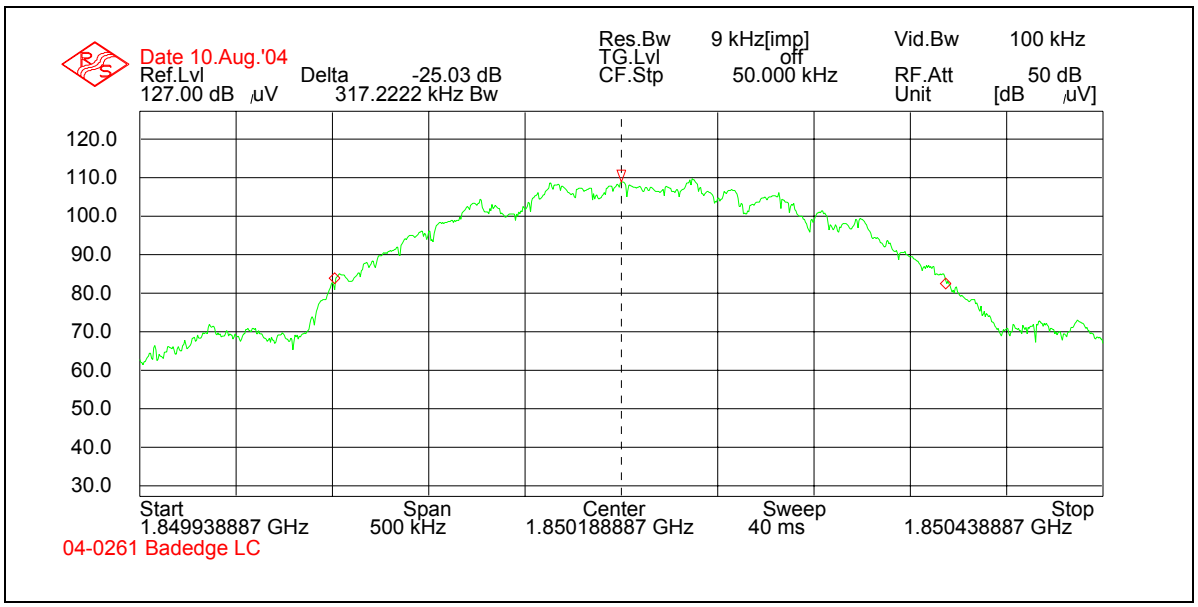

Figure 7.3.2-1: 26dB Bandwidth – Low Channel

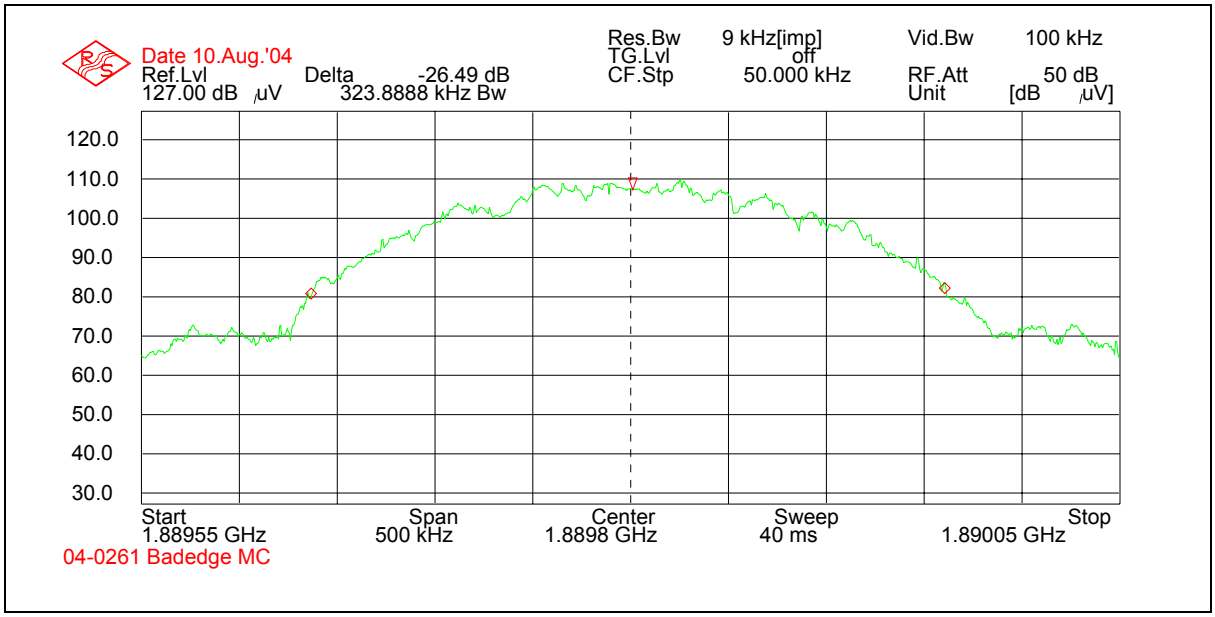

Figure 7.3.2-2: 26dB Bandwidth – Middle Channel

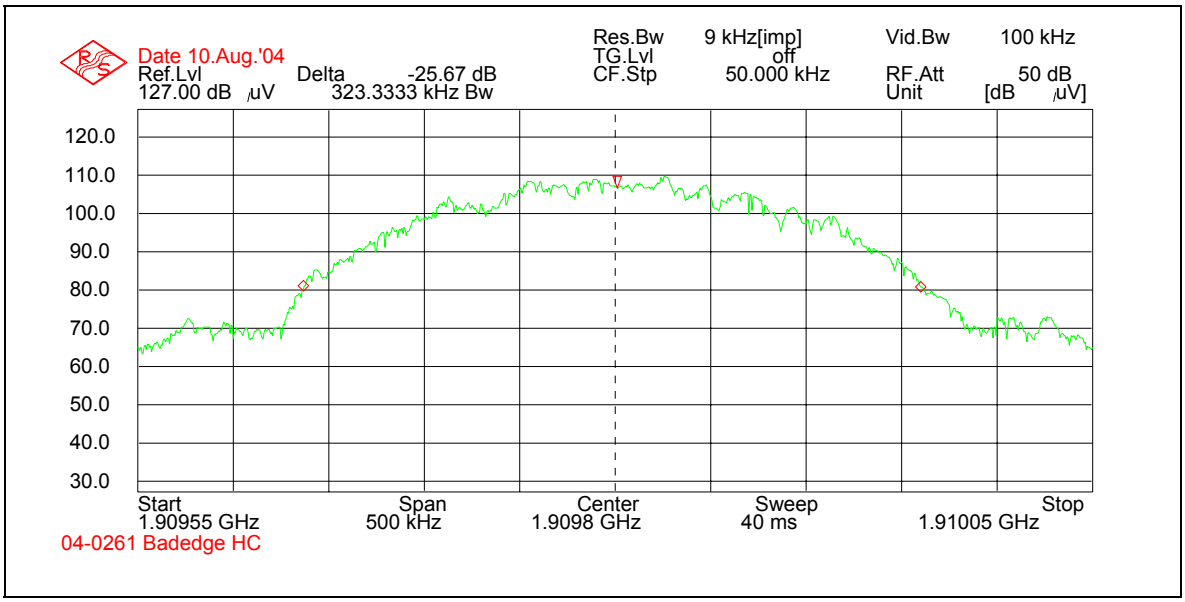

Figure 7.3.2-3: 26dB Bandwidth – High Channel

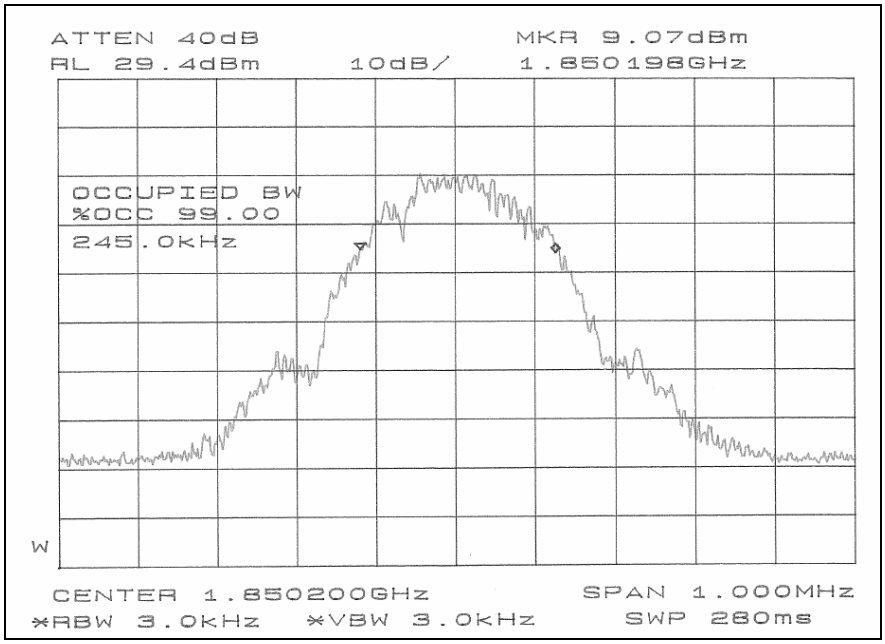

Figure 7.3.2-4: 99% Bandwidth – Low Channel

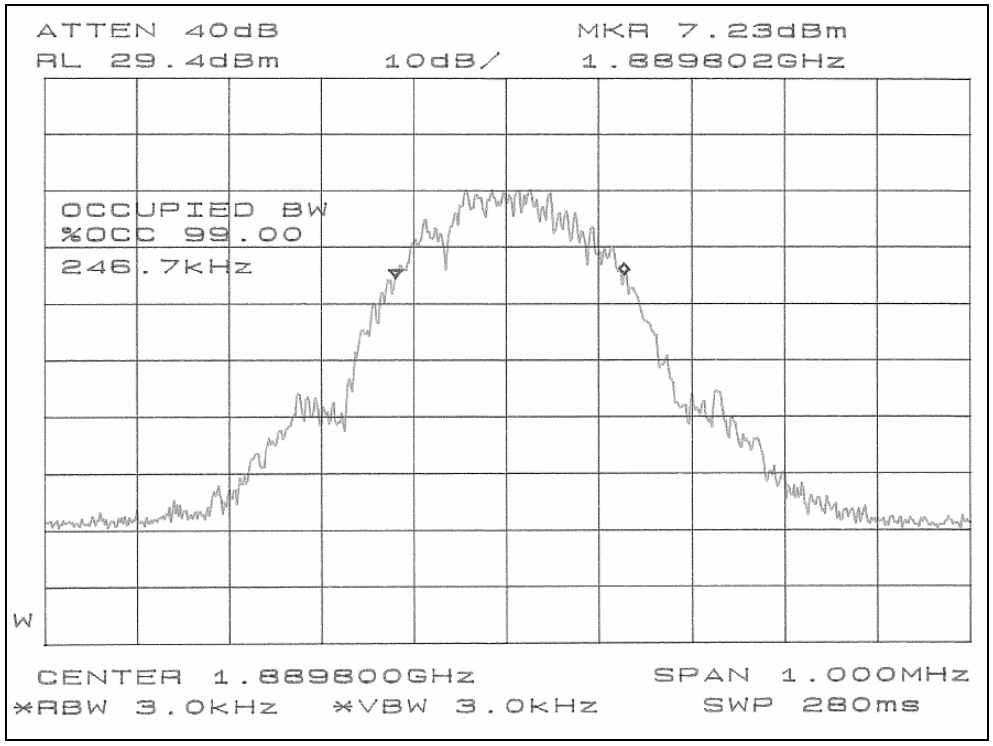

Figure 7.3.2-5: 99% Bandwidth – Middle Channel

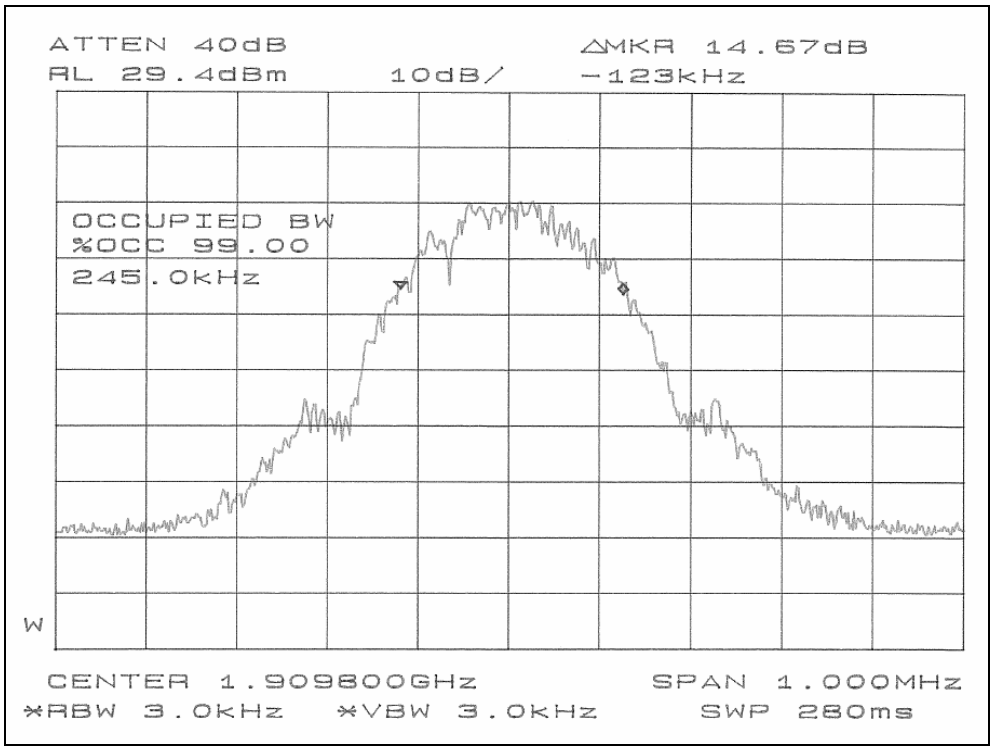

Figure 7.3.2-6: 99% Bandwidth – Middle Channel

7.4 Peak Output Power

7.4.1 Measurement Procedure

The EUT was setup as shown in figure 6.0-1 using the power meter and power sensor for making the measurements. The RF output of the equipment under test was directly connected to the input of the power sensor/meter. Power measurements were made at room temperature as well as the battery endpoints.

7.4.2 Measurement Results

Table 7.4.2-1 and 7.4.2-2 below gives the results of the power measurements as described above.

Table 7.4.2-1

Channel	Frequency (MHz)	Result (dBm)
1	1850.2	29.12
2	1889.2	29.32
3	1909.8	29.37

Channel	Frequency (MHz)	Battery Level (Vdc)	Result (dBm)
1	1850.2	3.31	29.21
		4.20	29.20
2	1889.2	3.31	29.35
		4.20	29.40
3	1909.8	3.31	29.36
		4.20	29.35

8.0 Conclusion

The EUT was found to comply with the requirements as specified in section 1.1.