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Report On

Specific Absorption Rate Testing of the
Panorama Antenna Type CM-7-60-NJ.

Document 75923312 Report 01 Issue 1

August 2013



Product Service

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SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the
Panorama Antenna Type CM-7-60-NJ



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate Testing of the Panorama Antenna Type CM-7-60-NJ to the requirements of CENELEC EN 50385: 2002, Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110MHz – 40GHz) – General Public.

Objective	To perform Specific Absorption Rate Testing to determine the Equipment Under Test's (EUT's) 'Touch Safe' input power.
Applicant	Panorama Antennas Limited
Manufacturer	Panorama Antennas Limited
Manufacturing Description	Antenna
Model Number	Type CM-7-60-NJ
Frequency Band	791-862MHz 880-960MHz 1710-1880MHz 1920-2170MHz 2500-2690MHz
Antenna Serial Number(s)	5019738308468
Test Specification/Issue/Date	EN 50385: 2002
Start of Test	12 July 2013
Finish of Test	25 July 2013
Related Document(s)	1999/519/EC EN50383:2002 EN62209-2:2010
Name of Engineer(s)	Michael Mawby Nigel Grigsby



1.2 BRIEF SUMMARY OF RESULTS

The Antenna described within this report has been subjected to a number of SAR measurements. The purpose of these measurements was to obtain the maximum input power allowed to be applied to the antenna to obtain the General Public 'Touch-Safe' SAR level of 2W/kg for the selected operating band

The measurements shown in this report were made in accordance with the procedures specified EN 50383:2002; modified; see section 1.4 of this report.

All reported testing was carried out on a sample of equipment to demonstrate compliance with EN 50385:2002. The sample tested was found to comply with the requirements in the applied rules. Using SAR measurements made close to the antenna, it has been determined that the compliance input power level required for meeting the basic restriction of 2W/kg should not exceed those listed below:

MAXIMUM INPUT POWER FOR SINGLE BAND TRANSMISSION		
Antenna Model Number	Band (MHz)	Max Input Power for 'Touch Safe' Criteria. (mW)
		General Public
Panorama Antenna CM-7-60-NJ	791-862	3161
	880-960	1819
	1710-1880	1639
	1920-2170	1213
	2500-2690	1019

NOTE: – [Maximum input power corrected using SAR 10g corrected as recommended in EN50383:2002 Clause 7.2.3.3 – 7.]



1.3 TEST RESULTS SUMMARY

1.3.1 Technical Description

The equipment under test (EUT) was a Panorama Antenna Type CM-7-60-NJ. A full technical description can be found in the manufacturer's documentation.

1.3.2 Test Configuration and Modes of Operation

The antenna was subjected to a number of Specific Absorption Rate (SAR) measurements. The purpose of these measurements was to obtain the maximum input power to obtain the General public 'Touch Safe' level for the antenna for the selected operating band.

Prior to SAR testing the antenna was connected Network Analyser and the VSWR was measured across the required frequency range. A specific frequency for maximum power transfer was noted for SAR testing within each frequency band. The antenna was then connected to a 250mW CW source at the appropriate frequency, and using a spectrum analyser with an RF sensitive probe connected, the antenna module was swept over to ascertain the point of RF concentration.

The flat phantom was filled with head simulant liquid appropriate to each frequency band. The dielectric properties were measured and were in accordance with the requirements for the dielectric properties specified in EN62209-2:2010.

SAR testing was initially performed with the antenna connected to a 250mW or 1000mW CW source and placed against the base of a flat phantom. The SAR probe was positioned near to the inner side of the phantom. The E_{eff} (V/m) in the medium was monitored while the radome position was adjusted to give maximum E field value. This position was marked on the radome prior to SAR testing. An area scan was performed to establish the maximum energy location, once established then a zoom scan centred at the maximum energy location to determine volume averaged SAR level. Subsequent scans were performed with the antenna placed at an increasing distance of separation from the flat phantom.

The resultant values were plotted and a trend line applied using greater than 4th order polynomial curve fit. Analysis of the results was used to obtain the extrapolated 'Touch-Safe' distance. The results were then compared to a trend analysis and the greater 'Touch-Safe' distance was applied to establish that the exclusion zone does not extend beyond the external radome / shroud of the antenna.

Because of the linear scaling quality of SAR with power, and assuming that all 'feed points' are in the same location within the radome (worst case), the total input power limit can be made up from any percentage contribution of the proposed input signals. For example 50% of the 1800 maximum input limit + 50% of the 2100 maximum input limit = 100% of the maximum input limit. In line with current SAR measurement theory, the SAR at any specific measurement point will scale linearly with input power (if nothing else changes) and this is supported by the measurements made during this assessment. Consequently measured results can be used to infer the assessed SAR levels for different input powers in direct proportion to the level of the input power.



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1.4 DEVIATIONS FROM STANDARD

1.4.1 Summary of Deviations

The phantom used during the assessment of the SAR testing of the Antennas was a rectangular Perspex Box IndexSAR items IBX-020 and IBX-2HF. The Phantom dimensions were 410mm x 270mm x 200mm with a base thickness of 6.0mm and 245mm x 195mm x 200mm with a base thickness of 2.00mm. Other deviations from the standard were the separation distances used.